Technology Consulting in the Global Community
Final Report

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Community Partner, JC Nkulikiyimfura, Deo Kabirigi

Table of Contents

I. About the Organization

Agahozo-Shalom Youth Village, otherwise known as ASYV, is a residential community located an hour outside of Kigali, Rwanda. The community primarily provides an education for children who are orphaned due to the 1994 genocide. As the genocide occurred 20 years ago, the village accepts vulnerable students from a variety of situations.

The mission statement of the organization is

To enable orphaned and vulnerable youth to realize their maximum potential by providingthem with a safe and secure living environment, health care, education and necessary life skills. Education and service are used to model and create socially responsible citizens in Rwanda and around the world.

- *www.asyv.org*

II. An updated Student Information System (SIS) is required

An integrated Student Information System has been in the works for the past couple of years, but a sustainable solution has not been found to capture a complete student profile containing recruitment, formal education, informal education, and alumni information. The 2013 TCinGC students program was just a prototype, and was not user friendly and never touched after the departure of the 2013 consultants. The staff and donors of the village need a user-friendly and stable integrated system with the capability to analyze data and generate reports.

Outcomes.

- Information was collected about why the prototype was not successful, why the subject has not been touched, and future ways to proceed.

Major risks to the sustainability of the task.

- Lack of ASYV staff with suitable IT skills to help
- Unstable network conditions

III. A continuation of Last Year's Hackathon Competition

In one paragraph, give a short description and justification for the first task in the scope of work.

Follow that with a brief description of the outcomes and major risks to the sustainability of the task. Bullet points may prove particularly effective in this section.

If you have a recommendation following up on this task, provide a brief description of it.

To continue the encouragement of last year's TCinGC students in encouraging the students in ASYV to learn programming independently and provide with further resources to explore into IT, the Alice Challenge was renewed for another year. It aimed at seeing if the students were able to organize a competition by themselves, and to see the level of self-learning that could be accomplished by the students.

Outcomes.

- Introduced a later version of Alice 3D interactive programming software called Looking Glass.
- Provided consultation sessions and learning resources.
- Collected and organized feedback.
- Networked with student coding groups in Kigali.

Major risks to the sustainability of the task.

- Needs to be run by an adult with suitable understanding in the program environment

IV. Typing Classes

Technology is the future of Rwanda, with more and more people becoming versed in computer skills. One important skill is typing speed. It's a category on many resumes, CV's, and application forms. The average typing speed in Rwanda is 13 wpm, with the best being able to type up to 40 wpm. ASYV currently uses Typing Master, a program on the computer, to teach typing. The kids learn by themselves. However, with no set curriculum, everyone is at a different typing level, and the children are unprepared for obtaining jobs in the workplace. By creating a typing class curriculum and making sure every student goes through it ASYV would better be able give the children better opportunities for jobs.

Outcomes.

- Installing typing software on all computers.
- Creating a typing curriculum.
- Finding a replacement for after departure.
- Teaching students how to use the typing programming and basics of touch-typing.
- Doubling many of the speeds of the students.

Major risks to the sustainability of the task.

- The replacement is a volunteer, and there will need to keep on finding replacements, with every year finding another teacher.

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Angela is a Junior in Civil and Environmental Engineering with a double in Biomedical Engineering.

Context Analysis

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I. About the Organization

Organization

Agahozo-Shalom Youth Village, otherwise known as ASYV, is a residential community located an hour outside of Kigali, Rwanda. The community primarily provides an education for children who are orphaned due to the 1994 genocide. The village seeks out the most vulnerable children throughout Rwanda to form a class size of about 125. Anne Heyman, founder of the village, modeled ASYV after youth villages in Israel that helped orphans from the holocaust. As the genocide occurred 20 years ago, the village accepts vulnerable students from a variety of situations.

The mission statement of the organization is

To enable orphaned and vulnerable youth to realize their maximum potential by providingthem with a safe and secure living environment, health care, education and necessary life skills. Education and service are used to model and create socially responsible citizens in Rwanda and around the world.

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The village was constructed in 2006, and opened for school in January of 2009 with 125 students. Presently, the school has around 500 students. There are about 200 staff members, totaling almost 700 people in the village. The children live in "families", 16 children to a house, with one housemother. In addition, each family has a big brother or big sister, another Rwandan to give comfort, and in Enrichment Year the family receives one of the English Speaking volunteers as a cousin.

Agahozo-Shalom Youth Village provides both an informal and formal education, promoting a loving and safe environment for the children the mature intellectually and emotionally in. The formal education requirements meet Rwanda's requirements, and informal includes both arts and sports, giving the children a normal education. The children are taught to become balanced adults, with a dedication to make their community and the world a better place.

Technology is of great use at ASYV. For formal education, a computer science track for Seniors 4, 5, 6 exists. For informal education, an IT Club exists, along with several other computer oriented clubs using digital media, and One Laptop Per Child training. There is Internet throughout the village and the school, however the Internet speed, power failures, and the number of computers limit the use of technology. The technology in place are grading systems, student information systems, and learning management system, although it is not utilized.

Facilities

ASYV is comprised of a residential area, school, sports field, amphitheater, dining hall, and a farm, totaling 144 acres. The main areas are the school, also known as LiquidNet Family High School (LNFHS), and the residential area, also known as the village. The school also rents out part of its land to GigaWatt Company, a company building Rwanda's first Solar Panels. The school has 17 classrooms, 3 science labs, 3 computer labs, 1 server room, 1 library, 3 administration offices, 1 volunteer room, 1 social worker/counselor room, and 2 teachers lounges. The village has 32 family houses, 8 staff houses, 4 guesthouses, and 2 clubhouses.

In terms of computers, there are 3 computers lab at school, 2 computer labs in the learning center (science and lab), and student resource center has 6 or 7 machines. In addition, in each family house there is one computer to share among the 16 children and 1 housemother.

There is Wi-Fi throughout the village, but Internet and power are both spotty. When the Internet is working, it is extremely slow. The Internet is connected to the near city of Rwamagana, so when the city is out, ASYV is out as well. The Internet is currently provided by the company New Airtel, but negotiations are in process for a newer internet system. Currently, New Airtel is supposed to provide a 10 megabit full duplex circuit, but the current radios are 10 megabit aggregate, which is really only allowing for 5 megabit. Wonderport Africa is generously donating a Wonderbox to become the proxy and central management for user access to wireless network. The existing Wimax system will be replaced; a new router and proxy server will be installed. The new wireless system will have greater quality of service and enterprise level network control. Ruckus Wireless is also donating equipment to help the Village go from stand-alone radios to a central control for management.

