Siavonga Technology Project
July 2015

Prifysgol Cymru
Y Drindod Dewi Sant
University of Wales
Trinity Saint David

GiaKonda IT
FOR ALL YOUR IT NEEDS

Work done by GiaKonda IT in Siavonga District July 2015

On this, our second visit to Siavonga, our overarching aim was to increase accessibility to the Zambia ICT curriculum. In order to achieve this aim, we had five main objectives:

1) to upgrade and add to the solar power installations
2) to supply an updated version of the Raspberry Pi to all 9 schools in the British Council Connecting Classrooms partnership
3) to use the old Raspberry Pis to provide an e-library and e-learning solution of useful information for teachers and pupils.
4) to network existing computers together with wireless routers and to prepare schools where possible for internet access
5) To deliver computer training to teachers.

Our main sponsors were University of Wales Trinity St David's who donated £3500 for the purchase of solar and computer equipment. Without their help the project could not have proceeded.

We are also grateful to Pentrehafod School Swansea for the donation of access points, Swansea University Engineering Department for keyboards and a notebook, and our friends and customers who donated money and laptops. (The laptops proved too heavy for our baggage allowance but have been allocated to go back with the Siavonga teachers who visit in September.)

We funded our own travel, food and accommodation costs.

The following is a detailed account of the work done in each school and suggestions for how we would like to proceed in future.

Bbakasa Primary School

Twinned with Waun Wen Primary, Swansea

Head teacher Edson Munsanje
Number on roll: 333 Girls: 156 Boys: 177

Many pupils have to walk 7km to school each day. Obstacles at different times of year include lions and elephants.
The school has no mains power.
In January we fitted 2 x 80W solar panels and two heavy duty deep cycle batteries (with the sponsorship of S&C Electric) providing power to the head teacher's office. At this point we also supplied 2 Raspberry Pi computers with keyboards, mice and makeshift screens.

July 2015:
We installed two new 135w solar panels and 220Ah battery (thanks to University of Wales Trinity St David's). We added a fuse box to the smaller system in the Head teacher's office and a larger fuse box and regulator in the computer room which has been set up in the library. The large new battery could now accommodate an inverter attached (this is not recommended as it loses a lot of energy). We were also able to run the laptop supplied by Waun Wen Primary School (not all laptops will run on 12v so if you are intending to use laptops check that it will do so[1]). We ran cables from the fuse box to the computer island and installed converters to reduce the voltage from 12v to the 5v necessary to run a Pi.
We set up a wireless router to provide the flexible infrastructure for networking future additional computers and ran cables from it to an access point to extend the range of the network.

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[1]   We have a list of laptops that work on 12 volts contact wendy@giakonda.com

We provided Khan Academy and RACHEL on 64GB SD card using old Raspberry Pi - this could be accessed wirelessly from any wireless device such as smart phone, tablet or laptop.
We also supplied a Raspberry Pi 2 which is 6 times faster than the previous model and can be used for word processing and spreadsheet applications as well as introducing children to programming using Scratch. We provided two 12v monitors for easier viewing.

Future:
The school would benefit from another laptop and a projector (solar charged).
We intend to provide another 10 Raspberry Pi computers with screens, keyboards, mice and wireless dongles. The school will need more converters to reduce the voltage from 12v to 5v. (Each USB power output would need to have a 2 Amp output.

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Kabbila Primary School

Twinned with Hafod School, Swansea

Head Teacher Winston Hamounga
Number on Roll: 80 Girls:? Boys: ?

This school has no mains power (but see the power lines in the phot below!). There are two classrooms and an office in one building and a second building is now being used for pre-school and Grade 1 children. In January we supplied two Raspberry Pi computers with keyboards, mice and makeshift screens.

