Rwanda Digital Schools

Phase 1 Final Report

December2021

Introduction

The Rwanda Digital Schools project has been working to improve teacher, student and educational outcomes at 8 Secondary schools across Kigali. This has been achieved by installing fully-functioning computer labs at each of the 8 schools and 3 teachers from each of the schools have taken part in ICDL training to improve their competencies with ICT.

Computing equipment was released from customs in early October and computer labs installations began in late October. continuing into November. As computer lab installations have been completed at schools, students have been accessing and completing the Student Baseline Survey soon after.

Output Progression

November 2019 - November 2021

School Selection & Refurbishment

Schools selected for the project were chosen based on a number of criteria including their need for modernising and infrastructure improvements, their capacity for equipment, and their ability to successfully sustain the labs. The Rwandan Education Board (REB), part of the Ministry of Education, led this process and ensured that schools chosen were not overly privileged. School selection was finalised by October 2020.

Teacher Laptop Delivery

Laptops for teachers were cleared from customs in February 2021 and were distributed to the schools in Kigali in March 2021, shortly before the start of ICT training. Teachers were utilising these laptops in order to take part in online ICDL training through Zoom.

Teacher ICDL Training

Teacher ICDL training was originally meant to occur in person, but due to the pandemic the training was adapted to take place online. The 24 teachers across the 8 schools began online training in March 2021 and concluded in May 2021. The teachers covered 6 modules in total covering Computer Essentials, Online Essentials, Word Processing, Spreadsheets, Presentations, and ICT in Education. The results from the ICDL teacher assessments are presented on Page 13 of this report.

Teacher Baseline Survey

The teacher baseline survey was conducted during a Zoom ICDL training session on the 13th of April. The link to the survey was shared on the call and teachers began completing the survey. The results of this survey are presented on Pages 6-8.

Computer Lab Installations

Computer lab implementation began on the final week of October across the schools. ICT equipment was delivered sequentially to each of the schools and equipment was then installed. The installation included not only computers and monitors, but also setting-up workbenches and all assistive technology including printers, projectors and speakers. All labs were setup by the end of November 2021.

Student Baseline Survey

Students began completing the baseline survey on 5th November at Rutabo Secondary School which was the first school to have its computer lab setup. Responses continued into November as more schools had their computer lab setup. The results of the student survey are explored on Pages 9-11.

Principal Metrics Survey

The School Metrics surveys were completed by principals across all schools, starting on the 8th November. This survey focuses on data around student and teacher attendance, absence, retention and also student grades in key STEM subjects. Data will be collected again to see how these metrics alter over the course of the project. Summary of metrics data is presented on Page 12.

Positive Impacts

The REB selected only public schools that had very few or no machines and needed help. Along with selecting the schools, the REB has been supporting all of them further with extra machines, ICT teachers or Internet. It's the first time that the Ministry of Education's intervention was so positive in the Digital Schools Project. It also shows that they will be keeping a closer commitment to these schools during the length of the project and beyond.

- One ICT teacher has been appointed by REB at one school (Cyimbazi) and 3 more will be appointed in 2022 in 3 schools (Nyigariseke, Rutabo and St. Vincent Pallotti).
- REB installed Internet for free in 3 schools (Gitanda, Nyigariseke, St. Vinvent Pallotti) and will install in 3 more in 2022 (Cyimbazi, Busanza, Musave).
- REB offered extra machines at St. Vincent Pallotti and will install more in 2 schools in 2022 (Cymbazi, Musave).
- 2 schools will increase the number of students studying Computer Science at senior level in January 2022 (Busanza, Pallotti) and 1 school is planning to offer this subject in September 2022 (Nyigariseke).

Teacher Baseline

A summary of the key quantitative and qualitative data from the teacher baseline survey is presented below. Chart 1 shows that most teachers are teaching Secondary Grades 1 & 2, so ages 13 and 14. Chart 2 indicates that 41% of teachers hadn't used a computer before the project. That's a considerable portion starting with no prior access to computers.

