

Establishing a Computer Lab in a Slum School in Nairobi:

Conversations with Teaching Staff and Administration
Regarding the State of the Lab a Year On

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There are numerous benefits to using technology in the classroom. These include a marked increase in motivation and improved learning, and students are able to engage in new and meaningful experiences that traditional teaching materials are unable to provide. Many developing countries are undertaking initiatives to bring technology into schools, with Kenya playing a leadership role¹ on the African continent with the government having promised to deliver digital devices to all public primary schools by the end of 2017². However, more often than not many of these schemes are not implemented on a sufficiently large enough scale; nor do they reach many of the poorer areas, and this is where private contributions can make a difference. Especially since in the case of Kenya, many children remain out of the public schooling system, and have to make do with what resources are made available to them through various private initiatives³ or NGOs.

The idea for establishing a computer lab at Grapesyard School originally came to mind during a field trip there in March 2015. During the visit, it was noted that Grapesyard (an NGO) had very limited resources, with textbooks being old or outdated, and the children had no access to technology. It was there that the idea of a computer room was discussed with Mr. Edmond Opondo, the director and founder of the organisation. Upon returning to Japan, the author put forward the idea to colleagues to create a computer laboratory at the school with a vision to allow the students to come into contact with technology so they would be able to expand their learning horizons. The end goal would be to have them learn to use the computers as catalyst to enrich their lives, to provide them with the opportunity to increase their chances of future success and to break the cycle of poverty.

In March 2016, the author was pleased to help bring this idea to fruition as a part of a second trip to Nairobi to attend the annual Peace as a Global Language Conference at the Management University of Africa.⁴ With nine colleagues recruited from colleges from various parts of Japan, a computer lab was established on campus in a specially designed building complete with desks and power outlets. Kind donations of computers came from delegation members. Each of the original donated computers was firstly securely formatted and the op-

erating system replaced with Linux, a free operating system. By chance, one of the delegation was also involved in a new digital publishing initiative in which their company was promoting the use of digital textbooks in developing countries, and agreed to use Grapesyard as a testing ground. As part of the scheme, they kindly provided a mini-computer (Raspberry Pi) loaded with dozens of digital textbooks.

This provided the impetus that the project needed, and with the Pi acting as a central server, we created an internal closed wireless network to which each of the donated computers connected to in order to access the digital textbooks. The material ranged from novels to interactive magazines and mathematics and science. The initial donation of ten computers was just the first stage, and in March 2017, we were happy to return to Grapesyard School where we were able to substantially increase the size of the lab. After completing the setting up of the extra computers, several of our delegation held a conversation with some of the staff and administration to gauge how the computers had been used over the year, parts of which are reproduced below. It is hoped that excerpts from this informal interview will provide thought for non-governmental organisations and academics working in developing countries on similar initiatives, since through the conversation several pitfalls became clear, issues to which we were glad to be alerted to, and perhaps hadn't considered in our rush to establish the lab.

Finally, each of our delegation was profoundly influenced by the project and now carries a responsibility to initiate positive action for change on behalf of the children and community of Korogocho. Indeed, since the visit, our contingent has worked to raise awareness of the issue of poverty and lack of education resources in the slums of Kenya by sharing the experience with our students and colleagues in Japan and we pledge to continue do all we can to support the pupils and staff of Grapesyard in the future, too.

Notes

- 1 Refer to the official Kenyan government website: [<http://icta.go.ke/digischool/>]
- 2 As reported by The Gaurdian [<https://www.theguardian.com/sustainable-business/2017/jan/23/tech-startups-kenya-bridge-education-gap>]
- 3 For an example of privately funded initiative to bring computers to schools (particularly to poor rural schools) see: [<https://www.theguardian.com/sustainable-business/2017/jan/23/tech-startups-kenya-bridge-education-gap>]
- 4 The Peace as a Global Language Conference was established in 2001, and has been held annually since then at various universities throughout Japan. In 2016, the author was pleased to be involved in taking the conference outside of Japan for the first time to Nairobi, in association with the Management University of Africa.

Conversations with Teaching Staff and Administration Regarding the State of the Computer Lab a Year On.

Carried out on March 2nd, 2017, at Grapesyard School, Korogocho, Nairobi.
(Names have been changed to project privacy).

Interviewers A, B, C

Teachers A, B

Administrator

(Partial Transcript)

Administrator: I work at Grapesyard as programme officer, and part of my work is to oversee the administration of this computer lab. So my work is operating the computers, the feedings [Child lunches], the child sponsorship, and to some extent the home visits.

Teacher A: I am a Level 2 teacher, teaching all subjects.

Interviewer A: Level 2 is from what age?

Teacher A: Seven years.

Interviewer A: Seven years. Because I am not familiar with the system, so from seven years. So that is Level 2. So you're teaching math?