In addition, there is talk of turning the village into a Solar Village, installing solar panels on all of the rooftops, selling the power back on the grid, and pulling energy at night. This is due to the large amount of power outages each week and cost. A large and costly feat, it will pay back after fifteen years. Currently ASYV rents out part of its land to GigaWatt Solar Company, a solar panel company that is pioneering the first of Rwanda's solar energy.

Programs

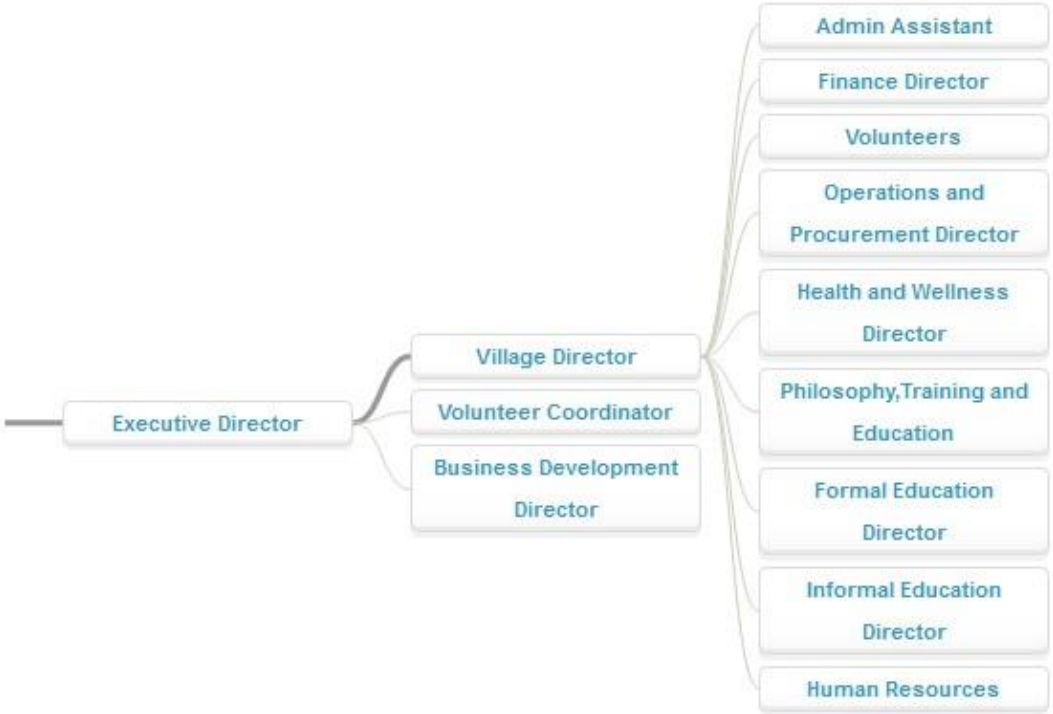
There are three terms in the school year, with two-week breaks in-between them. There are two main programs: formal education and informal education. Formal education comprises of an enrichment year and years Senior 4, 5, and 6. All classes are taught in English. In the enrichment year, students review the material from Senior 1, 2, and 3, which are the last three years of

mandatory education in Rwanda. This is to ensure that all students catch up to the same level, because some students may have not had as good as a prior education as others. All students take courses in French, English, Entrepreneurship, and IT. After enrichment year, each student also chooses to study one of the following combinations of subjects:

- Physics, Computer science, Math
- Biology, Chemistry, Math
- Math, Economics, Computers
- Math, Economics, Geography
- History, Economics, Geography
- Kinyarwanda, English, French

The informal education consists of sports, art education, and service. The art can be anything from digital medial, recording and photography, and movie making. The service portion is called "Tikkun Olam", standing for "repairing the world". The children teach English in nearby schools, build houses for the poorer villages, work in a clinic, or do One Laptop Per Child training. They also can participate in a club, such as Dance, Drums, or Information Technology. For students who show certain potential, there is a TOEFL class and a SAT class. There is also family time from 9-10 pm, where debates, discussions, and activities occur. On Friday evenings, the whole village gathers in the amphitheater, watching the news together and preforming different talents. On Saturday, many volunteer in the farm or watch movies, and on Sundays, they have church services and clean their homes.

Staff



The staff is divided into the New York staff and the Village Staff in Rwanda.

Anne Heyman founded the Village, but recently passed away. A native of South Africa with ties to Israel, she heard about Rwanda through a lecture she went to and committed to helping the vulnerable children.

The Executive Director is Danielle Burnstein, who lives in New York. She just started her position as of January 2014.

Barret Frankel is the Manager of Volunteer Services, who also lives in New York. She is the main coordinator between Carnegie Mellon University and ASYV.

The Village Director, Jean-Claude Nkulikiyimfura, is then in charge of the following positions: Admin Assistant, Finance Director, Volunteers, Operations and Procurement Director, Health and Wellness Director, Philosophy, Training and education, Informal Education Director, Formal Education Director, and Human Resources. He is dedicated to providing a platform and a voice to the voiceless. He received a degree in Mass Communication from the University of Central Arkansas in the United States, and came back to Rwanda as a media and protocol officer in the Office of the President in 2001. He joined Agahozo-Shalom as Director of the Village in July 2011.

The IT Manager is Deo Kabirigi, who is in charge of all IT-related activities. He runs IT club, teaches professional IT skills, trains the kids in One Laptop Per Child, and helped start part of See Far Enterprises.

Eric Salongo Kalisa is the Chief Operating Officer (COO).

Bonaventure Mujyeneza is the Director of Formal Education, also known as LiquidNet Family High School's principal.

Sonia Mikanagu is the Director of Health and Wellness.

Alain Munyaburanga is the Director of Philosophy, Education, and Training.

Jean-Pierre Nkuranga is the Director of Informal Education.

Sylvia Gata-Salama is the Director of Finance and Administration.

Celine Uwineza is Director of Human Resource.

Noella Nyamuniga is Village Administration Assistant.

Lovell Biira is the School's Administration Assistant.

There are Big Brothers, Big Sisters, and Mamas. Mamas live in the house and serve as the main connection between the kids and the staff. Big brothers and big sisters also help mentor the children, often playing other jobs in the village, such as recruitment. The families also have "cousins", the volunteers.

