Rwanda Digital Schools

Phase 2 Interim Report
December 2022

COMPUTERAID

Introduction

The Rwanda Digital Schools project has been working to improve teacher, student and educational outcomes at 8 Secondary schools across Kigali. In Phase 1, computer laboratories were setup across each of the schools and 3 teachers per school were trained and assessed in ICDL modules.

Now in its second phase, the project has focused on widening teacher capacity with 47 teachers having now been trained and assessed in ICDL modules. Students have had more exposure to their computer labs and had classes with their trained teachers, allowing them to benefit from the technology and grasp new digital skills.

Rwanda ICT Education

In Rwanda, the school system is broken down as follows:

Primary School consists of Grades P1-P6
Secondary School consists of Grades S1-S6 with S1-S3 considered Junior Secondary and S4-S6 considered Senior Secondary.

ICT is a compulsory subject for grades S1-S3 and then at senior level it is an elective subject, but not all schools yet offer it at senior level. Many schools want to extend their offering of ICT to senior level if not already offered.

Due to this, in Phase 3 of the project, we will train a portion of S3 students from each school in the Computer Essentials ICDL module, which they will then be assessed in. The Computer Essentials modules is the most basic of all ICDL modules offered and covers much of the content covered in the Rwandan ICT curriculum for Grades S1-S3.
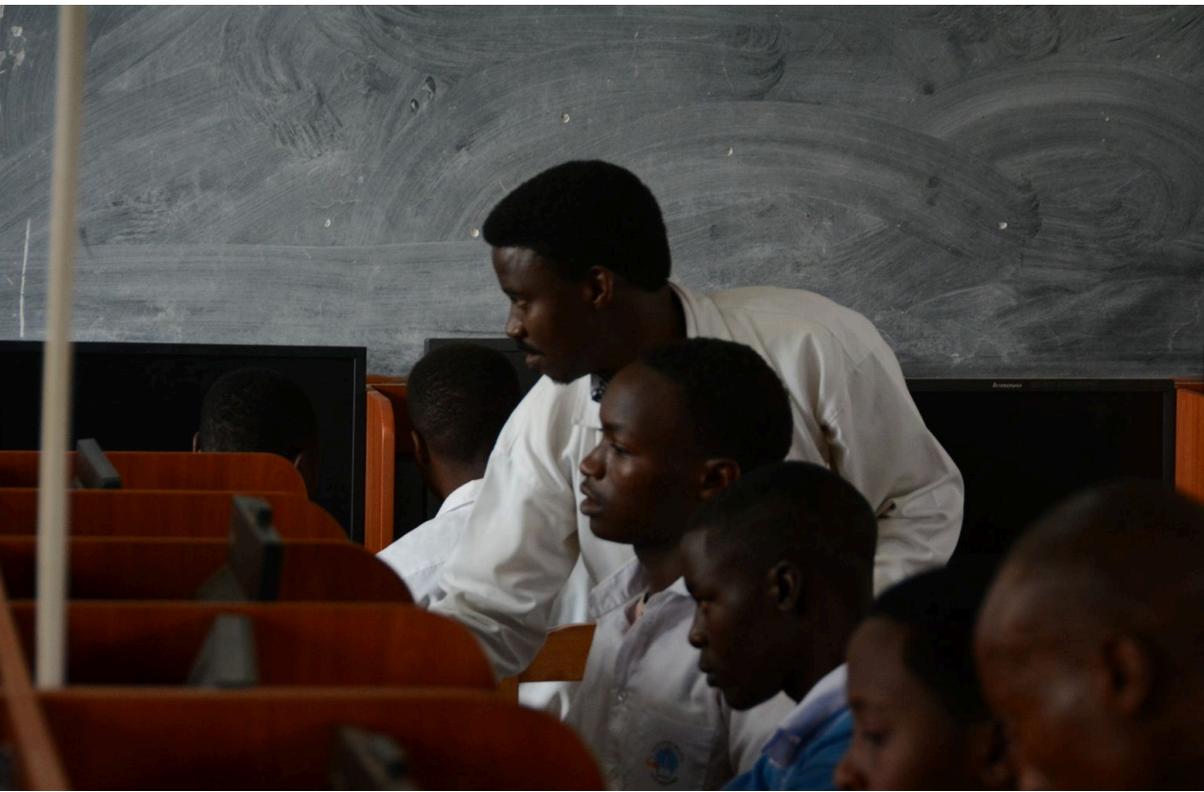
Output Progression

November 2021 - November 2022

Teacher ICDL Training

Teacher ICDL training resumed in August 2022 and took place between 16th-31st August. The training was an opportunity for new teachers who had not completed any ICDL modules to be trained in ICDL modules.