Administrator: Math, English...

Teacher A: All subjects.

Interviewer A: Oh all subjects, got you.

Teacher B: Mine is bit difficult [**Teacher A** I know].

Interviewer A: It's not so much.

Teacher B: I'm a teacher here, I'm teaching class 1, six years average and I'm also the senior teacher of this school.

Administrator: She is number three in command.

Interviewer B: So how long have you been working for this school?

Teacher B: Six years

Interviewer B: How about you, **Teacher A**?

Teacher A: This is the third year.

Interviewer B: And **Administrator**, how long have you been working?

Administrator: Ten years.

Interviewer A: We are moving into the interview faze. So if you could describe how the curriculum works in this school in Korogocho.

Administrator: All right, basically we follow the government curriculum with the system of 8-4-4, but it is now under review. It consists of seven subjects: that is maths, English and science. And a third one combines three. We call it Social Studies, it is made of CRE (Central re-

ligious education), or IRE then geography and then history.

Interviewer A: So this is taught right from Level 1 through, so it's 8-4-4 right?

Administrator: Level 1 up to Level 8.

Interviewer A: In later levels do the students have, are they all compulsory? Do you have any non-compulsory courses?

Administrator: No, they are all compulsory as of now.

Interviewer A: What teaching resources to you have access to?

Administrator: Basically textbooks, which again is a challenge, just a few copies for 1,200 children.

Interviewer C: So you mean you copying those few textbooks and distributing them to the children?

Administrator: Right. So, most of the time we just use the blackboard.

Interviewer A: So there are not enough textbooks and you use the board. So you copying the textbook onto the board.

Administrator: Right.

Interviewer A: What about stationary for the students such as pens and pencils.

Administrator: They have access books, pencils or pens.

Interviewer A: That's all supplied to students?

Teacher B: No, they buy them.

Interviewer A: So textbooks, pen and pencils, they all buy them by themselves. It's not subsidized?

Administrator: No, not subsidized.

Interviewer B: Are there any students who are having difficulty acquiring have notes and pens? So they come to school but they don't have notes and pens.

Teacher A: It is a challenge.

Teacher B: Mostly if they do classes then they may come to school, but then after school they lose their pens or pencils.

Interviewer B: If a student comes to you and says they lost their pen, then how do you deal with it?

Teacher A: There are cases in which some students have two pens. So in such as case, they can get them from their friends.

Interviewer A: As you know last year we established this computer lab. On a very limited scale we had maybe 8-10 computers?

Administrator: Six working computers

Interviewer A: So only six. Four non-working. How do you incorporate this lab into your teaching and how did you incorporate it into your curriculum?

Administrator: Aight. They do the basic teaching in the class. And when they do the exer-

cises, they come to the lab and they practice their exercise. So for example, the maths we have on the board. So, they practice the concepts in the classroom.

Teacher A: For the English we have story books. And they store them in the computers.

Interviewer A: That is the Raspberry Pi. As you know there is a new one, and so yesterday, we got it going. That arrived in August. So could you tell me, why were you not able to replace the old one with the new one?

Administrator: I think the problem was that part of it was missing. We need something to help me and guide me. Yes. And the other one was a bit straight forward. If you open it, you find the menu and everything. But this other one, you needed to scroll up and down and the things were not loading.

Interviewer A: Too complicated. So, how much access to the students have to the computer lab. You had only six working computers.

Administrator: That is the biggest challenge we had. We had to divide it into one class [Teacher A: They can come six at a time].

Interviewer A: So they had one computer for one student?

Administrator: Yes, and we swapped them. One group comes in and the other group goes out.

Interviewer A: How long do they spend in this room?

Teacher A: Normally we start from 2. Lower classes we start from 2, because we don't have lessons. 2 to 3, they come to the computer lab.

Interviewer A: So 2-3pm they come here in groups of six.

Teacher A: For one hour.

Interviewer A: So six computers. So you have 1200 students right? So I am a little bit confused.

Administrator: At the moment we are running it for the lower classes rather than the upper classes because fitting all of them is a problem. Except for the final grade of 8, they will be coming here to read the story books. Basic history books. And another problem is aligning the digital content with the government curriculum. Especially for the upper classes. So upper primary classes 4,5,6,7. We found that the content stored is more appropriate for the lower classes. So the upper classes only come here for the story books.

Interviewer A: Very good point. So, take an example of teachers. So you have how many students in your classes?

Teacher B: I have 68 students

Teacher A: I have 65.

Interviewer A: So in one week, can you describe how your students use this lab? In an average week?

Teacher B: We do come twice a week. That is on Tuesdays and Thursdays.

Interviewer A: Twice a week. So you have 68 student right. You have six at any one time. So by my calculations that leaves 62 students. So how do you do this?