July 2015:
We supplied 2 new Raspberry Pi 2 with keyboard, mouse and 12V screen. We demonstrated Scratch programming to the delight of the pupils.
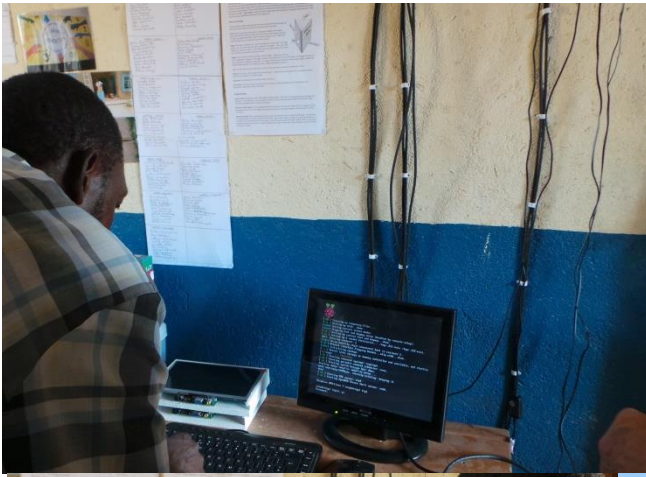We upgraded the solar power setup by adding a fuse box and a regulator. We ran a cable around so that pupils could work at two separate computer desks in the head teacher's office. We set up RACHEL and Khan Academy e learning resources on an old Pi and linked this to a router

The Future:
The school needs converters to reduce the voltage from 12v to 5v. It would also benefit from having a solar charged projector.
Ideally there should be more solar panels to provide power to the second building. The school is hoping to be allowed to become a boarding school and will seek grants to provide more buildings to achieve this.

Kariba Primary School

Twinned with Burlais Primary Swansea

Head Teacher: Rodah Muchawa
Number on roll: 905 Girls: ? Boys: ?

This is a very large school catering for pupils up to Grade 9. Pupils come in at 3 sessions during the day. The school has power and there is a computer room with 20 PCs, mainly Dell. They have no internet although there is a strong signal there.

July 2015:
Installed a router and networked three of the PCs via wireless dongles.
Supplied new Raspberry Pi and demonstrated Scratch.
Left an old Raspberry Pi but did not have a 64GB SD card with RACHEL/ Khan Academy.
Left an access point for use to boost wireless signal around school.
Gave advice on network security.

The future:
They would benefit from more wireless dongles. With a better router they could access the internet via a USB broadband dongle. They also need a projector.
They need 64GB SD card with RACHEL/ Khan Academy suitable for the original Raspberry Pi.

Matuwa Primary School

Twinned with Plas Marl School, Swansea

Head Teacher: Esnely Mbewe
Number on Roll: >500 Girls: ? Boys: ?

This is a large school which caters for pupils up to Grade 9. The school has mains power and is fairly near to a MTN mast which may provide it with steady broadband access in the near future.
In January we had provided two Raspberry Pi computers with keyboards, mice and screens.
In June 2015 they purchased 15 computers (from Computers for Africa I believe at about £80 each), all except one running Windows 7.

July 2015:
We provided two new model Raspberry Pis with keyboard, mouse and screen. We also brought a 64GB SD card with RACHEL and Khan Academy e learning library and resources for use with one of the old Raspberry Pis.
We set up a 300Mbps wireless router and provided wireless dongles for 7 of the PCs. This enabled them to connect to the old Raspberry Pi and so access the huge e-learning resources without need to access the internet.
We prepared sets of Ethernet cables so that other PCs could also be networked together and to the Pi.

We measured out a very long cable to carry the wireless signal as far as possible via an access point. This cable has since been sent to Bridget Muyuni for her to install the access points.

Namumu School

Twinned with Blaenymaes School, Swansea

Head teacher: Mr Luxton

Number on Roll: 316 Girls: 146 Boys: 170

This school has power to a building used as teacher accommodation and also in the Deputy Head's room.
They have 7 Zedupad pupil tablets (Android tablets), one teacher tablet and a pico projector donated by Karen Fagyas of Eagles Rest Lodge. These are all solar charged.
In January we supplied two Raspberry Pi computers with keyboard, mouse and screens.

July 2015:
We supplied a 64GB SD card with RACHEL and Khan Academy e library and e learning resources. We installed this on an old Raspberry Pi and set up a wireless router. This enabled us to access the e learning resources wirelessly via a smartphone and laptop. We were able to demonstrate the software in the classroom next door using the projector. The Zedupads have internet capabilities but were locked down from accessing it. We are looking into a resolution for this problem but in the meantime would not recommend schools investing in these devices.
We prepared a long cable to extend the wireless signal via an access point.

Oba Premia Trust School

This was a private school not under the British Councils remit. We were there because the Discovery project had included it in their remit.

