

Zambia Digital Schools

Phase 2 Interim Report
November 2019



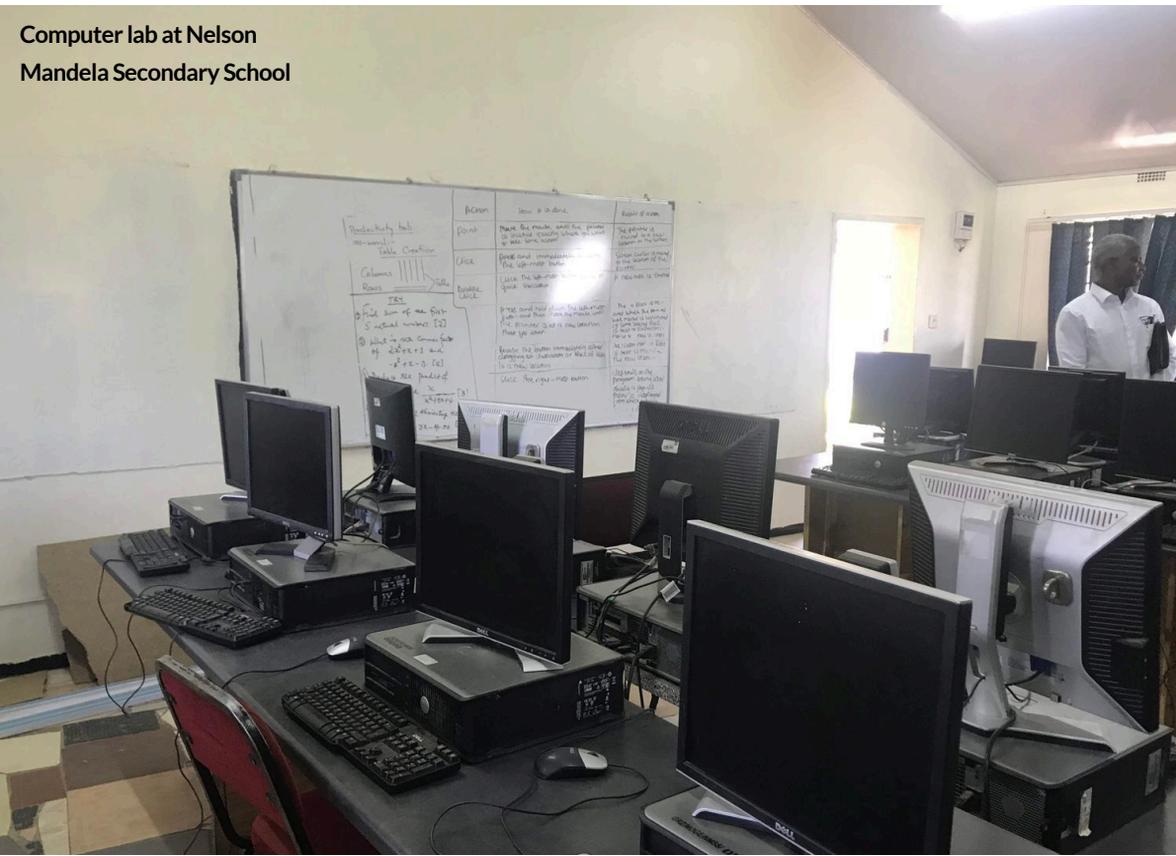
Introduction

The Zambia Digital Schools project, now in its second phase, is working to strengthen teacher, student and educational outcomes at 10 Secondary schools across Lusaka. In Phase 1, the schools had a computer lab setup and capacity building was provided to teachers in basic ICT modules.

Phase 2 is focusing on coding skills; initially through teachers being trained in the 'Computing' and 'Using Databases' ICDL module exploring coding and database concepts. Schools have undertaken coding workshops and coding clubs will be implemented across schools in early 2020, in an effort to increase opportunities for students to code at school with oversight from their newly-trained teachers. Therefore, students should benefit from better-skilled teachers who have been certified in the 2 mentioned ICDL modules and basic coding skills should improve at the schools.

Baseline surveys for Phase 2 of the project were completed in October 2019, with principals, students and teachers. The results from the baseline monitoring will be discussed in this report.

Computer lab at Nelson Mandela Secondary School



Output Progression

Coding Workshop

Activities for phase 2 of the project began in May 2019, during Computer Aid's visit to Zambia. The plan was to build on the skills teachers had gained in Phase 1 and to train teachers so that they could implement the Computer Studies curriculum for Senior Level (Grades 10-12). Teachers from across the schools were gathered for an introductory coding workshop led by staff from the Asikana Network (an Zambian organisation that seeks to increase the participation of women and girls in technology). The purpose of the session was to introduce the training plan and Computer Studies curriculum to teachers. Unfortunately the session was not particularly successful, partly due to the poorly prepared trainers and also because the curriculum was too ambitious given the teachers' levels of ICT literacy.