There are 9 volunteers from around the world, who work in Videography & Movie Editing, English & Research Development, Communications & Journalism, Events Management, Database & Logistics, Information and Communications Technology, Advocacy and Partnership, Visitors & Hospitality, Career Development Coordinator and Sports Development, and Arts and Graphic Design. They are also known as "cousins", each serving as a mentor to a family.

The volunteer for Videography & Movie Editing teaches the kids Adobe Photoshop as an Enrichment Program. He also advises the TV Club, where Adobe Photoshop and Pinnacle Studio

are taught. The club is responsible for broadcasting ASYV news and clips from the Rwandan local news every Friday.

All the staff has their own laptops, in addition to each family house owning one laptop. They have access to Internet and basic applications, using Microsoft Word, Excel, and Access the most. There are sessions every Thursdays for 2 hours on how to use technology. Most staff is comfortable with using the technology, with the exception of some of the Mamas. Many of them go to the IT office for help frequently.

Technology Infrastructure

Servers and Computers

Equipment	Name	Operating System	Specification	IP	Location
Server	Earth	Windows Server 2008 R2	CPU: Intel® Pentium® D CPU 2.80 GHz 2.79 GHz RAM: 4.00 GB	192.168.10 0.43	School server room
Server	Sky	Windows Server 2008 R2 64 bit	CPU: Intel® Core™ 2 CPU 6400 @ 2.13GHz 2.13 GHz RAM: 4.00 GB	192.168.10 0.40	School server room
Server	RW0REDIKER	Windows Server 2003 R2 64 bit	CPU: Intel® Pentium® D CPU 2.80 GHz 2.79 GHz RAM: 2.00 GB	192.168.10 0.45	School server room
Server	Fire.lan	Windows XP SP3	CPU: Intel® Atom CPU N270 @ 1.60 GHz 1.61 GHz RAM: 1.00 GB	192.168.10 0.8	School server room
Server	Wood.lan	Windows XP SP3	CPU: Intel® Atom CPU N270 @ 1.60 GHz 1.61 GHz RAM: 1.00 GB	192.168.10 0.7	School server room
Server	Heart.lan	Windows XP SP3	CPU: Intel® Atom CPU N270 @ 1.60 GHz 1.61 GHz RAM: 1.00 GB	192.168.10 0.9	School server room
Server	ASYV LMS			192.168.100.25	School Server Room
RasberryPi				192.168.100.120	School Server Room
Rasberry Pi				172.28.0.15	Science Learning Center
Rasberry Pi				172.18.0.190	Dining Hall

PC	SLC---LAB---01	Windows XP SP3	CPU: Pentium® Dual---core CPU @ 3.00 GHz 3.00 GHz RAM: 3.00 GB	DHCP	Science Learning Center
PC	SLC---LAB---02	Windows XP SP3	CPU: Pentium® Dual---core CPU @ 3.00 GHz 3.00 GHz RAM: 3.00 GB	DHCP	Science Learning Center
PC	SLC---LAB---03	Windows XP SP3	CPU: Pentium® Dual---core CPU @ 3.00 GHz 3.00 GHz RAM: 3.00 GB	DHCP	Science Learning Center
PC	SLC---LAB---04	Windows XP SP3	CPU: Pentium® Dual---core CPU @ 3.00 GHz 3.00 GHz RAM: 3.00 GB	DHCP	Science Learning Center
PC	SLC---LAB---05	Windows XP SP3	CPU: Pentium® Dual---core CPU @ 3.00 GHz 3.00 GHz RAM: 3.00 GB	DHCP	Science Learning Center
PC	SLC---LAB---06	Windows XP SP3	CPU: Pentium® Dual---core CPU @ 3.00 GHz 3.00 GHz RAM: 3.00 GB	DHCP	Science Learning Center
PC	SLC---LAB---07	Windows XP SP3	CPU: Pentium® Dual---core CPU @ 3.00 GHz 3.00 GHz RAM: 3.00 GB	DHCP	Science Learning Center
PC	SLC---LAB---08	Windows XP SP3	CPU: Pentium® Dual---core CPU @ 3.00 GHz 3.00 GHz RAM: 3.00 GB	DHCP	Science Learning Center
PC	SLC---LAB---09	Windows XP SP3	CPU: Pentium® Dual---core	DHCP	Science Learning

			CPU @ 3.00 GHz 3.00 GHz RAM: 3.00 GB		Center
PC	SLC---LAB---10	Windows XP SP3	CPU: Pentium® Dual---core CPU @ 3.00 GHz 3.00 GHz RAM: 3.00 GB	DHCP	Science Learning Center
PC	SLC---LAB---11	Windows XP SP3	CPU: Pentium® Dual---core CPU @ 3.00 GHz 3.00 GHz RAM: 3.00 GB	DHCP	Science Learning Center
PC	SLC---LAB---12	Windows XP SP3	CPU: Pentium® Dual---core CPU @ 3.00 GHz 3.00 GHz RAM: 3.00 GB	DHCP	Science Learning Center
PC	SLC--LAB--13	Windows XP SP3	CPU: Pentium® Dual--core CPU @ 3.00 GHz 3.00GHz 3.00GB	DHCP	Science Learning Center RAM
PC	SLC--LAB--14	Windows XP SP3	CPU: Pentium® Dual--core CPU @ 3.00 GHz 3.00GHz 3.00GB	DHCP	Science Learning Center
PC	SLC--LAB--15	Windows XP SP3	CPU: Pentium® Dual--core CPU @ 3.00 GHz 3.00GHz 3.00GB	DHCP	Science Learning Center
PC	SLC--LAB--16	Windows XP SP3	CPU: Pentium® Dual--core CPU @ 3.00 GHz 3.00GHz 3.00GB	DHCP	Science Learning Center
PC	Recording Studios	OSX 10.5.3 Running on a DELL	CPU: Pentium® Dual--core CPU @ 3.00 GHz 3.00GHz 3.00GB	DHCP	Music Center