The school has 4 old PCs under wraps.

July 2015:

We supplied one new Raspberry Pi computer, keyboard and mouse. We set up a wireless router for them and looked at the old Dell PCs. They all seemed to be in need of new hard drives.

The Future:

With a faster router with USB ports, they could access the internet via a USB dongle. They would benefit from having a projector. They do need new computers to replace the existing.

Siavonga Basic School

Twinned with Llwynderw School Swansea

Headteacher:
Number on roll: >300 Girls: ? Boys: ?

This a large primary school with a computer hub. There are 18 networked HP micro PCs on one system. They also had a group of ncomputing devices which were not working.

July 2015:
We supplied one new Raspberry Pi with keyboard, mouse and monitor and explained how to use it. We also left 2 access points. We were able to get the ncomputing zero client systems working but we had to use a separate router for them. I don't think these devices are very useful in a rural setting.

The future:
They need a big switch (24 port) and a projector. They also need access to RACHEL/ Khan Academy e library and e learning resources.

Siavonga Basic School

Twinned with Llwynderw School Swansea

Siavonga High School

Twinned with Pentrehafod Secondary School Swansea

Head Teacher:
Number on roll: 1300 Girls: ? Boys: ?

This is a large secondary school with approximately 600 of pupils being boarders. Fees must be paid for secondary education in Zambia. The school is well equipped with three computer labs, each with 30 PCs. They have one projector.

July 2015:
We supplied new Raspberry Pi.
Left control equipment (berry clips etc.)
Downloaded RACHEL / Khan Academy
Ran cables from head teacher's office to Computer labs, well the kids did the work1
Access points set-up in Computer labs 1 2 and 3. Cables are too easily damaged; I hope the wireless dongle are not too easily removed. I have thought of super-gluing them but decided not to.
We began a general clean up on all PCs to get rid of viruses and malware and reset the administrative password. Bridget's first big job!
We provided 5 wireless dongles, if we had more we could have networked a lot more machines. Something for September maybe.
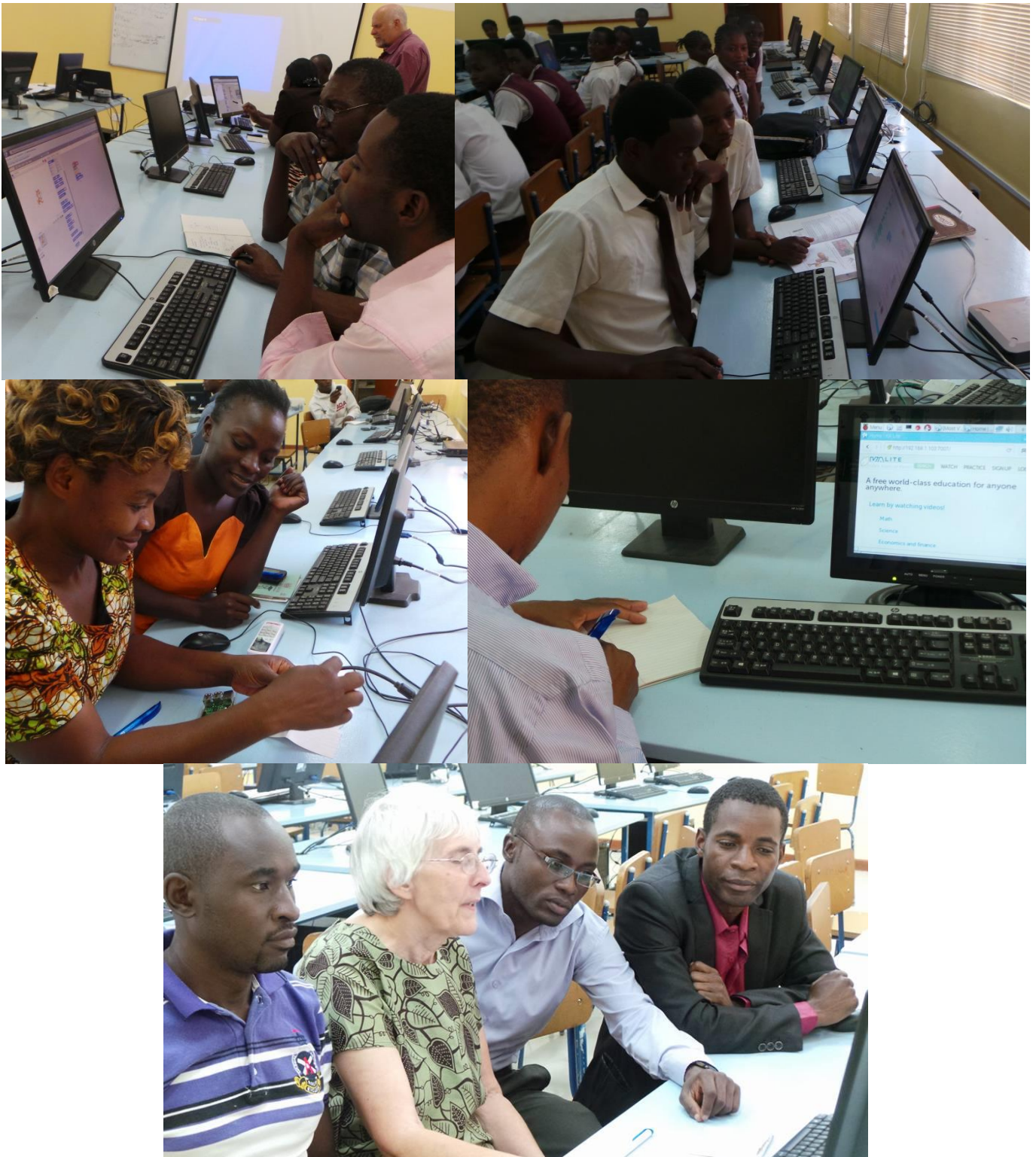All labs have some internet access now (At least 1 teacher machine)