Chart 1: Teacher Grades

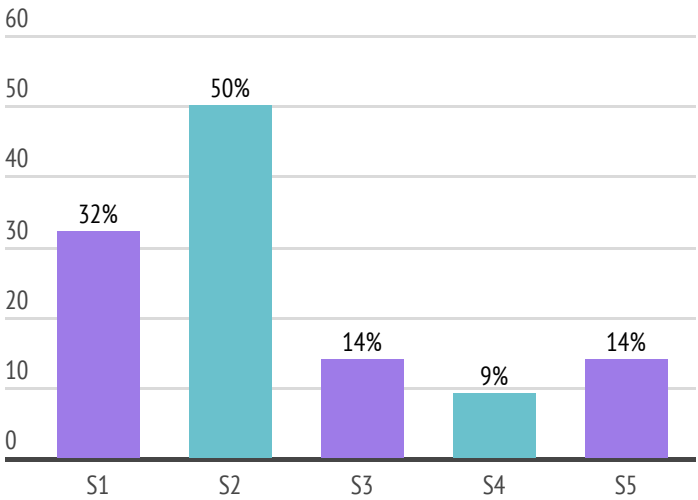
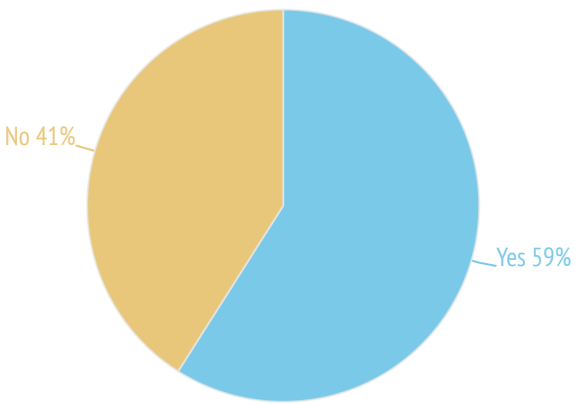


Chart 2: Prior Computer Access



Eugene Ndamyabera, Secondary 1 & 2 Teacher *at Nyiragiseke Secondary School*

"Lessons have previously been prepared using traditional means: paper and pen. Now we are excited for changes to our teaching."

When asked how useful the ICDL training will be, 86% of teachers responded 'Very Beneficial' with a quote below explaining why this was the case.

Violet Uwiragiye, Secondary 2 Maths and ICT Teacher *at Nyabagenwa Secondary School*

"Through this project, I hope we will overcome a lack of teaching resources, lack of practical skills, and lack of digital lesson preparation."

Chart 3: Teacher ICT Skill Confidence

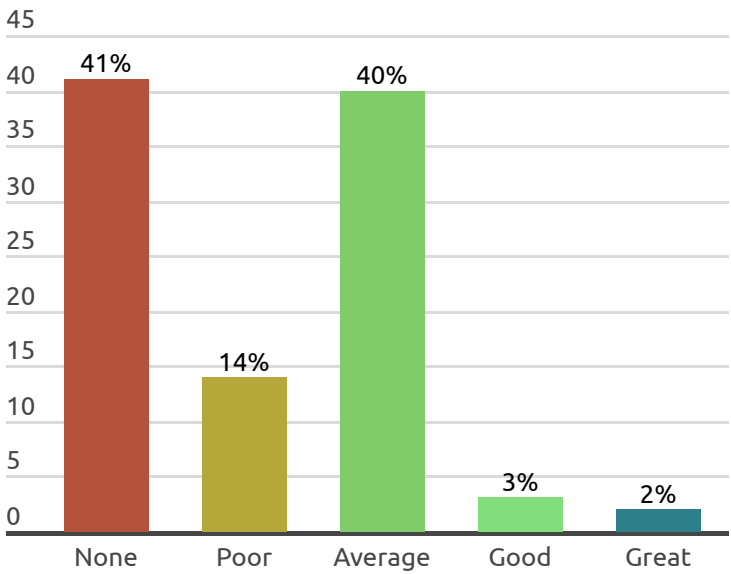


Chart 3 above shows teacher confidence levels in ICT at the Baseline Survey. 41% of teachers have no skills given that they have not accessed a computer before. The majority of teachers who have previously used a computer categorise themselves as having 'Poor' (14%) or Average (40%) computer skills.