Further Teacher ICDL Training

As a result of the Asikana coding workshop, it was decided that it would be more beneficial to engage with the ICDL trainers from the University of Zambia to train 2 teachers from each school, focusing on two intermediate modules 'Using Databases' and 'Computing'. The Database module explores how to use a database application (such as Microsoft Access) and extract information through a variety of tools. The Computing module explores computational thinking and coding to create simple computer. The teacher ICDL training began in late July 2019 and ran across August at the University of Zambia. Teachers from New Matero were not included as they failed to sit their ICDL modules in Phase 1. Additionally, after repeated absences from 2 teachers from Chelston, 1 teacher from Ndeke and 1 teacher from Bayuni, these teachers were dropped as they had missed too much training content, leaving a total of 14 teachers who were assessed in the modules.

Baseline Survey

The baseline surveys for principals, teachers and students at the 10 schools were carried out in October 2019. In Phase 2, the purpose of the baseline survey was to gauge changes particularly in the access and usage of the computer labs at the schools. The Phase 2 student baseline for Zambia was also the largest student sample size obtained in Zambia, with 219 students completing the survey.



Teacher ICDL training at the University of Zambia in 'Using Databases' module

Timeline Adjustments

There have been a few changes to the original project timeline:

- •
Due to the issues with Asikana training and the change in plan with regards to training, ICDL training began in July 2019.
- •
The Baseline monitoring took place in October 2019 rather than August 2019.
- •
The in-country visit will take place in November 2019, in order to prepare for the coding club

	2019					2020				
	ZAMBIA DIGITAL SCHOOLS - PHASE 2									
	Apr-19	Jul-19	Aug-19	Oct-19	Nov-19	Jan-20	Feb-20	Mar-20	Apr-20	May-20
COMPUTER AID INTERNATIONAL										
Baseline Monitoring				Baseline						
Visit					V					
Interim Report Y2					I. R 2					
Endline & School Metrics Monitoring								Endline		
Final Report Y2										F. R 2
SCHOOLNET and ASIKANA										
Coding Workshop in schools										
ICDL Training teachers										
Coding Club Implementation										

Teacher meeting at
Shinfwankula computer lab



Interim Outcomes

The baseline survey was conducted in October 2019 in collaboration with SchoolNET Zambia (SNZ), who oversaw the process in-country. With SNZ's support, we were able to obtain a larger sample size for the student survey (219 responses) than in Phase 1, in addition to responses from 10 principals and 30 of the ICDL trained teachers.

Principal Survey

The principal survey attempted to understand how schools are now utilising their computer labs in Phase 2 of the project. Principals were asked how the computer lab at their school is being utilised and all principals indicated that the labs are being used for teaching of the ICT syllabus and also for ICT examinations. Additionally, some schools such as Kabulonga Girls are using the lab for extra-curricular club activities. Schools which have internet access operate the computer labs as internet cafes during break-time. All principals confirmed that the computer labs are being used in some way for other subjects too, for example, teachers preparing lesson content, accessing the Connect Device, printing documents for classes, test preparation, record keeping for student grades and having classes in the lab.

Schools generally seem committed to providing further ICT training to members of staff, though their strategies differ. Some schools hope to utilise the teachers who've already been trained, others hope to enrol further teachers on training courses and expand ICT training to further student grades.

Tamara Phiri Chigaga, *Principal at Nyumba Yanga Secondary School*



"The school will continue supporting teachers and learners in terms of acquiring advanced skills in ICT. The teachers who were trained by ICDL will be supported further to make sure that the knowledge acquired during the training is passed on to other teachers and learners too."

When asked which subjects other than Computer Studies are using the lab the most, Science was the most common response, with 7 principals mentioning this. Maths was also mentioned by at least half the principals, with other mentions including Business Studies and History.

Principals were asked about the Grade 9 Computer Studies assessments in order to understand whether any change had occurred in these results because of the project intervention. In the 2017-18 academic year, an average of 108 students passed the Computer studies assessment across all 10 schools and an average of 25 students failed.

The passes were almost split evenly between males and females, although **60%** of fails were by females. The average pass mark was **78%** across all 10 schools

In comparison, during the 2018-19 academic year, an average of 135 students passed the Grade 9 Computer Studies assessment across all 10 schools. Again the split of passes across the schools was very close, with slightly more males (**52%**) passing than females (**48%**). An average of 26 students failed the assessment across all 10 schools, so the pass to fail ratio has increased, though almost **70%** of fails are by females. Finally, the average pass mark stayed consistent between both academic years.

Shumba Loveness Lubaba, *Principal at Ndeke Secondary School*



"Learners enjoy working on computers and teachers use the lab to research and type exam questions for end of term without looking for people to type for them. Even report cards are done in the lab by a group of teachers."

Some schools noted that there has been more efficiency in the completion of school examinations because of the computer lab, whilst a few schools like Nyumba Yanga are now implementing Computer Studies to senior students. **70%** of schools indicated that there has been an increase in graduates either from Junior to Senior Level, or from Senior level to University.