In total, 23 new teachers took part in the training and assessment in the following modules: Computer Essentials, Online Essentials, Documents, Spreadsheets, Presentations, ICT in Education, Online Collaboration, and Cybersecurity. Therefore, some teachers had the opportunity to pass and be certified in 8 modules.

Teacher Endline Survey

The teacher endline survey was conducted towards the end of the teacher ICDL training in August. In total, all 23 teachers who took part in the ICDL training completed the survey. The results of this survey are presented on Pages 5-7.

Student Endline Survey

The student endline survey took place during Computer Aid's visit to Kigali in November 2022. In total there were 184 responses across all 8 schools with an average of 23 students per school completing the survey. The results from the student survey are presented on Pages 8-10.

School Metrics Survey

School principals completed the school metrics survey for the second year in a row. The results of this survey focus on attendance, absence, drop-outs and grades in the 2021 academic year. Last year's survey focused on the 2019 academic year rather than 2020 due to the disruption caused by Covid in 2020. A summary of these results are presented on Page 11.

Teacher Endline

The key data from the teacher endline survey (conducted in August-September 2022) is presented below. Chart 1 shows that most teachers have been teaching Secondary Grades 1 & 2 in both Phases. Chart 2 indicates that 87% of teachers have used a computer before completing the survey. That's a considerable improvement on Phase 1, where only 59% had accessed a computer before.
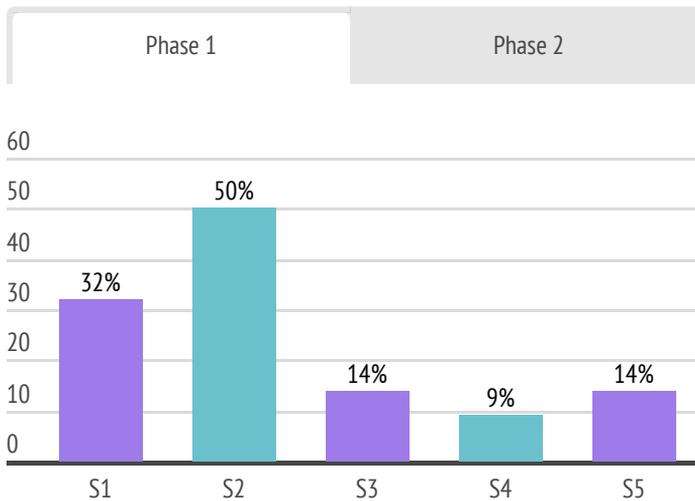
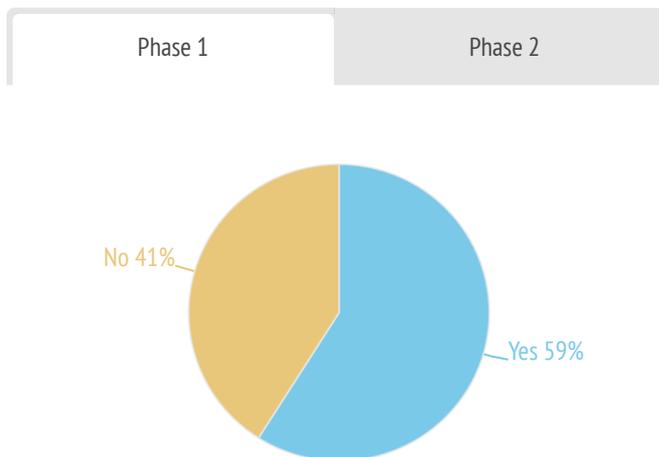## Chart 1: Teacher Grades

Phase 1	Phase 2

	S1	S2	S3	S4	S5
	32%	50%	14%	9%	14%

Chart 2: Prior Computer Access

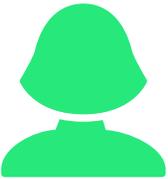| Phase 1	Phase 2

No 41%

Yes 59%

Emmanuel Twizerimana, Secondary 1 & 2 English Teacher *at Rutabo*

"I now use printed material and online resources to prepare my lesson content at school."

When asked if they had received any prior computer training, 61% of teachers responded that they had not.