Chart 4: Student Class Indicators

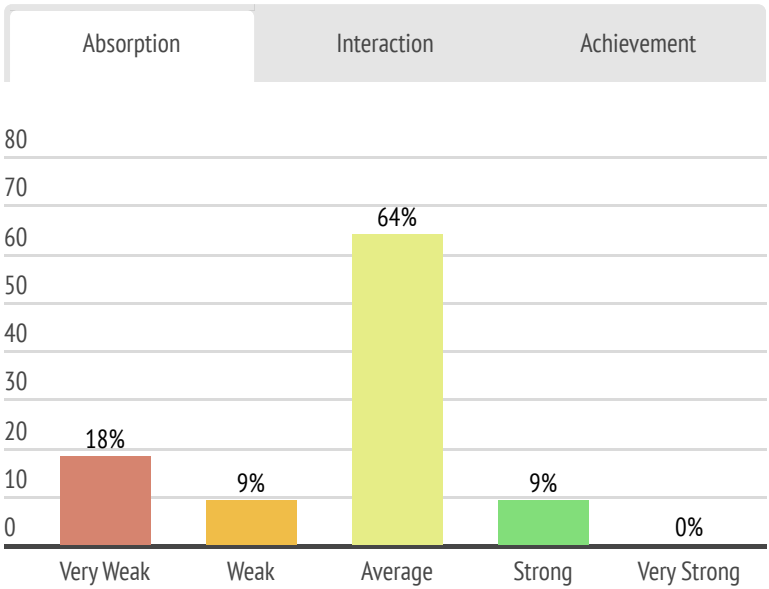
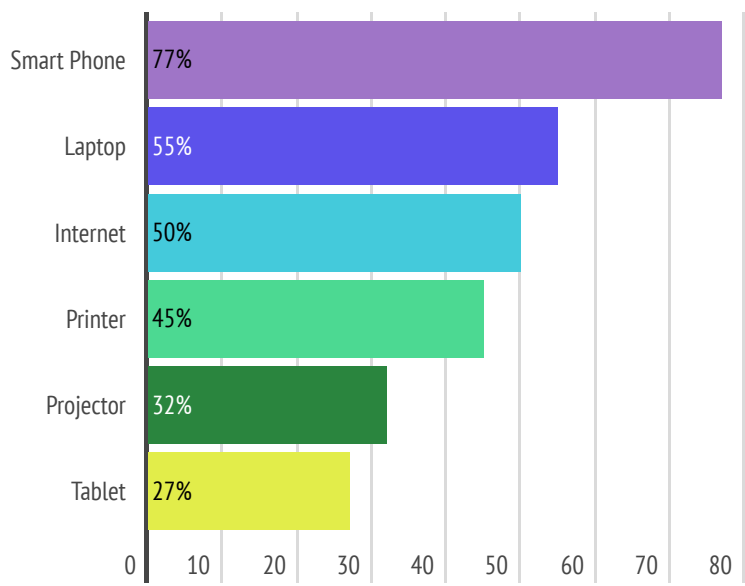


Chart 4 above indicates teacher ratings for various student indicators in classrooms. Student absorption in classes across schools was mostly rated (64%) as 'Average.' Levels of student interaction in classes was similarly rated, with 64% of of teachers choosing 'Average.' Finally, achievement levels in classes were mostly rated (41%) as 'Very Weak.' Therefore, there is plenty of scope for improvements in these student indicators over the course of the project.

Chart 5 below show which types of technology teachers have previously accessed.