When asked how many students moved from Junior to Senior level, responses indicated than on average 135 students across the 10 schools continue to Senior level. Data for graduates from Senior level to University is harder to obtain and it seems schools aren't completely aware of these numbers.

Finally, principals were asked if any other major changes were occurring at the schools; 3 schools mentioned that they are building science labs (Ndeke, Bayuni and Nelson Mandela). Principals also mentioned recruitment drives to get more staff and improve teacher to student ratios.

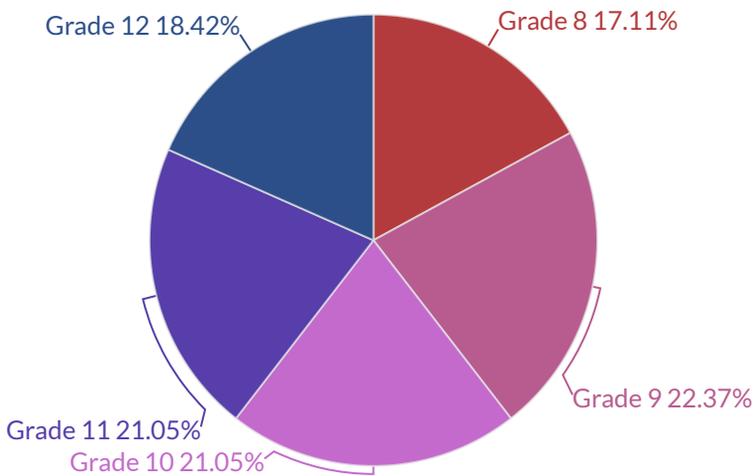


Teacher graduation ceremony, with representatives from project partners

Teacher Survey

30 trained teachers completed the Stage 2 baseline survey. Chart 1 (C1) below shows which grades teachers teach, split for Primary and Secondary level.

C1. Teacher Grade Breakdown



C1 indicates that there is a mostly even distribution of grades taught by the trained teachers, with most teaching Grade 9. This could be because of the Computer Studies assessment which occurs in Grade 9.

Teachers teach an average of 335 students per week across all 10 schools, with the highest student figures being at New Matero and Twin Palm and the lowest student figure being at Nyumba Yanga. Most of the trained teachers teach Computer Studies (47%) and Maths (40%), with some also teaching Science, Business Studies and Languages.

Sonny Tembo, Teacher at Ndeke Secondary School



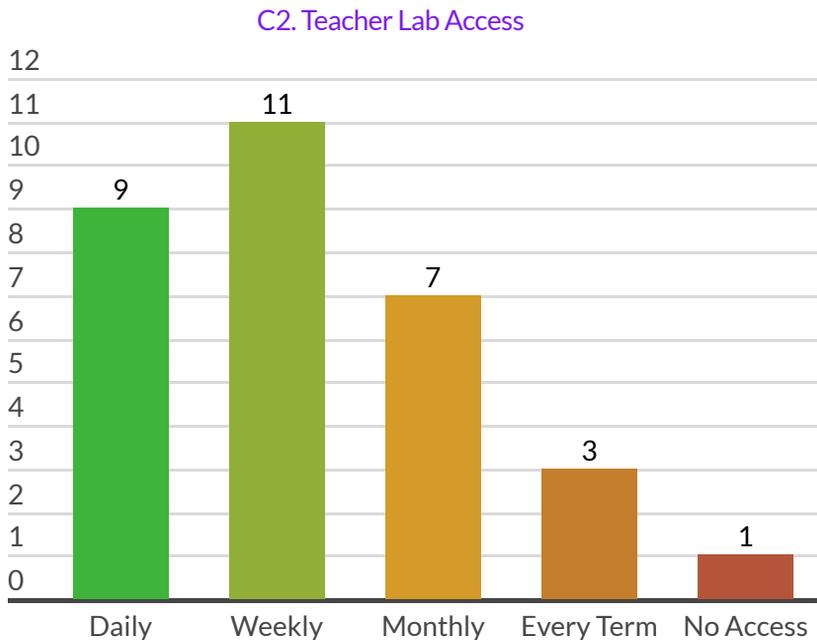
"I prepare powerpoint lessons and conduct lesson planning on the computer. Learners also watch videos depending on what they are learning e.g. ICT in Everyday Life and I show short videos on how computers have influenced our lives.."

Mubele Mambo, Teacher at Nyumba Yanga Secondary School



"The ICDL qualification has benefited me a lot in terms of databases which i was unable to teach before undergoing the training. As for now, i am able to deliver databases, pseudocode and algorithms properly to the senior grades 10, 11 and 12 after undergoing the training.."

According to teachers, most of them use the lab weekly as part of their teaching. Chart 2 (C2) below shows the breakdown of computer lab access for teachers.



With the exception of 9 teachers, **70%** of teachers access their respective computer labs daily or weekly for teaching. When teachers are accessing the computer lab for teaching, **83%** teach for 80 minutes (often a double 40 minute period). Only teachers at Chelston Secondary School teach for slightly shorter (usually double periods totalling 70 minutes). Across all schools, most teachers are teaching in the lab for 3 hours per week.