Therese Mwamini, Secondary 2 ICT Teacher *at Nyabagenwa*

"Training is important. It is increasing our knowledge and skills in order to raise the quality of education."

Chart 3: Teacher ICT Skill Confidence

Phase 1	Phase 2

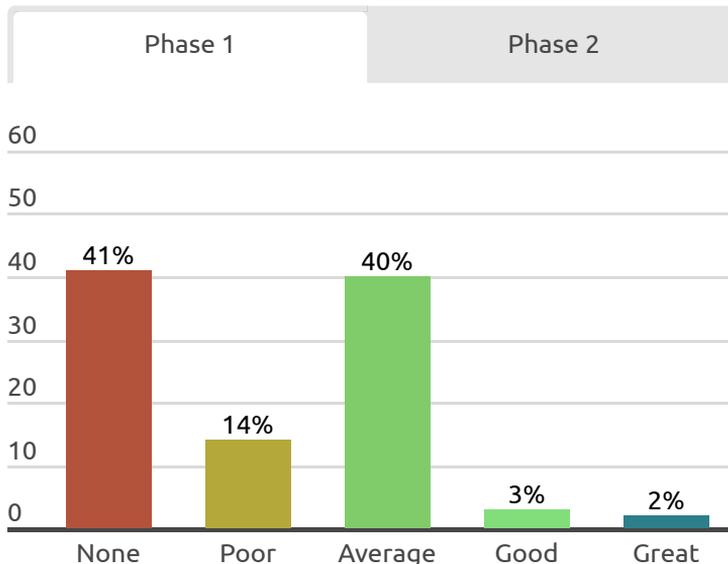
Chart 3 above shows teacher confidence levels in ICT at Phase 1 and 2. The change in confidence is clearly observable between the phases The majority of teachers now categorise themselves as having 'Average' (52%) or 'Good' (30%) computer skills.

Chart 4: Student Class Indicators

< Absorption P1 ∨ >

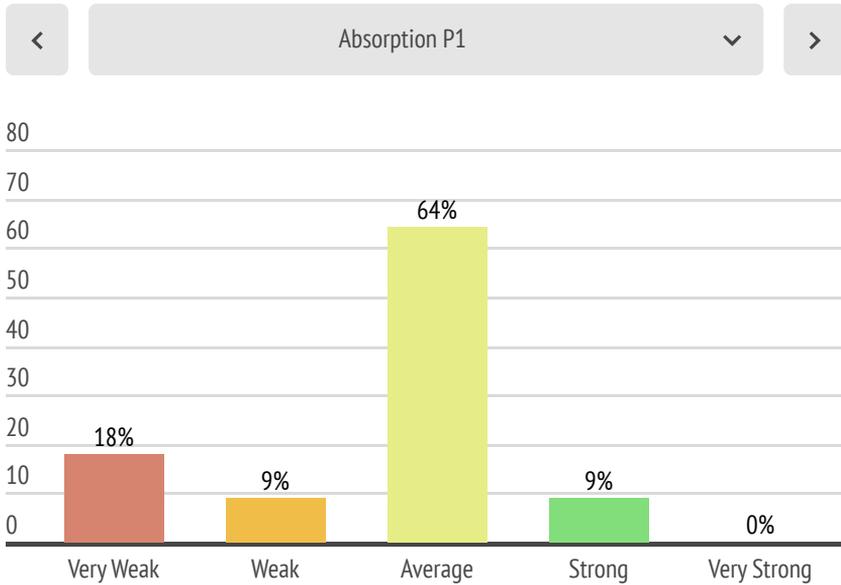|				
18%	9%	64%	9%	0%
Very Weak	Weak	Average	Strong	Very Strong

Chart 4 above indicates teacher ratings for various student indicators across Phase 1 and 2. Student absorption in classes across schools was mostly rated (70%) as 'Average.' Levels of student interaction in classes were similarly rated, with 70% of of teachers choosing 'Average.' Finally, achievement levels in classes were mostly rated (61%) as 'Average.' There has been some improvement in these indicators from Phase 1 and there is more scope for improvement in Phase 3.

Chart 5 below show which types of technology teachers have accessed in Phase 1 and 2. Access to all devices has increased in Phase 2.