Chart 5: Teacher Previous Device Access



Student Baseline

A summary of the key quantitative and qualitative data from the student baseline survey is presented below. Students across the 8 schools completed the surveys across November 2021. A total of 173 students completed the survey, with an average of 22 students from each school. Among respondents, 58% were male and 42% were female. The students also form a fairly even mix across school grades, with most students in Secondary 2 (29%) and Secondary 3 (29%). When asked if they'd ever used a computer outside of school, 50% of students surveyed replied 'No' indicating that this project is providing them with the first opportunity to access computers.

Chart 6 shows how often students are accessing their computer labs both during class and outside of class. Most students completing the survey are yet to access their computer lab for classes (50%). This is because installations occurred days before surveys were completed. Of those who have had classes in the lab, 34% are accessing weekly. Outside of class, 25% of students are accessing the computer lab weekly, whilst 57% are yet to access.

Chart 6: Student Lab Access

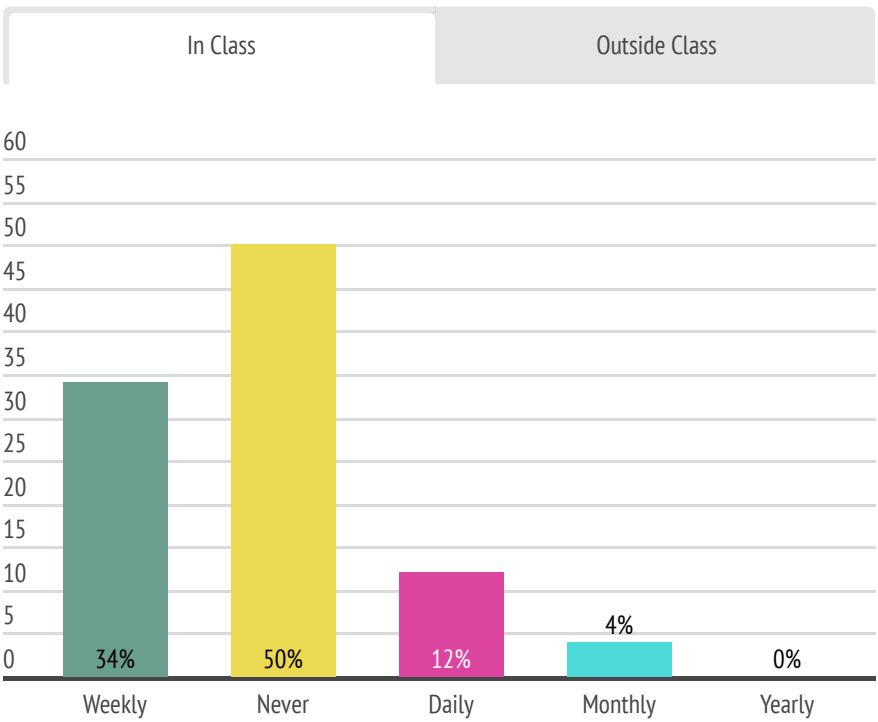


Chart 7: Duration Of Student Lab Access

In Class | Outside Class

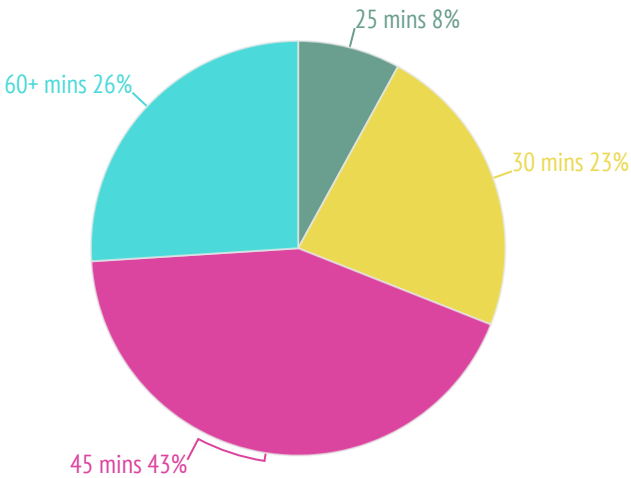


Chart 7 shows the duration of access for students both inside and outside of classes. In class, most students (43%) are accessing the lab for 45 minutes. Outside of class, 51% of students are accessing the lab for 30-60 minutes.

