

Abstract / Summary

I flew out to Africa to inspire, teach, and equip children in the field of programming. My teaching has reached many children in Harare, and I have been able to donate equipment to some educational organisations to enable them to continue learning about programming. In summary, it has been an amazing trip and everyone that I taught has now got a better understanding of programming, and have been inspired to take their learning further.

Supporter Thanks

This trip would not have been possible without the supporters that kindly offered to help the project!

The Ollie Feast Trust

Thank you so much, Ollie Feast Trust, for the bursary of £500. This was instrumental in getting the trip off the ground, into the air, and into Zimbabwe. This was the main facilitator of my travel. Your bursary has allowed me to have the experience of a lifetime and broaden my horizons significantly.

Mark Calleja (Mr C) - Hacklab

Thank you, Mr C, for all the help that you gave me throughout my trip. Your advice really helped my teaching material to be more accessible and intuitive for the students. Your enthusiasm towards the project really gave me confidence and helped me to push on. Thanks for being a great support!

ARM

Thank you, ARM, for the donation of 10 BBC Micro:bit computers! They were absolutely fantastic, and allowed the students to bring their code off the screen and into their hands. This also enabled them to see programming in a more real way, and I am certain that they will be continuing their learning with them.

Pi-Top

Thank you, Pi-Top, for the donation of 2 Pi-Top CEEDs. These were brilliant, as they were light and portable, and allowed me to set up a workstation in the blink of an eye! They were, both, great attractions when I was teaching - and both I and the educational organisations were so impressed with their ease of use and helpfulness! A great asset to the classroom!

Redgate

Thank you so much, Redgate, for the donation of £530 worth of equipment! This was an essential contribution to the trip, and enabled the teaching to take place. Without you, I would not have had enough kits to teach the kids and I would have been in a VERY sticky situation. I cannot thank you enough for saving the trip!

Frederick Vandenbosch

Thank you so much, Frederick, for the donation of the majority of the Raspberry Pis and some extra hats. Without these pis, I wouldn't have had enough to run the workshops effectively. The extra hats will also be a great asset to the kids - enabling them to go further and do more with the coding skills that they will develop in the future.

A huge thanks to everyone that helped, even if not explicitly mentioned here. You've helped the project so much and it wouldn't have been such a success without your support.

Thank you!!!

Activity Details

I flew out to Harare, Zimbabwe on the 23rd of July to inspire, teach, and equip children in the field of programming.

This started at Gateway Primary School.

This venue had screens, keyboards and mice that I could use. This was especially helpful as I was, unfortunately, unable to ship all of the screens, keyboards and mice that I had available. This allowed me to have one station per student.

As they were already being taught about Microsoft Word and Excel, they could follow my teaching without too much trouble.

I taught them to program a simple guessing game in python. They learnt about how a computer “*thinks*” and how to break a task down into smaller chunks.