PC	SLC-TVLAB-1	Windows 7 Professional 64 bit	CPU: Pentium® Dual--core CPU @ 3.00 GHz 3.00GHz 3.00GB	DHCP	Science Learning Center
PC	SLC-TVLAB-2	Windows 7 Professional 32 bit	CPU: Pentium® Dual--core CPU @ 3.00 GHz 3.00GHz 3.00GB	DHCP	Science Learning Center
PC	SLC-TVLAB-3	Windows 7 Professional 32 bit	CPU: Pentium® Dual--core CPU @ 3.00 GHz 3.00GHz 3.00GB	DHCP	Science Learning Center
PC	SLC---TVLAB---4	Windows 7 Professional 32 bit	CPU: Pentium® Dual---core CPU @ 3.00 GHz 3.00 GHz RAM: 3.00 GB	DHCP	Science Learning Center TV Lab
PC	Agahozo---2	Windows XP Professional SP3	CPU: Intel® Pentium® M professor 1.3 GHz 1.29 GHz RAM: 512MB	DHCP	School administration office
PC	LAB1PC1	Windows XP Professional SP3	CPU: Intel® Atom CPU N270 @ 1.60 GHz 1.61 GHz RAM: 1.00 GB	DHCP	School computer lab
PC	LAB1PC2	Windows XP Professional SP3	CPU: Intel® Atom CPU N270 @ 1.60 GHz 1.61 GHz RAM: 1.00 GB	DHCP	School computer lab
PC	LAB1PC3	Windows XP Professional SP3	CPU: Intel® Atom CPU N270 @ 1.60 GHz 1.61 GHz RAM: 1.00 GB	DHCP	School computer lab

PC	LAB1PC4	Windows XP Professional SP3	CPU: Intel® Atom CPU N270 @ 1.60 GHz 1.61 GHz RAM: 1.00 GB	DHCP	School computer lab
PC	LAB1PC5	Windows XP Professional SP3	CPU: Intel® Atom CPU N270 @ 1.60 GHz 1.61 GHz RAM: 1.00 GB	DHCP	School computer lab
PC	LAB1PC6	Windows XP Professional SP3	CPU: Intel® Atom CPU N270 @ 1.60 GHz 1.61 GHz RAM: 1.00 GB	DHCP	School computer lab
PC	LAB1PC7	Windows XP Professional SP3	CPU: Intel® Atom CPU N270 @ 1.60 GHz 1.61 GHz RAM: 1.00 GB	DHCP	School computer lab
PC	LAB1PC8	Windows XP Professional SP3	CPU: Intel® Atom CPU N270 @ 1.60 GHz 1.61 GHz RAM: 1.00 GB	DHCP	School computer lab
PC	LAB1PC9	Windows XP Professional SP3	CPU: Intel® Atom CPU N270 @ 1.60 GHz 1.61 GHz RAM: 1.00 GB	DHCP	School computer lab
PC	LAB1PC10	Windows XP Professional SP3	CPU: Intel® Atom CPU N270 @ 1.60 GHz 1.61 GHz RAM: 1.00 GB	DHCP	School computer lab
PC	LAB1PC11	Windows XP Professional SP3	CPU: Intel® Atom CPU N270 @ 1.60 GHz 1.61 GHz RAM: 1.00 GB	DHCP	School computer lab
PC	LAB1PC12	Windows XP	CPU: Intel® Atom CPU N270	DHCP	School computer

		Professional SP3	@ 1.60 GHz 1.61 GHz RAM: 1.00 GB		lab
PC	LAB1PC13	Windows XP Professional SP3	CPU: Intel® Atom CPU N270 @ 1.60 GHz 1.61 GHz RAM: 1.00 GB	DHCP	School computer lab
PC	LAB1PC14	Windows XP Professional SP3	CPU: Intel® Atom CPU N270 @ 1.60 GHz 1.61 GHz RAM: 1.00 GB	DHCP	School computer lab
PC	LAB1PC15	Windows XP Professional SP3	CPU: Intel® Atom CPU N270 @ 1.60 GHz 1.61 GHz RAM: 1.00 GB	DHCP	School computer lab
PC	LAB1PC16	Windows XP Professional SP3	CPU: Intel® Atom CPU N270 @ 1.60 GHz 1.61 GHz RAM: 1.00 GB	DHCP	School computer lab
PC	LAB1PC18	Windows XP Professional SP3	CPU: Intel® Atom CPU N270 @ 1.60 GHz 1.61 GHz RAM: 1.00 GB	DHCP	School computer lab
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PC	LAB1PC21	Windows XP Professional SP3	CPU: Intel® Atom CPU N270 @ 1.60 GHz 1.61 GHz RAM: 1.00 GB	DHCP	School computer lab

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PC	LAB2PC26	Windows XP Professional SP3	CPU: Intel® Atom CPU N270 @ 1.60 GHz 1.61 GHz RAM: 1.00 GB	DHCP	School computer lab

Equipment	Name	Operating System	Specification	IP	Location
PC	LAB3PC1	Windows XP SP3	CPU: Intel® Atom CPU N270 @ 1.60 GHz 1.61 GHz RAM: 1.00 GB	DHCP	School computer lab
PC	LAB3PC2	Windows XP SP3	CPU: Intel® Atom CPU N270 @ 1.60 GHz 1.61 GHz RAM: 1.00 GB	DHCP	School computer lab
PC	LAB3PC3	Windows XP SP3	CPU: Intel® Atom CPU N270 @ 1.60 GHz 1.61 GHz RAM: 1.00 GB	DHCP	School computer lab
PC	LAB3PC4	Windows XP SP3	CPU: Intel® Atom CPU N270 @ 1.60 GHz 1.61 GHz RAM: 1.00 GB	DHCP	School computer lab
PC	LAB3PC5	Windows XP Professional SP3	CPU: Intel® Atom CPU N270 @ 1.60 GHz 1.61 GHz RAM: 1.00 GB	DHCP	School computer lab
PC	LAB3PC6	Windows XP Professional SP3	CPU: Intel® Atom CPU N270 @ 1.60 GHz 1.61 GHz RAM: 1.00 GB	DHCP	School computer lab