A majority of **87%** of teachers have found ICDL training to be 'Very Useful', with only four teachers stating that it was 'Somewhat Beneficial'.



Maud Kamwengo-Mkangaza, Teacher at *Kabulonga Girls Secondary School*

"I have used the lab to create a collection of lesson plans, content, additional exercises, preparation of test assessment and research topics to be taught."

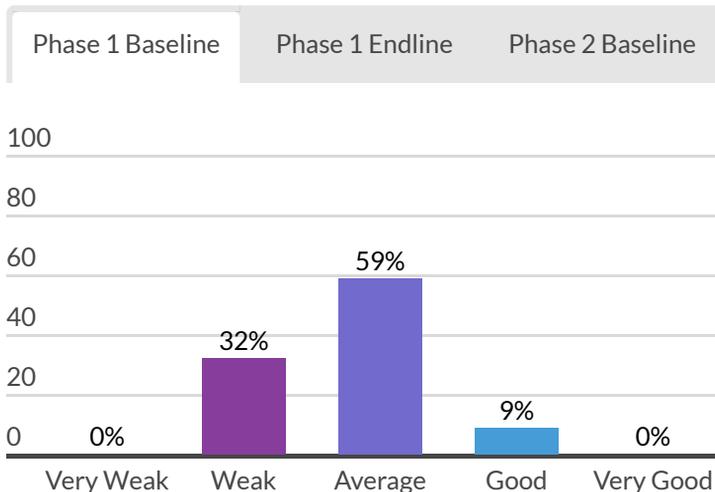


Audrey Kazhila, Teacher at *Kaunda Square Secondary School*

"The ICDL qualification has made me gain more confidence in my teaching as I had a number of challenges to deliver a perfect lesson in the past."

Chart 3 (C3) below shows teacher ratings for their ICT skills. Across all school, most teachers indicate that their ICT skills are 'Good'.

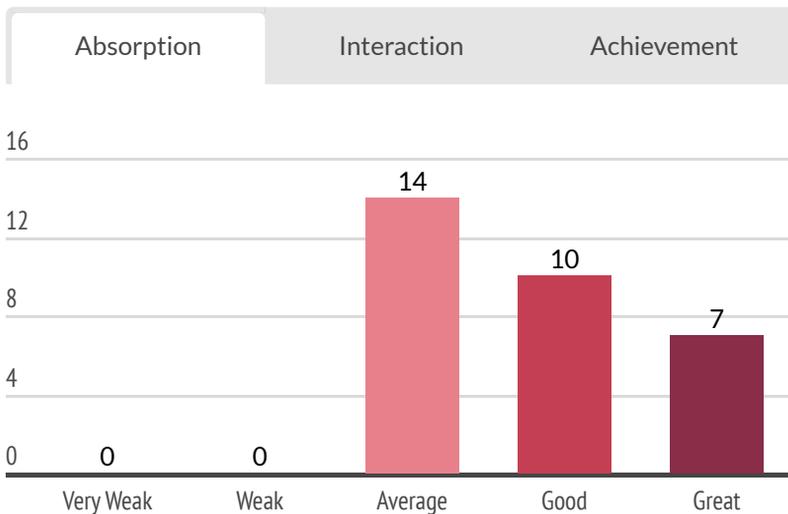
C3. Teacher Skill Confidence Ratings



C3 indicates that there has been a consistent improvement in the levels of teacher confidence with regards to ICT skills; this has been across every survey so far.

Chart 4 (C4) below shows how teachers have rated students levels during a class in the computer lab. Student absorption is ranked as 'Average' to 'Great' by all teachers in the survey, whilst most felt that interaction in the lab was 'Great'. Achievement levels were ranked evenly between 'Average' and 'Great'.

C4. Teacher Rating Students





Banda Gabriel, Teacher at Nelson Mandela Secondary School

"I find my work very interesting and as such my level of achievement has been improved. My perception of the world and technology too has changed."

Teachers were asked how they have been using the assistive technology and the most popular answer was to project a PowerPoint presentation to the class. The projectors are also used with speakers to show videos to classes and a number of teachers described using video to visualise a science experiment that they could not conduct in class.

With regards to the Connect Device, there were a real mix of responses, with schools who have internet not utilising the device so often, though this varied depending on the teacher. Just over half the sample (58%) stated they use the device often and 42% stating they don't use the device so often.