Interviewer B: So I think the first 68 students use it on the first day, and the second group on Thursday.

Teacher B: No, no. In a class, for example in my class, I have 65. So these are the concepts I have taught in class and now for the exercise then we come to the lab. So we come to the lab within this one hour. All of them will come to the lab. So for example, three [inaudible] will not come, we extend the time, so all of them. For example, if my day is Tuesday, all of them come on Tuesday.

Interviewer A: So within one hour you are getting 68 students through here.

Teacher B: Within one hour we ensure all of them have access to the computers. But within that hour, if some of them can't access a the computer, we extend the time.

Interviewer A: So the average access time, is sixty-eight divided by nine, so that is about 9 minutes per group.

Administrator: Right.

Interviewer A: So that is twice a week, for 18 minutes, or around 20 minutes of access a week give or take. Is that right? So swapping over time, and other times coming in, does that cause problems

Teacher B: You know, they also know they can't all fit here. When a group is here, they just stay quiet, they don't have a problem. They know after a while, they will come.

Interviewer A: So they are kind of waiting over there. So they kind of rotate. So when these six students are finished, they leave?

Teacher B: They leave.

Interviewer A: That is very interesting. OK. Got it. So, the next question is, we will start with the negative the issues you have. You went through some of the issues with these computers. For example, not enough high-level material and four computers not working and access to video was working or not working, there are issues with that. Any other negative issues?

Administrator: Another negative issue is especially for the admin, my side. The operating system we are using, it takes a bit of effort and time for me to grasp it, because I am trained with Windows. And I am transcending between Linux and this other one [**Interviewer A:** The operating system is Linux] Yes, the operating system is open source. It is good. So by the time I discover a problem it can be a couple of weeks before I am able to fix it.

Interviewer A: Oh, OK so you don't have the training. So can you give me an example of a problem?

Administrator: One problem was that they changed password. For example somebody went into the system and changed the password.

Interviewer A: So some students changed the password.

Administrator: So that computer behind you. So that computer has been down until yesterday.

Interviewer A: I fixed it. So we are actually mitigating against that. Last year I think we had very limited time to set it all up. So we didn't actually have time to train you in how to use it.

Well, just to open the browser, and access it, that is easy. But any of these things, such as changing administrative password, making groups, or giving restricted access and stuff, we had no time to train you in that. Training is an issue.

Administrator: Another thing and for the teachers as well, when they do the exercises, especially for P2 (Raspberry Pi2), they are still not being able to monitor the scores of the children through the system.

Interviewer A: Actually, the P3 [Pi3] has that built in.

Administrator: We are getting a bit of a challenge [**Interviewer A:** In just using it] Yes, right.

Interviewer A: So monitoring.

Administrator: So we have to reply on physically seeing what the students are doing.

Interviewer A: Interesting. So from level one, up to which level are you using these computers?

Administrator: Up to Level 4.

Interviewer A: Up to Level 4. And that is because the content is not suitable. So what is on the computers at the moment even with the old Raspberry Pi (and the new one has other things on it) that is suitable? You managed to incorporate it into your teaching? Was it OK?

Administrator: Especially the science and the English and the maths.

Interviewer A: That is great. OK. We will do the good points. Those were the bad points, the negative points. You did mention a few good points. Any other good points?

Administrator: The good point is that the pupils get the desire to use the computers. They rarely miss school when they know they are going to use it.

Teacher A: They come to school when there is computer day.

Interviewer A: That is the student side. Anything else?

Administrator: Anything else...if we can have enough machines, it is going to make their work quite easier. We would be able to sit somewhere with one computer, and monitor the students.

Interviewer A: Exactly. You could take one computer and use it for the teacher, use it as a monitor.

Administrator: Yes, it will make the work quite easier.

Interviewer A: We have, you can see we have almost tripled it. We will have maybe 18 computers, by Sunday, even maybe 20. Now for you, that is basically just three groups. So they get to spend 40 minutes a week now. What we are working on, and actually one of the issues was that, and you are not that familiar with how these work. He (**Administrator**) hasn't seen it yet. What it is, is the multimedia, the browser has some special software you install to access video and sound through the browser. So this was missing on many of them. We rushed last year, and I didn't realise it wasn't included. So yesterday, we tried to fix them up. You also mentioned the sound. You were not using headphones. So really the multimedia aspect you weren't using so much according to my understanding.

Administrator: It is not there at the moment.

Interviewer A: It is not there at the moment. So that is our next challenge I think, to set them all up. I will actually show you how to do that if you want to set them up with multimedia. It is simple enough. I will show you right now after this. If we don't have enough time, if you have a phone, you can tether it. You can use limited internet access and you can do that one by one. And install the necessary software. And it is not that (heavy) and it will use about 50-60 megabytes per computer. So once it is set up, it's set up. And they don't need to access the internet at all after that, right? So they are just going through the internal LAN. Anything else you want to add?