PC	LAB3PC7	Windows XP Professional SP3	CPU: Intel® Atom CPU N270 @ 1.60 GHz 1.61 GHz RAM: 1.00 GB	DHCP	School computer lab
PC	LAB3PC8	Windows XP Professional SP3	CPU: Intel® Atom CPU N270 @ 1.60 GHz 1.61 GHz RAM: 1.00 GB	DHCP	School computer lab
PC	LAB3PC9	Windows XP Professional SP3	CPU: Intel® Atom CPU N270 @ 1.60 GHz 1.61 GHz RAM: 1.00 GB	DHCP	School computer lab
PC	LAB3PC10	Windows XP Professional SP3	CPU: Intel® Atom CPU N270 @ 1.60 GHz 1.61 GHz RAM: 1.00 GB	DHCP	School computer lab
PC	LAB3PC11	Windows XP Professional SP3	CPU: Intel® Atom CPU N270 @ 1.60 GHz 1.61 GHz RAM: 1.00 GB	DHCP	School computer lab
PC	LAB3PC22	Windows XP Professional SP3	CPU: Intel® Atom CPU N270 @ 1.60 GHz 1.61 GHz RAM: 1.00 GB	DHCP	School computer lab
PC	LAB3PC23	Windows XP Professional SP3	CPU: Intel® Atom CPU N270 @ 1.60 GHz 1.61 GHz RAM: 1.00 GB	DHCP	School computer lab
PC	LAB3PC24	Windows XP Professional SP3	CPU: Intel® Atom CPU N270 @ 1.60 GHz 1.61 GHz RAM: 1.00 GB	DHCP	School computer lab

PC	LAB3PC25	Windows XP Professional SP3	CPU: Intel® Atom CPU N270 @ 1.60 GHz 1.61 GHz RAM: 1.00 GB	DHCP	School computer lab
PC	LAB3PC26	Windows XP Professional SP3	CPU: Intel® Atom CPU N270 @ 1.60 GHz 1.61 GHz RAM: 1.00 GB	DHCP	School computer lab

This table was developed by previous TCinGC students, and the only changes were the upgrade of all computers to Windows XP and 3 new RaspberryPis.

Wireless Equipment

Name	Type	IP	Role	Location
ASYV LMS	Server	192.168.100.25	Learning Management System	School - Comp Lab 2 (C10)
Earth	Server	192.168.100.43	DC, FS	School S1
Fire	Server	192.168.1.35		School S1
Heart	Server	192.168.1.64	Web server, intranet	School S1
Sea	Server	192.168.100.45	Rediker	School S1
Sky	Server	192.168.100.40	DC-p, BackUp	School S1
Wood	Server	192.168.1.66	Web server, Wood.lan	School S1
HP Laserjet 2055	Printer	172.24.0.242 Dyn	Printer	Administration Conf room
HP Laserjet 2014	Printer	USB	Printer	Orange - Student Resource
Administration	Network	192.168.1.24 172.24.0.1	Router	Administration Conf room?
AdministrationAP	Network	172.24.0.2	Access Point	Administration?
DiningHall	Network	192.168.1.18 172.18.0.1	Uplink	Dining hall
DiningHallAP	Network	172.18.0.2	Access Point	Dining hall
Guest2	Network	172.21.0.23	Uplink	Guest house 2
Guest2AP	Network	172.21.0.67	Access Point	Guest House 2
Guest3NE	Network	172.21.0.30	Uplink - Access Point	Guest House 3 NE
Guest3NW	Network	172.21.0.91	Access Point	Guest House 3 NW
House02	Network	172.21.0.20	Access Point	Hosue 02
House05	Network	172.21.0.39	Uplink	House 05

House05da	Network	172.21.0.28	Access Point	House 05
House05oa	Network	172.21.0.10	Access Point	House 05
House11	Network	172.21.0.6	Uplink - Access Point	House 11
House13	Network	172.21.0.42	Uplink	House 13
House13AP	Network	172.21.0.54	Access Point	House 13
House16	Network	172.21.0.72	Uplink	House 16
House16AP	Network	172.21.0.75	Access Point	House 16
House21	Network	172.21.0.57	Uplink	House 21
House21AP	Network	172.21.0.61	Access Point	House 21
house24	Network	172.21.0.49	Uplink - Access Point	House 24
House25	Network	172.21.0.83	Uplink - Access Point	House 25
House29	Network	172.21.0.74	Uplink	House29 SW
House29 AP	Network	172.21.0.44	Access Point	House 29 NE
House46 Uplink	Network	172.28.0.46	Uplink	House 46
House46 AP	Network	172.28.0.47	Access Point	House46 Inside
LearningCenter	Network	192.168.1.28 172.28.0.1	Uplink	Learning Centre
LearningCenterNW	Network	172.28.0.24	Access Point	Learning Center
LearningCenterSE	Network	172.28.0.54	Access Point	Learning Center
LinkSys	Network	192.168.1.1	Router	Learning Centre - Drivers Office
Residence	Network	192.168.1.21 172.21.0.1	Uplink	Water Tower
Residence	Network	172.21.0.2	Access Point	Water Tower
Core	Network	192.168.1.1 41.197.41.2/29	Router	School S1
Core AP	Network	192.168.1.2	Access Point	School Roof
School AP	Network	192.168.100.2	Access Point	School Roof
School Router	Network	192.168.100.1 192.168.1.27	Uplink - Access Point	School S1
Core Antenna - New Artel	Network	192.168.169.21	Uplink	School Roof
Core Antenna - Rwamagana	Network	192.168.169.20	Access Point	Rwamagana District Office
Orange Clubhouse	Network	192.168.2.1	Uplink - Access Point	Orange - Student Resource

Technology Management

Deo and the IT volunteer, Simon, do the managing of their technology infrastructure. There are also two interns, students that have just graduated ASYV and are transitioning to university or another job. Because of that, Interns are always changing. To log problems, a form is filled out in the IT office. Simon then puts it into an excel spreadsheet, and highlights the problem when it is finished. Maintenance of equipment is all over the place, with equipment barely broken being put away in storage and dug out months later, the problem unknown. Simon is currently working on fixing all the equipment in storage.

An IT club is also available for help. LiquidNet provides external support, visiting every year for maintenance.

Technology Planning

About once a year, LiquidNet sends a team to assist ASYV with their wireless issues. Last year, The Liquidnet team and CMU students did maintenance and site survey, replacing Aps and directional antennas.

Currently, a business initiative is being pushed by the board of ASYV to start a digitalization company called See Far Enterprises. The company will take the graduates out of ASYV and train them to transfer papers and documents into PDF files to decrease the space physically taken. Deo is in charge of planning the company, hiring and creating training for the upcoming year.

Communication

Information is shared using Email. ASYV has a domain hosted off of Google (asyv.org). Since the Internet is not stable, it is not reliable. There is an intranet, and an internal file sharing system, however it is not used as much. All the staff and volunteers are easily reachable by cell phones, and have a plan with the local network so they can call and text each other for free, which is the best way of communication.

Information Management

There are 3 main servers called Sky, Earth, and Sea. Earth is the file server where all the information is stored and shared. Information such as Attendance, Health, Inventory, and student information system are being used.