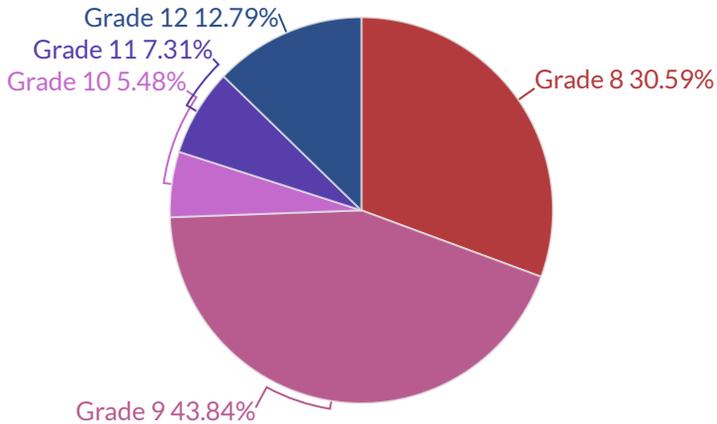


A class utilising the Connect Device at Nyumba Yanga Secondary School

Student Survey

The student survey was completed by 219 students across 10 schools, with an average of 22 students completing at each school. C5 below shows the breakdown of grades for students who completed the survey.

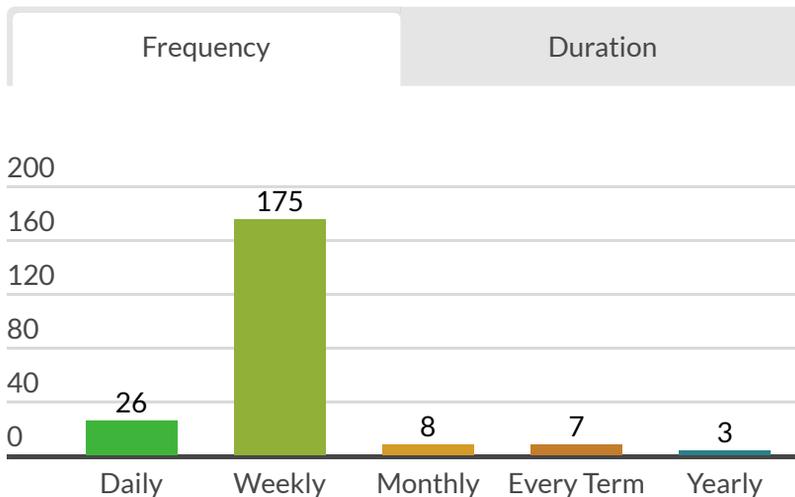
C5. Student Survey Grade Breakdown



Most students who completed the survey are in Grade 9 (44%), most likely because Grade 9 students most consistently access the labs across schools because of the Grade 9 Computer Studies assessment; of the 219 students who completed the survey, 135 (62%) first accessed a computer as part of the project.

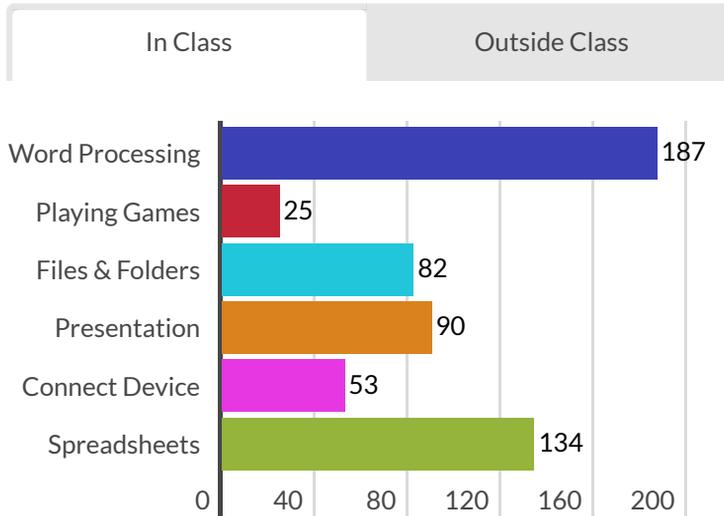
C6 below shows computer lab access for students as part of a class. Most students are accessing the computer lab for class weekly (80%), and mostly for more than 60 minutes (63%). This is consistent with what teachers mentioned of double periods in the computer lab, with a class lasting 80 minutes.

C6. Student Lab Access - During a Class



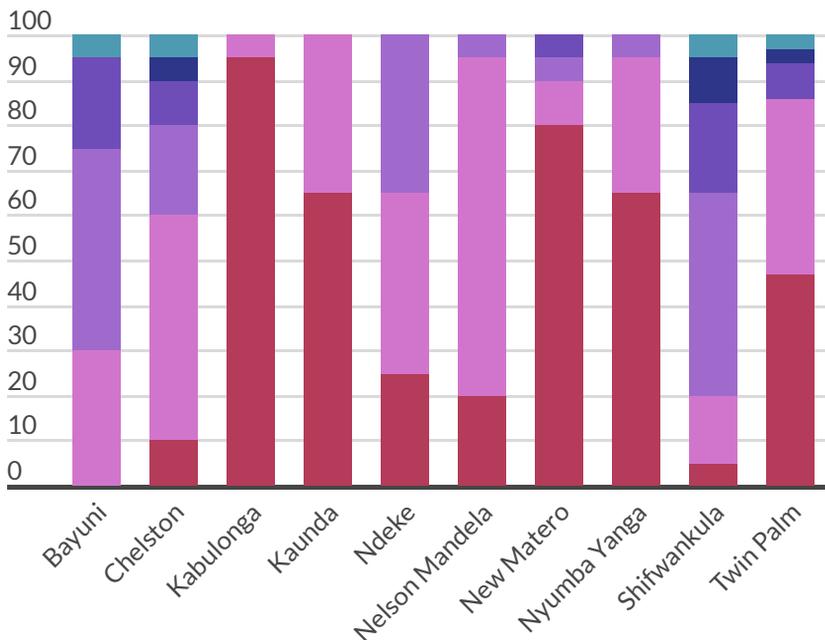
C7 below shows student usage and which types of tasks students are completing on the computers, during class and outside of class. Unsurprisingly, playing games increases outside of class.