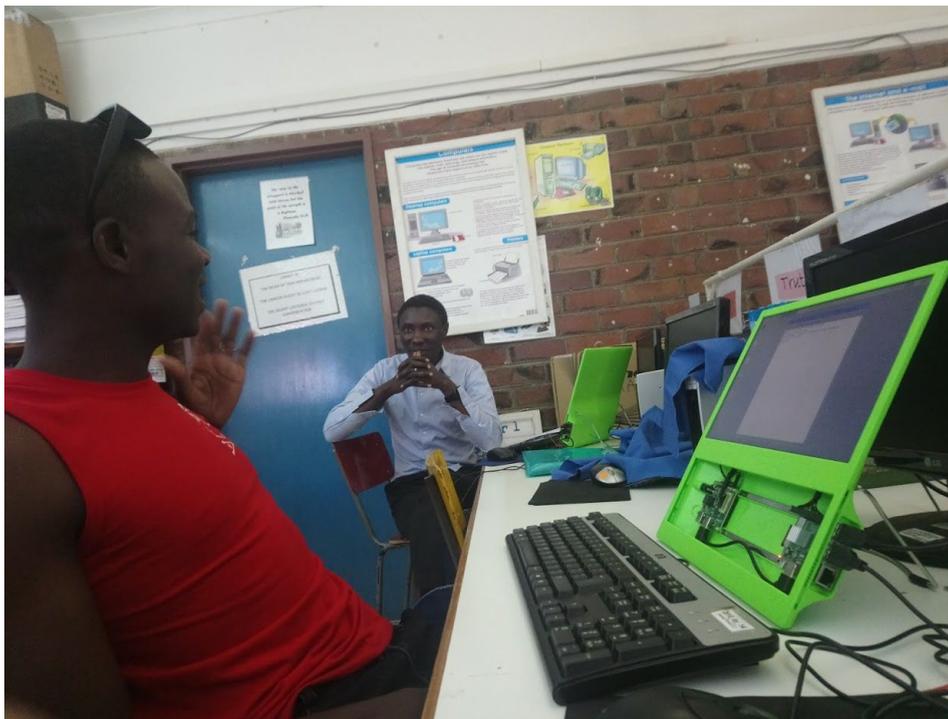


One of my main methods in this regard is the *jam sandwich* analogy. This is where I pretend to be a robot, that follows instructions just as a computer may. This taught the kids that they can't just tell a robot to *make me a jam sandwich* unless it has already been taught how to do so. They had to go down to a more basic level, specifying to pick up the knife and open the butter before buttering the bread. The moment of realisation was when I couldn't get a slice of bread because I hadn't opened the bag yet!

After this, they understood the mindset of a programmer and how to structure a task for programming.

I then went through the guessing game with them and let them practice. I then asked them to tell me *how to run the game* just as they did in the *jam sandwich* analogy. This was how I introduced pseudocode to them, and I actively used this pseudocode in my explanation and walk-through of the code. In places where the code reused a concept taught in previous lines, I asked the students what they thought would be best for this line. Many of them recognised that we had already coded something similar, and could even start coding the line before I told them what to write. This reassured me that they were indeed learning, and not just copying what I had written on the board.

In the end, everyone managed to get their code working and understand how it worked. From some of the feedback from the children, they really enjoyed the lesson and many were amazed that they had told a computer what to do!



The next workshop that I taught was still at Gateway primary. However, I was teaching teachers from external organisations that had come to Gateway for the workshop. I was not teaching Gateway students this time around.

The adults had a much more intuitive grasp of the *jam sandwich* analogy, and many came up with intricacies and snags that I hadn't thought of myself!

However, many of these adults were not computer literate. For many, I had to explain concepts such as

shift vs CAPS-Lock and, with one, using a mouse. This was not something that I had anticipated, as I was not teaching in an extremely rural area and Harare is nothing like the mud huts that many are led to believe. Regardless, everybody got their code working and I believe that some did actually find it useful and now understand some basic programming concepts.

The idea with the teachers was to try to reach more students than I could teach in my time there, as I could not teach as much as I had initially wanted to due to the Zimbabwe elections closing schools much earlier than otherwise. Unfortunately, I do not believe this to have been entirely successful. However, I do think I have sparked an interest in some; such that they may research further and be able to teach programming in future. To fully enable teachers to start teaching in their own right, I would have had to run multiple workshops aimed at different abilities in order to catch some up, and deliver further material for teaching.

The next place that I visited was the Zimbabwe Maker Club. Here, the students had already done some work in Scratch, but many hadn't learnt this to an intuitive level yet. Here, I was able to go through the *jam sandwich* analogy very quickly, and I was able to finish the guessing game with lots of time to spare. The python was new to the students, evident through some basic mistakes. However, these mistakes were quickly corrected and the students learnt their way around the language very quickly; even making some jokes in their code! I could then move on to teaching python further, in the context of BBC Micro:bits. The students were able to bring across much of what they had learnt in the previous task - and we managed to make a picture gallery for the BBC micro:bits very quickly - some going on to customise their code!



Possible Future Plans

In teaching the kids, I realised that I have really sparked their interest in programming. My aim, in doing a workshop for educators, was to be able to equip them to teach their students some of what I had taught them - and some of what they had learnt themselves, after my workshop. This was based on the assumption that the educators would be quicker to understand the material. Unfortunately, this assumption was wrong. However, the theory still lies. If I can teach other educators, then I will reach far more students indirectly than I ever could directly. If I were to do this trip again, then I would want to focus mainly on educators - and run a series of workshops aimed at getting them ready to teach code from the ground up. The other issue that I faced this time around that I won't face again for a while, was the elections. Schools closed 2 weeks early to be polling stations. This significantly damaged my available time to teach. In future, I will have time for more workshops.

Final Words

This has been a brilliant experience; both for the kids and myself. I really loved the kids' reactions to new concepts and how they handled these. Everyone that I taught was extremely thankful for the teaching and were hungry to learn more. This is where the kits come in - they will allow them to continue to expand on their skills and knowledge. The organisations were really grateful for the equipment, and I'm sure they will make good use of it.