Relating to activities in the computer lab, 86% of students are using internet browsers in classes, and word processing is also a popular activity in classes, with 81% of respondents stating this. Across the schools, 38% of students are able to use a machine on their own, whilst 17% share with another classmate. Given that each school has received 40 computers, we expected the student to computer ratio to be lower.

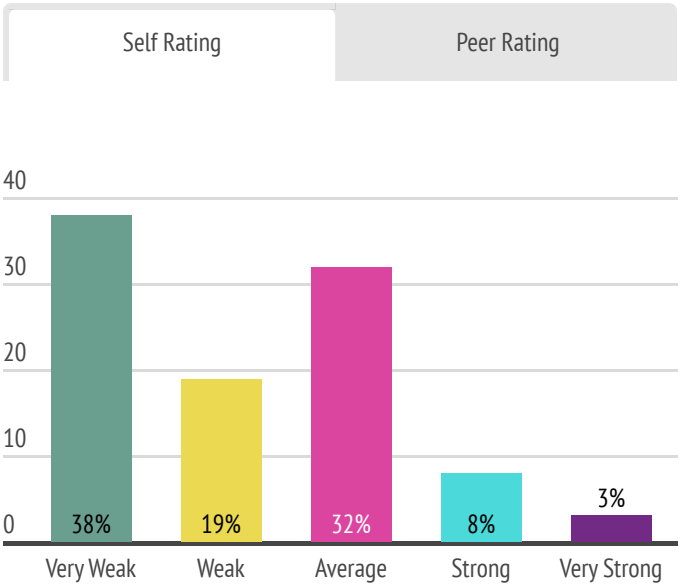
Iradukunda Josue, Secondary 5 Student *at Busanza Secondary School*

"Computer lab is most important because it helps me in gathering more information."

Samuel Ntakirutimana, Secondary 2 Student *at Cyimbazi Secondary School*

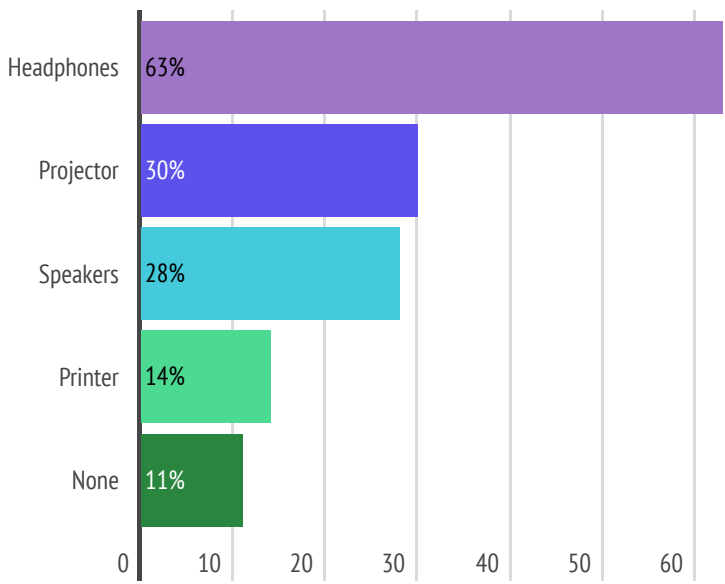
"The COVID pandemic has caused a delay in my studies. It takes one year away from my studies."

Chart 8: Student IT Confidence



Students were asked to rate their ability with computers, and also rate their peers. Chart 8 shows the data from these responses. The majority of students (38%) classify themselves as having 'Very Weak' computer skills, with 32% stating their skills are 'Average'. Students generally rate their peers as having similar computer skills or worse, with 41% rating their peers as having 'Very Weak' skills. Chart 9 shows device usage outside of school, with 63% of students accessing headphones, and 11% of students have not accessed any device listed.