C7. Student Lab Usage



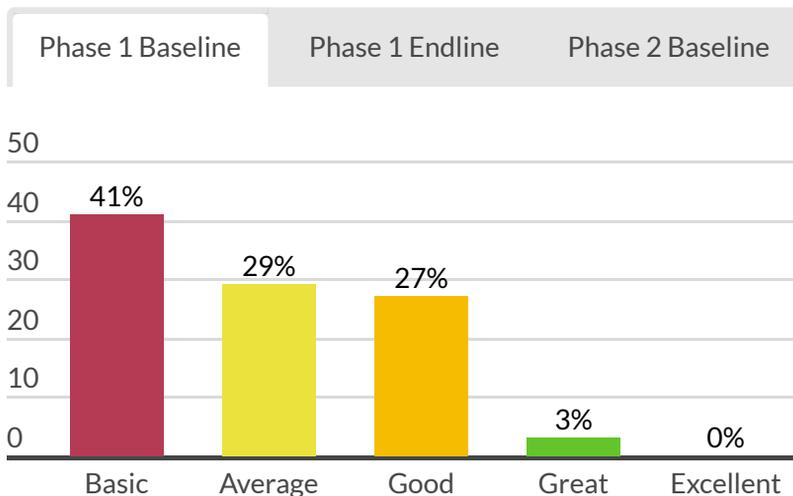
C8 below indicates what the computer to student ratio is within classes. Students were asked how many classmates they share a computer with, during a typical lesson in the computer lab. The chart indicates that at most schools, most students (90%) are using the computer alone, or sharing a computer with 1 or 2 classmates. Shifwankula and Bayuni have the worst student to computer ratios in classes, whilst Kabulonga and Kaunda Sqaure have the best ratios.

C8. Student-to-Computer Ratio in Class



C9 below indicates students' overall ranking with computers at various times in Phase 1 and 2. Given that the sample sizes are different in the surveys, we will look at the percentage of respondents who categorise themselves in various categories and compare to see if there has been any improvement.

C9. Student Ability Comparison



The results from C9 indicate that there has been a substantial improvement in the way students rate their abilities across the 10 schools. Whilst 41% of students surveyed in the Phase 1 baseline felt their computer skills were 'Basic', in Phase 2 that number has dropped to 1%. Additionally, 62% of students surveyed in Phase 2 feel that they have 'Good' or 'Great' computer skills. It should be noted that these results are somewhat subjective, however, observing this clear shift in results across the 10 schools and 3 surveys is promising.

When students were asked to rank their classmates ability with ICT, the results largely mirrored C9 (Phase 2 Baseline), with most students feeling their classmates had 'Good' ICT skills. When comparing these results with the data from C9, students generally felt that their classmates had a similar skill level to themselves, or a slightly inferior level of ICT skills.



Victoria Kasonkomona, Grade 8 student at *Chelston Secondary School*

"There were days when I asked my dad if I can remain in the computer lab and he accepted."



Natasha Thornicroft, Grade 9 student at *Kabulonga Girls Secondary School*

"My favourite memory is when we learnt about multimedia files and my ICT teacher showed us how to shoot a video and how to edit the video with software."

