

South Shore Regional School Board Technology Teacher-Leader Byron Butt has been transforming the Bridgewater Jr./Sr. High School library into a “learning commons” environment complete with technology, makerspace materials and print resources thanks in part to a project grant from the Program Development Assistance Fund (PDAF).

The PDAF project A Learning Opportunity in Electronics and Computer Programming via Raspberry Pi attempts to fill an important need for young people in the digital age says Butt. “This project provides resources and materials necessary for student led inquiry and project development in electronics and computer programming.”

For those of you who don’t know what about Raspberry Pi, according to its website is “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 how to program. It’s capable of doing everything you’d expect a desktop computer to do, from browsing the internet and playing high-definition video, to making spreadsheets, word-processing, and playing games.”

Butt says the Raspberry Pi (<https://www.raspberrypi.org/>) kits were chosen from several small portable devices because of their low cost (about \$280 for each device, including monitor, keyboard and mouse setup) and ability to allow students to explore computer programming (in languages such as Scratch, Python, and Wolfram), and design innovative projects. “Projects ideas abound online with YouTube videos of students as young as five years of age creating innovative projects utilizing the Pi and simple computer programming,” he adds.

The kits contain the credit card sized circuit board complete with input and outputs, a clear plastic case, a wifi USB for connecting to the internet, cables to connect to an HDMI monitor, and assorted electronic parts such as breadboards, resistors, diodes, etc. “We required a monitor and wireless keyboard/mouse for each device.”

Butt says the Raspberry Pi was originally conceived in England. “It was developed by folks who wanted to get kids excited about coding,” he says. “It’s really ultimately all about coding.” Coding has been a hot topic of late in education circles. Last December hundreds of students across Nova Scotia participated in the Hour of Code, a massive international learning event, in which students are introduced to computer science, and coding is demystified. “Coding is an important part of all the technology we use, and it’s important for students to learn a computer language along with other languages,” adds Butt.

“Through its 32G storage capacity and its own website, Pi store, browser etc. it’s really great for students who want a platform for games. In Minecraft for Pi game students can create and develop their own character through coding and programming. So my students now have self-directed learning opportunities by utilizing those resources, hints, tips, and example programs that the online Raspberry Pi community of users provide.”

An afterschool and lunch hour club have been developed in the learning commons says Butt to give students opportunities to learn basic coding through online websites (code.org), mobile apps (Hopscotch) and now through Raspberry Pi devices, obtained through PDAF funding.

“I started the “Pi Club,” says Butt. He recalls how he had students set up the hardware, load the software and play with the options in the user interface. “I must confess to having already set up my own Raspberry Pi and having played around with the programming language and online resources. But how would these shy young people cope with it? Honestly, there were a few moments when I questioned the problem solving skills of one student. His desk a mess of torn cardboard, ripped plastic, upon which electronic components were scattered. After a couple of days curious students were stopping in to check out the set up. Another two students requested the opportunity to set up their own Raspberry Pi and with little to no instruction went to work, completing the task with the support of the other Pi Club members. I now had the foundation of a club.”

He is also reminded of an exchange student from the Czech Republic. “He took full advantage of all the components,” he says. “His dad is a software engineer and he would regularly check in with him to troubleshoot coding



*South Shore Regional School Board Technology Teacher-Leader Byron Butt is shown with Grade 12 students using Raspberry Pi kits.*

problems.” Other parents at the school have Raspberry Pi’s at home as entertainment centres.

“One of the most exciting aspects of running the Pi Club is the opportunity to interact with students as they take on learning activities and projects both individually and collaboratively,” he continues. “Students are now accessing the Pi resources at all times of the day and during our weekly after school meetings.”

For those teachers thinking of using the Raspberry Pi in their classrooms or in after school clubs Butt says “Do not be ashamed to say ‘I don’t know’ to an issue, problem, or query. I tell students up front that I am here to learn with them. The students who take on this learning tool have an interest and drive to understand. We problem solve issues together with them teaching me as much as I can teach them.”

Butt and students explore the online resources together. “We have “played” with the extra resources such as the camera module and a 7” portable LCD monitor and the discovery continues. It’s a rewarding learning opportunity for both student and teacher.”

Butt says one colleague is incorporating coding into his curriculum through a discovery class course and will integrate the Raspberry Pi project kits for his students. Butt is presenting a Raspberry Pi workshop at this year’s AST (Association of Science Teachers) conference and also presented at the 2015 Summer IT Institute for teachers that takes place at StFX University. “I had no training other than my own experiences, but through learning with students and sharing my knowledge with teachers and I am slowly becoming knowledgeable.”

Butt was also able to get more Raspberry Pi kits when Bridgewater Junior-Senior High was chosen as the South Shore Regional School Board’s Brilliant Lab’s site. Being a Brilliant Lab site gives students the access to technology such as 3D printers, Oculus Rift, robotics kits, sewing machines, and Raspberry Pi platforms to gain skill and experience in engineering, metal and woodworking, fashion, textiles, electronics, robotics, computer programming etc.

*The PDAF program encourages innovative program development in Nova Scotia’s public schools. Co-sponsored by the NSTU and the Department of Education and Early Childhood Development with an annual sum of \$200,000, it provides financial support for projects directly related to the Public School Program. **The next application deadline is December 1st by 4:00 p.m.** For more information visit the Professional Development section of the NSTU website at [www.nstu.ca](http://www.nstu.ca) or contact NSTU executive staff officer, Stacy Samson at 1-800-565-6788 or 902-477-5621 or [stsamson@staff.nstu.ca](mailto:stsamson@staff.nstu.ca) or [pd@nstu.ca](mailto:pd@nstu.ca).*



*A credit-card sized component that is Raspberry Pi.*



*A student looks at code through a Raspberry Pi device.*