Interviewer C: It's a typical question regarding international development. But for aspects of the maintenance, if any computers go down, do you have any skills to fix it, or do you have any ways to fix it? What is your plan?

Administrator: I go online, and try and get instructions on how to deal with some of these issues. For the most complex ones, we have people who can give us support. But the problem is that they charge. So, I try to deal with problems by myself.

Interviewer A: Well **Administrator**, I would be most happy to keep in contact with you and send you links. Especially with Linux being open source, there are forums actually online. For what you are doing with it, it won't take you long to actually get trained up. Self-trained if you like. I am self-trained. [**Administrator:** I will do that] It is just a process for that. The reason why we put the Linux on the computers was to keep them uniform. If you have all different operating systems it is a mess, and it if you want to network them in the future, you will have a lot of issues. So that's why we kept it uniform.

Administrator: That is true. And the other problem is how to you call it, the certification, issue. If you have to go for Windows you need a licence.

Interviewer A: You do. Licensing is a huge issue.

Administrator: This one is open source.

Interviewer C: That could be an aspect of the software, but how about the hardware?

Interviewer A: How many computers have gone down over the year?

Administrator: Four have gone down and fixing them has become a problem. Four of them [Points to the four computers that are out of order]. That white one.

Interviewer A: That white one was dead in the first place.

Administrator: Otherwise, the ones that were functioning have not gone down.

Interviewer A: That is excellent. Those original four, we couldn't get them going in the first place. What happened was when I set it up, I said, "minimum specs" but some people gave us old ones you know. It was not going to work anyway, so it is going to be very difficult to get those up. My suggestion is that we have now given you 4... you got 8 proper ones now and we have another four coming, so that is 12, maybe 14 all together, so still better than only 6. So you are almost tripling. so it should be a little better. And we will set them all up with multimedia capabilities after this. The other ones will be set up with multimedia as well. So I am

quite impressed that none have [died], for the amount of [work] you're doing - Tuesdays/Thursdays, right? [points at **Teacher A**]. You're doing Tuesdays/Thursdays for access for an hour, so overall right, between grades 1-4, how often are these being used? How many hours a week?

Administrator: Maybe, they come here twice a week, and the other three days are for the other classes.

Interviewer A: Right, so every day, basically between 2-3pm, that's computer day. That's an interesting tactic. Its computer day. So you're maximising the use for that one hour.

Interviewer A: Can I ask you why don't you use two hours a day?

Administrator: Because of the population. Because we want each and every child to be able to use the machines. And besides there are also other subjects and classes in the curriculum.

Interviewer B: Because you have the PC lab now, do you think you get more work to do for students? Because from my point of view, it might be kind of extra work?

Teacher A: I don't. Because we told you in the first place that we come for the exercises. So they do it there, and when they get it right we go back. So instead of doing it in their exercise books they come and do it in the computer room.

Interviewer A: Then they can save paper and it saves resources.

Teacher A: So it is like the workload is reduced, especially marking. In the class, half of it they will do it in the computer.

Interviewer B: Because when I am a teacher, when I get new books to use, and new software to use and I have to learn first before I teach my students, it means from some point it is kind of extra work.

Interviewer B: It's hard work.

Administrator: One thing they failed to mention is that the government curriculum does not incorporate digital learning.

Interviewer A: No not yet.

Administrator: Not yet. So transitioning from the manual system to cope with the IT lab requirements you must do a bit of mentoring and training which would be helpful for them [**Interviewer A:** training for the teachers] So that they have [inaudible] And are comfortable to manage the machines.

Interviewer A: Sorry for taking so much time. Its fascinating. So what is your competence level with using a computer? Are you quite competent? [**Teacher B:** not really].

Administrator: They are very beginning [**Interviewer A:** but you are getting better] That is they need to know how to get the computers on, how to use the digital content, how to get and load software, the digital content and the children and so on. That is the basics. But they do require training. They do require training.

Interviewer A: See, my idea is for you to become competent and train them [laughter].

Administrator: Yes, with whatever limited money I have, I will help them.

Interviewer A: Well, **Administrator**, you can see me, and I will help you. Over the year, I

didn't have any contact. The only thing I really heard was that it is going very well, and that is it, so I didn't actually know how they were being used, and so it is interesting. Some of the problems you outlined can be solved if you send me an email," How do I do this?", or, "I have this issue", like when I contacted the person who supplied the Raspberry Pis. I was messaging them yesterday, they asked if I can give them more information and we can solve it. But we managed to solve it ourselves in the end...

[**Technical discussion. Removed from the transcript**]

Interviewer A: Do you have any other questions? Have we covered everything? No? Then, thank you very much for your time.