C10. Difficulty Obtaining Computer - Outside of Class

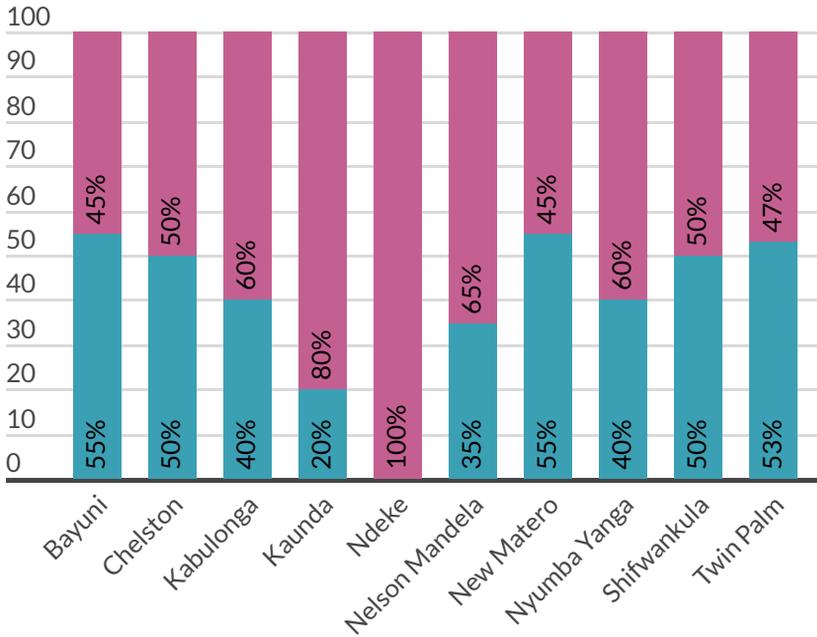


Chart 10 above indicates how difficult it is to access a computer outside of class, according to the students. The chart is also broken down by school in order to see which schools suffer most from this issue. Most schools have a mix of responses, however Ndeke was the most promising, with 100% of students stating they don't have an issue accessing a computer outside of class. Schools like Kabulonga which have a better student to computer ratio in class, still have a high demand for computers outside of class, meaning that it can be difficult for students to access.

More students expressed difficulty accessing a computer outside class at New Matero and Twin Palm Secondary School.



Students at Kaunda Square Secondary School

Further Quotes From Students

"I spend most of my time in the lab because I go there early before afternoon classes to study."

"The lab also gives me time to refresh my mind by playing games."

"I had fun learning with my friends, this was my favourite moment in the lab."

"The lab has made me a computer genius!"

"I can prepare my PowerPoint presentations on my own."

"My favourite memory in the lab was when I learned how to use Microsoft Access and how to develop a database."

"It doesn't take much time for the teacher to explain concepts."

"My favourite memory is when I was reading a book through the Connect Device."

"I have been able to learn languages like French through the use of a projector."



A Grade 9 student at Chelston Secondary School

Interim ICDL Results

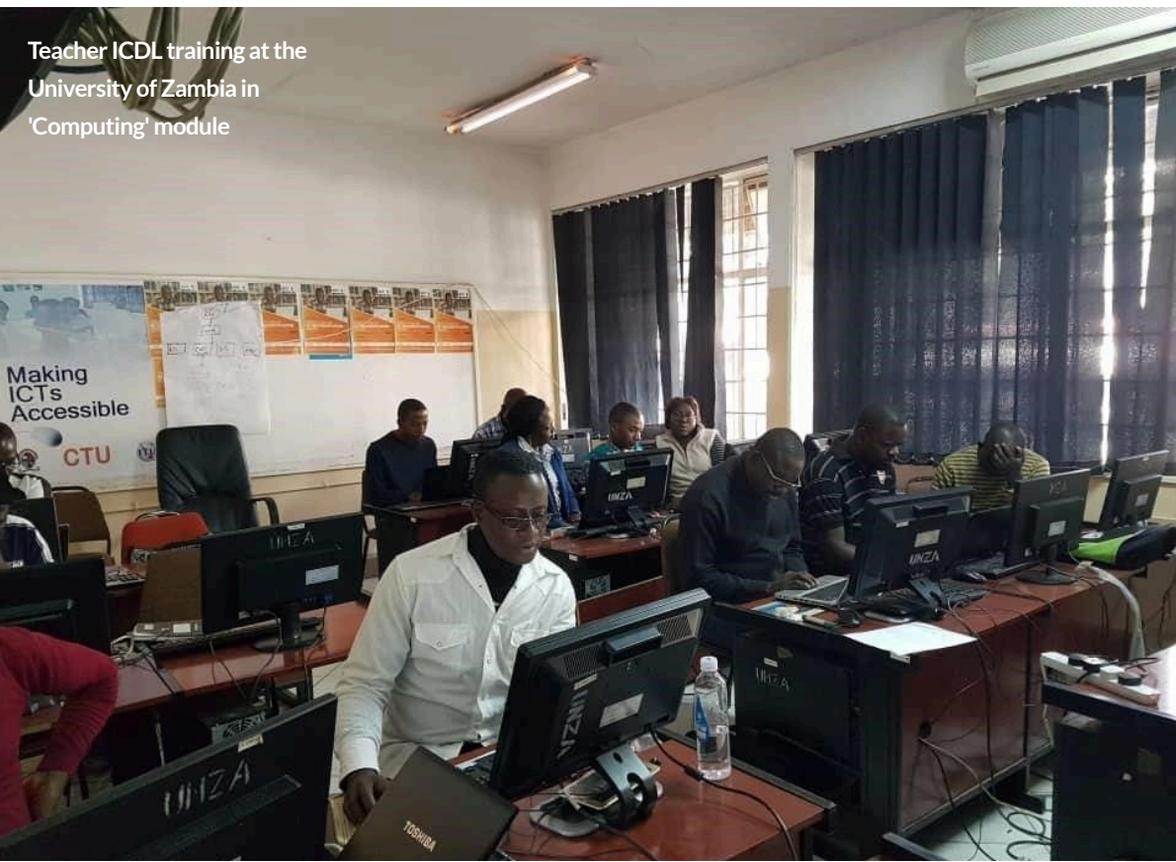
The table below shows the results for all ICDL assessments taken in Phase 2 of the project.

