



# Oggcamp 2014

Les Pounder speaks to some of the people behind the many projects at the largest UK open source gathering.

## Ben Nuttall

Raspberry Pi Foundation: Education and Outreach



**Linux Format:** Is this your first Oggcamp and why did you come to Oggcamp?

**Ben Nuttall:** No, I have been to Oggcamp previously and really enjoy coming each

year – the community created by this event is diverse and interesting. Each time I come back I get to catch up with friends from around the world and discuss new ideas for projects in a social and welcoming atmosphere, and that's thanks to the great Oggcamp community.

**LXF:** Around Oggcamp we can see many different projects powered by Raspberry Pi. The Raspberry Pi Foundation has done well in the last two and a half years. What do you believe the success is based on?

**BN:** It's a combination of a lot of things. The Raspberry Pi is exciting to many different types of people, including those already hacking cool things in software. The Raspberry Pi enables those who are already competent with software to do something much more interesting with just a little bit more knowledge. It's not to do with making it easier for them, rather it's making it more accessible for them.



**LXF:** Accessibility seems to be an important aspect of the Raspberry Pi. In the past anyone interested in working with hardware would use a PIC controller or an Arduino, but with the Pi this is a little different?

**BN:** Yeah, a lot of people even to this day still



ask me "What is the difference between a Raspberry Pi and an Arduino?" or "What's the point of the Raspberry Pi if I already have an Arduino?" Arduino is a great platform to work with but if you want to work with them you need to write the code in C and then deploy the code to the Arduino. Further tinkering requires that you edit the code on your computer and then redeploy the code to the Arduino. The Raspberry Pi gives you a full desktop environment and a full Linux stack to work from. You can then choose what language you would like to work with. If you want to program in C you can, but you can also try out Python, Ruby and Scratch. Many of these languages can also program in the real world with physical computing, and the Raspberry Pi enables much more flexibility.

**LXF:** The flexibility of the Raspberry Pi is mirrored by its accessibility especially to children and young adults. Organisations such as Code Club are there to promote computing in schools and we now have Ragworm, which has developed a similar concept to teach electronics to children. Do you think the Raspberry Pi has started a revolution in 'Maker Education' for children?

**BN:** I wouldn't say it started it, as there was already a presence. But the Raspberry Pi has certainly helped it and in some ways 'exploded' the idea along the way. The Raspberry Pi has helped people to set off on to different paths and some will stay with the Raspberry Pi while others will migrate on to other projects. But the Raspberry Pi has given them a good introduction and many will continue with the Raspberry Pi as their main development platform. The Raspberry Pi community is excellent and they continue to give so much, for example in the form of Python libraries, learning resources and Raspberry Jams. All of

these actions by the great community lead to more people doing more great projects.

**LXF:** Leading on from the great work done by the Raspberry Pi community: are there any projects that you would like to try or any that you just had to do?

**BN:** That's a great question! I'd have to say that

## ON CODING ON THE RASPBERRY PI

# "It's not about making it easier for them, it's making it more accessible for them."

robotics (see page 52) is a great project to learn with. In the past robotic toys have been just that – no controls other than a remote control unit. While these are good fun, they don't provide me with anything more than the ability to drive them around. The Raspberry Pi gives you the chance to build your own robot, starting with something as simple as a Raspberry Pi on top of a wheeled chassis and then growing your robotic project with the use of Python modules to create a pattern of



movement or sensors to enable the robot to learn about its surroundings. There are many platforms for robotics and the question of which is the best platform boils down to what you want to do with your robot.

**LXF:** Robotics is a great way to visualise a sequence of code as the output from all of your efforts are the actions of the robot.

**BN:** That's right. I've just recently written about this for a conference talk proposal. Imagine if the first FOR loop that you ever wrote was to make a robot turn around or spin on the spot. You are learning Python by doing this but now you have a reason to learn it. Questions such as "How can I make it move forward?" and "How can I draw a shape?" are quite common and encouraged.

**LXF:** Education is a champion cause for the Foundation, and your website has recently been redesigned to focus more on the teaching/learning of Raspberry Pi related activities. Can you tell us how and why this came about?