Business Systems

Christine Icyigetse is in charge of accounting. She uses Codipaie to manage payroll, salaries, and staff information.

II. Student Information System

Motivation

ASYV wants to further continue the SIS system and make a database that stores everything from the recruitment period of students to alumni status. Previously, TCinGC students have created a customized solution of the SIS system, which is no longer being used in the village. It is almost never touched, based on the lack of training, and not easy to use.

The Alumni Database is being managed by one full time staff member, a fellow, and an intern. The reason why alumni are important to keep track of are because of the numerous amounts of donations that ASYV receives. The donors would like to know if ASYV is sustainable in which the children do not reenter poverty and where they are in the world. The donors would like information such as:

- What percentage of graduates are studying abroad?
- What percentage of female/male graduates are studying abroad?
- What percentage of female/male graduates are in college?
- What percentage of female/male graduates are around locally?
- What percentages of people who drop out are from the eastern providence -> should they look out for certain people from certain providences?
- What percentage of people drop out are pregnant?
- What percentage of people have internships?
- What is the female: male ratio?
- What are the grades?
- What are certain trends?
- Where are most of our students living now?

The process of obtaining this information is also very difficult, having the workers calling or being sent into the field to locate this information takes well over a week. When the students leave ASYV, they create their own families, where one person is in charge of a couple other people, so that they can always have a chain of people for support and contact. If the information was stored somewhere and could be managed by the Alumni themselves, it would be very helpful to ASYV.

It needs to be a system that works on the intranet, and then uploads onto the Internet when connected, but cannot rely on the Internet. However, last years TCinGC students wrote "This allows users to access the system from anytime and anywhere, even from the New York office. Also, having this hosted off-site from the local server improves reliability, as the local server is susceptible to power outages and operating systems issues." In addition, the system has to be very easy to use and require very little data entry since the average typing speed is 25 wpm and takes hours for them to type in simple data.

A sustainable SIS would help keep track of the students and make sure they are fulfilling ASYV's dream after graduation in becoming socially responsible citizens.

Outcomes

The custom system is a well-justified idea for which there is not a cheaper, more sustainable solution. A customer relationship management system (CRM) or a constituent management system would be more ideal. They provide support, and can change the field names in which the areas ASYV would require. However, nothing functional and sustainable is free. Open source SIS systems are an option, but then again, they do not have support. There are forums that one can ask questions in, but it would be best if there were someone who could be there full time to give support. KLabs in CMU Rwanda was mentioned as a resource, but it's a growing field and the

students there are not viable options. If you want support and feel like the system might change in the upcoming years, you have to pay. An option was to use open source and to make sure Deo knows how to do it very well to make any changes.

In a consultation with Professor Michel of CMU Rwanda, he highlighted that a customized solution is not a good idea. This is because this involves a huge amount of work, high risk of sustainability and possibly a plethora of bugs to fix, and given out short time frame of 10 weeks.

The current system is a working prototype, is user friendly and can meet the urgent need of the village; however, there is a need for a local person in the community to maintain the system where necessary. TCinGC students last year had a meeting with Deo to explain to him on his role and responsibilities of managing the system as a system administrator. Deo has also been given full access to the code on the Heroku server as a collaborator, where he is authorized to make changes to the code. However, Deo did not know how to access to code when asked, and the code has not been touched since the departure of 2013 TCinGC students.

This year a new SIS system was not built or implemented. This was due to the inadequacy of time or resources given. Throughout the 10-week period here, the database has been very infrequently talked about. When asked to see the current alumni database or information about data, it was never sent, even after inquiries every week. Deo has been overwhelmingly busy with the current IT workload and See Far Enterprises, as well as other staff members. After researching and downloading many open source and free CRM systems, none of them were deemed reasonable for ASYV's needs. There was no time to visit other schools in Rwanda that have customized solutions.

Instead, information was collected for future references. Several Opensource and CRM systems were tested, such as Project Fedena, Kuali Student, openSIS, RosarioSIS, Centre/SIS, sugarCRM, edGenuiti, Pipeliner CRM, OnContact, and Microsoft Dynamics. None of these options suited ASYV's needs, so future options were explored.

The instruction of the 2013 Prototype was a possibility, however most of the staff does not see the prototype as user friendly. All other options require outsourcing to different companies.

Recommendations

Continuation of 2013 TCinGC students prototype. If ASYV does not want to spend any money at all and wants a system to fit their needs, they may continue to use the prototype system. I highly advised against this, but if needed, training sessions can be created. These members were noted as advisors and contact for the working prototype should there be an urgent need for support. None of them were ever contacted when ASYV stopped using the SIS. It was never broken; it seems to be working perfectly fine. The problem did not lie in the systems code, it was in the ability to use it. These members and their contacts are:

Getkeep - Michael Benedict (michael@getkeep.com)

Liquid Net – Val Zhupan (vzhupan@liquidnet.com)

Liquid Net – Jim Westerby (jwesterby@liquidnet.com)

KLab – Migisha Kalisa Claude (mikaclau@gmail.com)

CMU Rwanda – Professor Bezy (bezy@andrew.cmu.edu)

Creation of a new SIS. The prototype was meant for the users to see what they liked and disliked so that they could tell the local vendor. Outsourcing to another vendor would cost money, but create a quality SIS. Local vendors with provable experience would be ideal; besides, there are many mature commercial products providing good international support and customization. With improved Internet connection within the village, cloud service can be considered as it enables convenient maintenance and data backup. The major risk involved in this solution is high cost. On top of that, choosing a qualified vendor is critical. These contacts were found from last years TCinGC students.

Rwanda Gateway (http://www.gateway.rw)

Kigali Coders (http://www.kigalicoders.com)

Netsys Computers (http://www.netsyscomputers.com/en)

Art Kenya Web Design (http://www.artkenya.net/softwaredevelopment.htm)

Kenya Web (http://www.kenyaweb.com/)

In general, they found contacts that are within Africa (rather than from America), because firstly, the vendors in Africa have a better understanding of the local situation as compared to America, and secondly, because they operate in the same time zone.

Work with Carnegie Mellon University. Withdrawn from the TCinGC program, there are two other options for the creation of the SIS system. Dean Andy Wasser (wasser1@andrew.cmu.edu) visited in Week Four and is inquiring about making this a capstone project, working over the cloud, and making sure many students can provide support. In addition, CMU Rwanda, Professor Bezy (bezy@andrew.cmu.edu), has projects for their Masters in Science and Technology students team term projects. I highly recommend using CMU Rwanda, since they understand ASYV on a deeper level and can travel to ASYV on a 5$ budget.