The future:
The school needs 16 port switch in the head teacher's office and 3 x 48 port switches (in the three Computer Labs) Network security must be tightened up (LDAP server).

Training Sessions at Siavonga High School
For Teachers and Pupils

St Malumba Special School

Twinned with Penybryn Special Needs School, Swansea

Head Teacher:
Number on Roll: ? Girls: ? Boys: ?

This school caters for children who are visually impaired, hearing impaired or have learning difficulties. Pupils board here during term time.
In January we supplied two Raspberry pi computers with keyboard, mouse and monitor and a 64GB SD card with RACHEL/ Khan Academy. They also have 4 other PCs and special equipment for Braille embossing.
There is internet access but signal is variable.

July 2015:
We supplied one new Raspberry Pi with keyboard, mouse and screen.
We demonstrated the Raspberry Pi as most of the staff had been absent on our previous visit. We set up a router to share the RACHEL/Khan Academy resources.
There was a form feed problem with the Juliet Pro Braille Embosser. After leaving, we researched the problem and were able to pass on a message about the reset code. We were delighted to hear that it solved the problem and they were able to use the Embosser correctly for the first time since it was installed.

The Future:
We would like to give help with Raspberry Pi software such as Sonic Pi and Minecraft which might especially appeal to the pupils at this school.
They could use a laptop and projector.

Siavonga Nutrition Group

We set up website for this organisation www.sng-zm.org

We provided and installed a Synology Server for central saving of all documents and networked PCs and laptops.

We installed a wireless router which is capable of offering internet access via a USB broadband dongle.

We undertook various repairs on laptops and PCs.

During the 2 months and intervening period we have come to understand more the issues surrounding the implementation of sustainable IT development. One of our concerns is the lack of on-going technical support. While we are there we obviously deal with any issues as they arrive. Once we have left these issues could be left unresolved and the equipment become unused. We found this at St Malumba special school where a Braille printer was not used because of a simple configuration issue.

To overcome this issue we decided to sponsor an IT technician. We wanted someone who could monitor the use of IT in schools for us, who could keep a record of the equipment left with the Siavonga Nutrition Group (SNG) and would be willing to work with us to develop their IT skills. This person would then be in a position to visit all the schools we have contact with and offer some support and advice. It would also mean that we had a more useful contact there and as a result be more aware of ongoing developments and issues.

The person we have identified for this role is Bridget Muyuni. She is a volunteer with SNG and has spent the last month working with us on issues around IT in the schools and has been instrumental in setting up the wireless access points and security at Siavonga High School.