**BN:** The first raspberrypi.org website was a simple WordPress blog with a few extra pages for information, and it remained that way for two to three years. The site worked well in promoting what people were doing with their Raspberry Pi, but for educators and those

looking to learn more there were no Foundation-provided education resources. This meant that sometimes complex projects, written up as blog posts on our site, would blow the minds of

the readers. So we wanted to put out the right information for everyone, as we have many different types of people coming to the site. The Foundation never set out to be the educators, merely the platform that enabled anyone to build a project. But from the tiny profits that we make on each board sold we are now in a sustainable position where we can provide educational resources to teachers and fund a dedicated education team.

**LXF:** Looking back we have had Model A and B Raspberry Pi, the B+ and the Compute module. Eben Upton recently announced that there would be an A+. Will we see any future revisions or new Raspberry Pi?

**BN:** The A+ will be a B+ board with a single USB port and no Ethernet connection. So there will be the expanded GPIO and the camera/display connections. There is currently no specific timeline set for future Raspberry Pi boards. For our price point of \$35 we've squeezed quite a lot of technology on to the board and the balance of technology to price is currently sustainable.

## Stacey Driver

Founder, Ragworm



**Linux Format: Who are Ragworm?**

**Stacey Driver:**

Ragworm are a PCB prototyping service used by PCB professionals, hobbyists, designers and makers

worldwide. Our aim is to give people an economical service in the UK rather than sending their prototypes to the Far East, which potentially has a lead time of up to 30 days including the shipping time, and Customs can further delay your project.

**LXF: So what types of projects does Ragworm handle?**

**SD:** Leeds Hackspace have just been working with us on a community project for Leeds Light Night ([www.lightnightleeds.co.uk](http://www.lightnightleeds.co.uk)), which was great. We are working with more open source projects and we are looking to enable open source hardware makers to release the designs for their boards via an open source licence on our website. This then enables anyone to view a catalogue of boards and purchase a quantity, with the money being split between the original maker and ourselves.

**LXF: The UK has weathered a financial crisis in recent years but we have seen an increase in the number of entrepreneurs and makers who are building businesses based on maker skills. Are we seeing a maker revolution?**

**SD:** The UK are great innovators, and I strongly feel that the maker revolution is where a lot of money is being generated and supporting our



economy. The maker movement is gaining pace so rapidly in comparison to other areas of the UK economy, and this is thanks to the great community of open source makers and hackers, like those that come to Oggcamp.

**LXF: Innovation is not just for business. We've seen recent changes to education thanks in part to the Raspberry Pi – can further innovations be made?**

**SD:** At Ragworm we have started an education programme focusing on electronics in a cross curricular and more creative manner. Our aim is to develop more innovators in schools. At events such as Oggcamp and Makerfaire, we are seeing children with impressive skills in both software and hardware. These skills if nurtured can be moulded into great innovations and products, enabling children to meet the requirements of the curriculum and obtain real skills for later life. We hope that we can provide the tools and knowledge that will help children to do more in class.

**LXF: Are we seeing a generation of children with better software and hardware skills?**

**SD:** Yes. Children have a built-in investigative nature that will always look at how things work,

and when they have the hardware in their hands they want to know what makes it tick. We have seen six-year-olds who have skills and knowledge on a particular subject and they have taught us new things. These children will be part of a more tech savvy community and help innovate future projects.

**LXF: Do you think Raspberry Pi has helped to develop the skills of makers and hackers?**

**SD:** Definitely, the Raspberry Pi has had a phenomenal effect on the maker community by providing a more cost effective platform for development and it has removed so many barriers to entry.

**LXF: So with children rapidly learning the basics of computing and electronics thanks to the Raspberry Pi, what can we teach children about PCB?**

**SD:** Schools already deliver a certain level of electronics knowledge, but PCB manufacture has a grounding in physics and chemistry, and we are trying to expose this link via a series of books that we are writing, which are linked to the national curriculum and show the links in the many different sciences to electronics. We really need to get kids interested in PCB as the average age in the manufacturing industry is 56. So we have many skilled workers who are approaching retirement and we need new blood to learn those skills to ensure that future projects can be manufactured.