Cloud based system. Even with the new network being installed in the Village, I would rather not have the system hosted on the Internet. I would prefer the system being hosted on the local server and updating to the cloud when there is Internet to preserve the content and allow access to the New York office.

III. Alice: Looking Glass Competition

The 2013 TCinGC students created a Hackathon in order to teach the kids basics of programming. The students are highly motivated to learn more about technology, but if not in the Computer Science track in Formal Education, they would not take the initiative to learn how to program. The

2013 Hackathon used Carnegie Mellon University's educational programming software called Alice. Alice uses drag and drop technology to produce 3D graphics, creating a story.

Last years competition lasted for one week with 20 students competing. The students enjoyed a creative opportunity to express their ideas, and upon arrival, students asked if a 2014 competition would be held. By helping plan the second Alice Competition, and giving students more of a roll in the planning, a tradition could start in which the kids can start organizing competitions themselves.

Outcomes

2014 ASYV Alice Challenge Schedule		
Date	Item	Description
9 June	Project Launch	• Looking Glass demo & Competition announcement
9 June – 10 June	Project Preparation	• Upload resources on the server for reference • Conduct registration • Ideas brainstorming • Software (Looking Glass) installation in the computer labs
16 June – 27 June	Coding & Consultation	• Consultation sessions • Provide assistance and monitor team progress • Finalize judges and presentation details • Design the feedback form
27 June	Teams Presentation	• Evaluate the participants' projects according to the competition rubrics
23 July	Prize Presentation	• Present metals • Follow-up networking

This year Washington University in St Louis's version of Alice, Looking Glass, was used. This is due to more advanced features and giving the students another software to learn. 18 students were registered, but only 13 students showed up to consultation sessions, and only 9 submitted final presentations. The competition occurred over several weeks, instead of one week. This was due to the students wishes to have more time, and the overwhelming amount of activities going on during that time period. This competition mirrored last years, but with individuals rather than teams. Many students expressed that they would like to try the software on their own and that they feel it would prepare them more. The competition was measured on similar metrics as last year, with a weight being the presentation so they do not overwhelmed with a programming weight. There were two different themes this year, not to limit the students. One was freestyle, and the other was about the student's dreams and passions in the future. This topic was chosen because the students are always dreaming about their future

The free time of the students was very low during this time period. No students in Enrichment Year or Senior 4 participated, since there after school timetable consisted of only one hour of free time. Many students in Senior 5 and Senior 6 also were extremely busy if involved in other clubs, otherwise they had only slightly more free time. Often the first free time the students would have is starting at 9 pm each night, going until 11 or 12 when Agahozo requires students to be in bed in order to have a good nights sleep. Office hours were made everyday where students could come and ask questions, or the lab was specifically opened for the students in the competition. Some problems that occurred where the lab was common space for multiple groups of people, and students would always want to come in to do research or other projects. The second week of the competition the Hackathon's location moved to Orange Clubhouse, so the participants had their own space and never had to wait for a computer.

In the feedback process, many students indicated that there was too much going on in the village at the time to focus, and they wish they had more time. However, all of the students wished to learn more programming, and after the competition ended, the students started teaching their friends Looking Glass and asking to borrow laptops to hold demonstrations, show off their projects, and help others learn how to program.

The top three winners of the competition were invited to Hack Out Loud, a coding competition held in Kigali, Rwanda. I accompanied them to the competition, sponsored by HeHe Limited. However, most of the Hackathon was lectures and speeches from workers at the Hackathon, and the students did not actually get to program as they ran out of time.

Recommendations

Organizers. This competition was partly run by the winner of last year's competition. The TCinGC students from prior years asked the winner of last year's competition to help organize. Doing this though was very difficult, the student kept on changing the time of office hours/meetings/presentations based on his schedule, and was not very reliable. Using another environment this year also threw off the students knowledge of the program. I would not try and plan it with a student next time.

All the competitions in the village are currently run by another fellow because of the difficulty with scheduling and prize coordination. I propose having CMU consultants in the future under the Technology Consulting in the Global Community program to seek assistance with another fellow to execute the competition smoothly.

Tool. Looking Glass is visually appealing to the eye. Its easiness of learning makes it attractive to newcomers to programming. It has more options then Alice, making it more appealing. As a 3D interactive animation environment, it motivates girls to learn programming by unleashing many styles for every character and object. Because Alice was used the prior year and Looking Glass was a newer expansion for Alice, it seemed like the perfect tool for competition, helping the students express themselves. The students learn Scratch in IT class, and do not enjoy it as well. However, Looking Glass caused several problems. At the time of competition, there were many bugs, causing several projects to be erased and lost on the last day. The program freezes quite a lot due to its high graphics and memory usage on slow computer systems. There is also no export function, so when the students want to show their projects, they have to do it through Looking Glass rather than save it on VLC, requiring them to have access to a computer that has Looking Glass on it.

Time and Training. There never seemed to be a time that everyone was free. All the grades have different activities at different times. During the night time, the students were constantly watching all the world cup games until midnight, and time management was a huge issue. Since there was a large amount of time between the start and the end of the competition, some students got to have more time than others, since Senior 6 was booked solid for a couple days at a time. The next time this competition happens, I would highly suggest doing a lot of the office hours during the weekends when there are not as much activities going on. If Looking Glass is used in following years, I would suggest using the participants of this years competition as individual mentors for each student. As the only one in the whole village who knew how to use Looking Glass, the small amounts of times when we could have office hours limited greatly my ability to help the students for large amounts of time.

Structure. In last years Alice Challenge competition, the students worked in teams. Teams were not chosen this year because the students easily formed groups of those who were most experienced and those who were not experienced at all, creating a divide and a feeling of unwantedness. However, this year many people did not present their final product since they did not feel their project was up to par. Therefore, in future competitions, I propose to randomly match the students, and practice teamwork, if not mentorship.

Follow-up. The Facebook group from last year, Code 4 Good Rwanda, has not been touched since the summer of 2013. The students were connected with students from HeHe Limited, who showed them their inventions over the years and how they created them. The students from HeHe limited did what the students from ASYV wanted to do, which is create tools to help Rwanda. HeHe offered them mentorship and shown interest in recruiting the graduates in the following years, helping to benefit the students in practical IT experience and career development.