MODULE	NUMBER OF PASSES	NUMBER OF FAILS	HIGHEST SCORE	AVERAGE SCORE
Computing	13	4	94%	82%
Using Databases	13	13	100%	72%

The results indicate that 13 teachers have passed each module, though the 'Using Databases' module appears more challenging for the teachers given the higher number of fails and lower average score. These results are promising in that all but one teacher have passed both modules.

As a result of teachers across 8 of the schools passing ICDL assessment in 'Using Databases' and 'Computing', 8 schools will implement coding clubs in early 2020. Sadly because of Chelston and New Matero's absence from the training, it will be harder to implement a coding club at these schools.

Teacher ICDL training at the University of Zambia in 'Computing' module



Overall ICDL Results

The table below shows the results for all ICDL assessments taken across both Phase 1 and 2, from a total cohort of 30 teachers.

MODULE TYPE	MODULE	NUMBER OF PASSES	NUMBER OF FAILS	HIGHEST SCORE	AVERAGE PASS SCORE
Base	Computer Essentials	25	18	100%	84%
Base	Word Processing	22	20	100%	87%
Base	Online Essentials	20	4	100%	85%
Base	Spreadsheets	20	11	94%	83%
Intermediate	ICT In Education	20	0	100%	87%
Intermediate	Computing	13	4	94%	86%
Intermediate	Using	13	13	100%	85%

Teacher ICDL graduation



SUSTAINABLE DEVELOPMENT GOALS

4 QUALITY EDUCATION



Quality Education

This project contributes to Target 4.4 of SDG 4 which states:

By 2030, substantially increase the number of youth and adults who have relevant skills, including technical and vocational skills, for employment, decent jobs and entrepreneurship.

Both teachers and students at project schools are directly gaining and have the opportunity to gain relevant technical skills that will improve their job prospects, contributing to Target 4.4.

5 GENDER EQUALITY



Gender Equality

This project contributes to Target 5.B of SDG 5 which states:

Enhance the use of enabling technology, in particular information and communications technology, to promote the empowerment of women.

By working exclusively with schools with similar ratios of boys to girls and in some cases having more female students, usage of equipment by both genders ensures that no individual is excluded.

9 INDUSTRY, INNOVATION AND INFRASTRUCTURE



Industry, Innovation And Infrastructure

This project contributes to Target 9.C of SDG 9 which states:

Significantly increase access to information and communications technology and strive to provide universal and affordable access to the Internet in least developed countries by 2020.

By providing 10 schools with computer labs and assistive technology such as projectors, thousands of students have access information and communications technology.

12 RESPONSIBLE CONSUMPTION AND PRODUCTION



Responsible Consumption And Production

This project contributes to Target 12.5 of SDG 12 which states:

By 2030, substantially reduce waste generation through prevention, reduction, recycling and reuse.

ICT Equipment used in projects is donated largely from companies; equipment is data-wiped and refurbished before being sent to projects. Therefore, this project is promoting the reuse of equipment and reducing e-waste.

Next Steps

The Zambia Digital Schools project has delivered a number of outputs in Phase 2, however, further outputs and outcomes are expected in the coming months.

The teacher from Nelson Mandela who hasn't passed either ICDL module yet will be re-assessed before the coding clubs are implemented.

Coding clubs across the schools will be implemented in January 2020 in an effort to utilise teachers who have been certified in the 'Computing' and 'Using Databases' ICDL modules. Students should benefit from these coding clubs which in many cases will be the first opportunity for them to gain coding skills.

The endline survey will run over March and April, with principals also completing school metrics surveys during this time. The results from these surveys will be presented in the final report, including a comparison of school metrics from Phase 1 and Phase 2. We hope to see a positive change in data regarding the level of absences, retention and school grades in STEM subjects.



Students at Shifwankula Secondary School

Summary

In summary, the Zambia Digital Schools project is progressing in Phase 2 with improved outcomes in computer access, usage and skills as data in the Phase 2 Baseline survey indicates. The data from the surveys is promising since it largely presents what we would expect: increased access of the computer lab, consecutive improvements in teacher and student confidence levels with each monitoring exercise, and more diverse content exploration and software usage.

Thirteen teachers have passed assessment and been certified in the ICDL 'Computing' and 'Using Databases' modules and these teachers will be instrumental in delivering the upcoming coding clubs at their schools. Some of the schools may also offer Computer Studies as an elective at a Senior level (Grade 10-12).

Computer Aid will visit the schools in November 2019 ahead of the coding club implementation in January 2020, and all future updates and monitoring will be presented in the final report due in May 2020.



**Students at Kabulonga
Girls Secondary School**