**LXF: Is a good knowledge of science essential for PCB manufacturing?**

**SD:** Yes. If you don't already possess it you will learn it as you go through the industry, but what we hope is that we can capture children's imagination from an early age and give them the foundation they need.

**LXF: So how can we get children interested in PCB?**

**SD:** We've created characters based on leading figures in the development of electronics, and these characters link to our education system to create a fun learning method. We also reference organisations such as NASA, names which children will recognise. The education system covers the history of the science behind the PCB industry, and we also deliver the lessons to classes via visits to schools.

**LXF: Why did you come to Oggcamp?**

**SD:** Oggcamp has a fantastic community that surrounds it. Everyone has such a great grasp of open source projects, such as Reading Hackspace, who have brought all the toys for us to play with. Oggcamp attracts both children and adults who are keen to learn and talk about their projects in an open forum that fosters great ideas.

### ON THE COMMUNITY AND INNOVATION

**“We have seen tech-savvy six-year-olds who have taught us new things.”**



# Paul Tansom

South East Regional Co-ordinator, Code Club



**Linux Format:** For those that don't know, what is Code Club?

**Paul Tansom:** We are an after-school programming club for children at primary school. Code Club

co-ordinate volunteers who come into schools and deliver coding for an hour a week.

**LXF:** So what type of content do you deliver?

**PT:** We provide four terms of work that cover Scratch, web technologies such as HTML and CSS, and programming via Python. For example, we provide games in Scratch, such as *Ghostbusters*, which is a 'whack-a-mole' type game, but facilitators are free to enrich the course content with their own mix of ideas and skills.

**LXF:** So the training is delivered by these volunteers under the supervision of the teachers in the schools?

**PT:** Yes, we partner with STEMnet [Science Technology Engineering and Maths] ambassadors who are fully DBS checked and insured to work with children. The STEM ambassador is there to facilitate the session while the teacher is there to assist the children.

**LXF:** Code Club has been operating successfully for a few years now. What is your favourite success story?

**PT:** My favourite is hearing from a teacher that their Code Club had inspired a child and really captured their imagination and given them the confidence to do better at school.

**LXF:** Code Club is linked to learning to code, but is any of your content cross curricular?

**PT:** To a degree, yes, as the course content encourages the use of logical thinking, problem solving, maths and other essential skills. By learning to develop their own games, children learn creative skills such as art and design.

**LXF:** Do you think that the remit of Code Club will be extended to encompass electronics?

**PT:** We have already developed some new course materials via a DIY Gamerkit from Technology Will Save Us ([www.techwillsaveus.com](http://www.techwillsaveus.com)). This requires some soldering to create a hand-held console with a simple 8x8 LED matrix for a screen, which kids love

to work with. I can see that, as the National Curriculum changes, we will need to adapt the content to meet the needs of children.

**LXF:** With the changes to the National Curriculum requiring children in Key Stage 1 – so, as young as five years old – to understand the basic concepts of programming, do we really need to teach children that young about coding?

**PT:** There's too much focus on coding. At Reception level children are not taught to 'code' as we know it, rather they are taught to solve problems in a logical manner. For example Bee-Bots are simple devices that can be programmed to follow a sequence of instructions and move around in a programmatic manner.

**LXF:** As the new school term has just started, we have

**a year group of children who've effectively skipped two years of coding lessons and are therefore starting at a disadvantage. They will require a fast track to get them up to speed. Do you think that this is detrimental to their learning?**

**PT:** Yeah, we've got an interesting transitional period. In my school the Year 6 children, those that will join secondary schools next year, are still under the old curriculum, whereas the Year 5 children are starting the new curriculum. So already we have two year groups that will be starting secondary school at different levels, which is something that Code Club can help



## ON CHANGES TO THE CURRICULUM

**“We have two year groups that will start secondary school at different levels.”**

with by providing the extra skills that children will need to get ahead.

**LXF:** So why did you come to Oggcamp and what do you enjoy about it?

**PT:** I came to Oggcamp to show the work that Code Club does to both the children and the adults in attendance. What I enjoy most about Oggcamp is that it has a great community that's always expanding thanks to Hackspaces such as Oxford, Swindon and Reading, who are also in attendance and helping to get kids coding, creating the next generation of Oggcampers. **LXF**