III. Typing Classes

Technology is the future of Rwanda, with more and more people becoming versed in computer skills. One important skill is typing speed. It's a category on many resumes, CV's, and application forms. The average typing speed in Rwanda is 13 wpm, with the best being able to type up to 40 wpm. ASYV currently uses Typing Master, a program on the computer, to teach typing. The kids learn by themselves. However, with no set curriculum, everyone is at a different typing level, and the children are unprepared for obtaining jobs in the workplace. By creating a typing class curriculum and making sure every student goes through it ASYV would better be able give the children better opportunities for jobs.

The typing is evaluated currently in typing competitions. The IT department runs the typing competitions, and certificates are given out. However, not all students join the competition, so there is no measurement currently. In the last competition, 60 kids out of 500 students participated.

Outcomes

Typing is a serious concern for ASYV. The students have dangerously low typing speeds, as seen selected classes in Figure 4. There are four grades: Enrichment Year, Senior Four, Senior Five, and Senior Six. At the time, Enrichment Year and Senior Five have computer classes during school, and senior 6 has typing classes after school. In the first two weeks before the classes started due to scheduling issues, I created curriculum for the school for beginners and advanced students, installed and tested several typing games and educational programs, and set lesson plans. The current system

to test typing is Typing Master, which has an educational part that teaches how to type, but it is just a demo, only teaching 8 keys. Typing Master is going to be continued to use, since they use it as the testing program, and also it contains several fun games. Rapid Typing is the typing software I chose to install in addition to Typing Master. This is due to several reasons:

- Rapid Typing highlights the letters as the student types, turning green, yellow, or red for correctness and speed.
- Rapid Typing can take any text and turn it into beginner, intermediate, hard, or expert by changing the size of the font, the speed threshold, the accuracy threshold, the highlighting, and the inability to use backspace.
- Rapid Typing does letter by letter analysis, showing the speed and accuracy for each letter
- Rapid Typing has an on screen keyboard that highlights the key and the finger needed to use. In addition, if the key hit is wrong, it appears in red, and the students can trace the key needed to hit with the key actually hit and find where the keys are without looking.
- You can input your own text as a lesson plan. I made several lesson plans after studying many lesson plans and the relationships between different letters. The program simply uses the text and adjusts the text to be a lesson.
- You can save your scores from previous times and track progress over time.

In addition to Rapid Typing, I found several games on Typing Master, which I taught the students how to play. This increased their attention span to the subject matter and encouraged them to practice outside of class. There are several different games focusing on speed or accuracy, incorporating pleasing visual graphics.

The first week of classes I made them take a typing test, in which I received the following scores.

Class	EYA	EYB	EYD	Group 1 S5	Group 2 S5	Group 1 S6	Group 2 S6	Group 3 S6
Speed (WPM)	7.6	12.12	10	10.6	6.48	6	3	2.52
Accuracy (%)	74.1	62	84	83.78	60.84	69	44	49

The scores are dangerously low for what the worldwide average is, and due to the rise of technological jobs in Rwanda, typing speed is vital on every resume. The goal set for ASYV is 18 words per minute, the lowest score for ASYV's digitalization company See Far Enterprises. Many of the issues included the large amount of students, the limited time period and the lack of resources. There was a language barrier between the Enrichment year students and I, and the lesson plans designed take much longer. For example, a ten-minute typing test lasted an hour. Many of these students are new to technology as a whole, and do not understand why typing is important, and do not try. However ASYV wants to start typing classes at Enrichment Year so that they are prepared by the time they leave ASYV.

The students had two classes each. This was due to the large amount of students (500) and the small number of computers available at any given time (25). Due to this, my time was split up into one hour chunks for Enrichment Year – Senior 5, and then 3 hour time periods for senior 6. With

the Holidays, Stand Up, and Exams, I only had two classes each with the students. However, between the first test and the last test, the average scores improved between 12-57%.

By letting the students know that typing was important and giving them the tools to practice, I believe that the typing speeds will increase. The importance of the classes was not so I could teach them each individual letter, but so I could explain how the typing program works, why its important to use a specific finger for a specific key, and to emphasize practicing. By giving them the tools, the students would come into open computer labs and practice typing, increasing their accuracy and then speed.

There was also the issue of identifying someone to take over the typing classes after my departure. Rwandans do not type as fast as me, or know how to properly type. The students that graduate and are Internets stay for small terms. The short-term solution was another IT volunteers to take over for the third term, and to revisit in the following years. Training the IT teacher would be the best solution if the school was to work the typing curriculum into the school, because then the integration of the classes would flow flawlessly and the need to hire an additional teacher would eradicate.

Recommendations

Curriculum. In the 2015-2016 school year, I believe ASYV should start to make typing a permanent part of the IT class, instead of just a temporary here-and-there class. The creation of permanent times ensures that kids know it's a typing class when they come to class. At that time period, everything on the computer should be locked down to which they can only go on the typing periods, and not on the Internet.

Hardware. The new computers donated should be put in an open area but locked down physically so that the equipment can't be stolen. The machines could be locked down so that the only program they can access is Typing Master or Rapid Typing. This way the kids can always practice regardless of a staff member letting them into a computer lab and wasting their own time watching kids type.

Grading and Teaching. Grading was difficult. Some students type 33 words per minute, and some type 0 at the beginning. At the end of the term, they asked me if I wanted to put their typing score on their report card. I said no, because there had only been two classes for each student over a four-week period. In the future, I would grade on posture and improvement, but not all students made it to two classes to see improvement.
For future instructors, everyone is at a different level, so I would suggest everyone to go at his or her own pace. That is very hard. They know how to use rapid typing and I've included a tutorial, but it is very self-explanatory. The instructor doesn't have to teach them anything but to stress that finger placements are crucial. I would ask them from time to time where the fingers go, and walk around. I also covered their fingers with paper over the keyboard, so that way they wouldn't look. It takes awhile to get used to, but you can request tape from the store, and tape paper at the top edge of the keyboard and they can slide their hands under and not look. I recommend keeping the paper over the hands at all time, so when it comes time to actually take a test and practice, their speed will increase because they may glance at their fingers if needed.

When not doing anything else, I recommend the person taking over typing sit in Orange or the IT office and do their work there. That way the kids can see that they are available and they can go practice. Typing is something you don't have to supervise unless they ask you specific questions, so when doing other work you can give them the opportunity to practice if they want.