Chart 9: Device Access Outside Of School



Metrics Survey

The School Metrics survey was completed by school principals in November and December 2021. The data relates to the 2019 academic year because COVID led to closures in 2020 and therefore there is minimal data on last academic year's performance.

On average across the schools, teacher attendance is high with 99.81% of total school days being attended by teachers. Teacher Retention across all schools is 93.88% with Nyiragiseke having the lowest rate with 16% of their teachers leaving the school in that academic year. Student attendance is also surprisingly high with an average rate of 99.95%.

Average grades across schools are quite poor, with the average STEM score being 52.79%. The average score for Maths is 52.76%, Science is 52.37%, and English is 53.25%. This is a similar pattern we observed in Zambia and Kenya, where Maths and Science grades are lower than English grades.

Schools had an average of 175 school days, an average of 33 teachers, and an average of 1,233 students. The 3 schools with the largest student cohorts are Busanza, Nyiragiseke, and Nyabagendwa.

Overall ICDL Results

The table below shows the results for all ICDL assessments, from a total cohort of 24 teachers. The results indicate that at least 67% of teachers have passed each module offered to them.

MODULE TYPE	MODULE	NUMBER OF PASSES	NUMBER OF FAILS	HIGHEST SCORE	AVERAGE PASS SCORE
Base	Computer Essentials	18	25	94%	82%
Base	Word Processing	19	23	97%	85%
Base	Online Essentials	19	12	91%	81%
Base	Spreadsheets	17	5	97%	86%
Intermediate	ICT In Education	18	21	91%	81%

Case Studies

Uwimana Jean Baptiste, Secondary 1 Computer Science Teacher at Busanza Secondary School

Uwimana was one of the top performing teachers in the ICDL assessments, passing all 6 modules first time, with an average pass mark of 88%.

Quote: "The training was beneficial because I have gained skills which will help me in teaching and learning activities. This is helping teachers and students to increase their skills in using ICT. Also, COVID-19 affected me as my income gained per month has reduced, and I had been at home for a long period without teaching."

Leoncie Tuyishimire, Maths and Science Teacher at Rutabo Secondary School

Leonice was the top performing woman in the ICDL assessments, passing all 6 modules, with an average pass mark of 90%.

Quote: "I have been impressed by the 'ICT in education' module where I learnt how ICT helps in improving engagement and knowledge retention among the learners. This is because technology provides different opportunities to make it more fun and enjoyable in terms of teaching the same things in different ways. I can not forget to mention how ICT plays a great role in modernising the world and making it a global village where people share and communicate at an instant of time through ICT Devices."

SUSTAINABLE DEVELOPMENT GOALS

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.

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.

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

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

Now that computer labs are fully installed across all schools, students are able to benefit from access and usage of the computers both as part of formal classes and also outside of class.

Due to the COVID-19 pandemic, the school year has changed in Rwanda, and rather than it running from January 2021 to January 2022, it is now running from September 2021 till September 2022. Therefore, teacher training will likely occur between July and August 2022.

Trained teachers are now able to implement the skills they have gained through the ICDL capacity building and in particular from the ICT in Education module into their classes. We therefore expect student educational outcomes to improve, especially levels of ICT skills. In 2023, 800 students will be tested in ICDL modules, in order to analyse how student ICT competence has improved as a result of the project.

Summary

In summary, the Rwanda Digital Schools project has made progress even with delays caused by the pandemic and lockdowns. All outputs expected in the first year of the project have now been achieved including the installation of computer labs across all schools.

Students now have the opportunity to utilise their respective computer labs and benefit from better engaging lessons with modern digital resources. Teachers will play a key role in cascading their knowledge of computers to their students, and teaching subjects in a more efficient and effective manner with the support of the computers and assistive technology.

The clear commitment of the REB and Ministry of Education to these schools is striking and has not been observed to this extent in other Digital Schools projects. We hope this will help to maximise the potential of this project and lead to more positive outcomes and greater impacts.