Chart 5: Teacher Device Access

Phase 1	Phase 2

Laptop	55%
Internet	50%
Printer	45%
Projector	32%
Tablet	27%
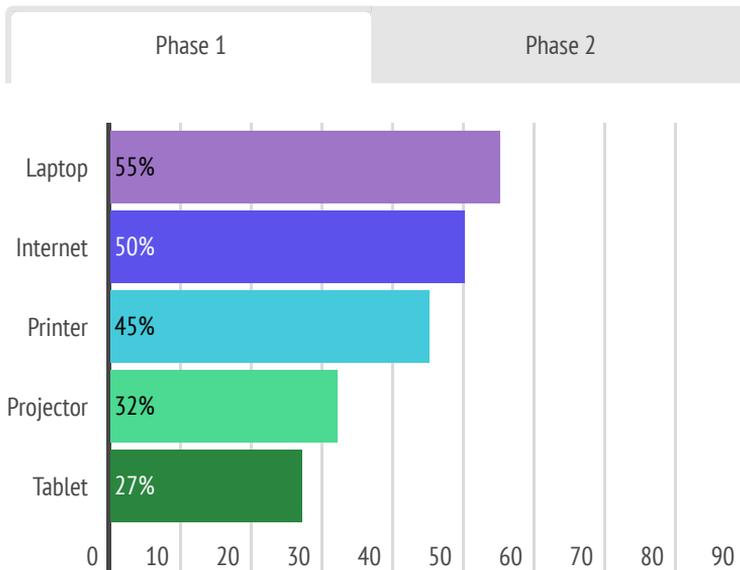
Student Endline

A summary of the key data from the student endline survey is presented below. Students across the 8 schools completed the surveys in November 2022 with a total of 184 students submitting responses, with an average of 23 students from each school. Among respondents, 60% were Male and 40% were Female. Most students responding were in Secondary 2 (31%) and Secondary 3 (28%).

When asked when they had first used a computer in their new school computer labs, 60% stated they accessed for the first time between Nov-Dec 2021, and 21% stated their first use was in Jan-March 2022.

Chart 6 shows how often students are accessing their computer labs both during class and outside of class across Phase 1 and 2. Most students are now accessing their computer lab more regularly with 53% of students accessing 'Weekly' in class and 30% accessing 'Daily.' Outside of class access has also risen, with 52% of students accessing Daily or Weekly.

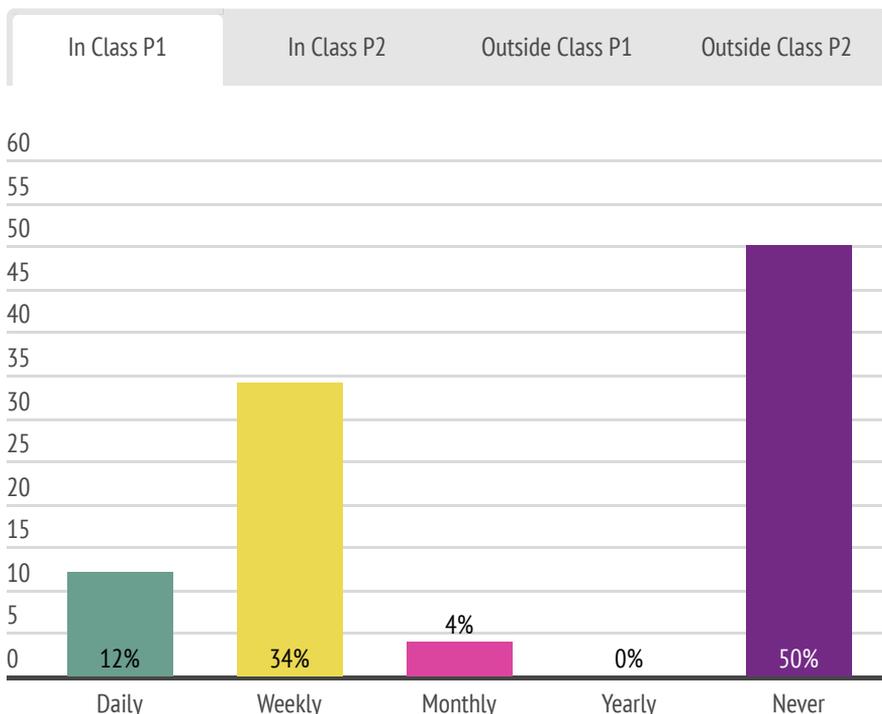### Chart 6: Student Lab Access

In Class P1	In Class P2	Outside Class P1	Outside Class P2

Daily	Weekly	Monthly	Yearly	Never
12%	34%	4%	0%	50%

Chart 7: Duration Of Student Lab Access

25 mins 8%
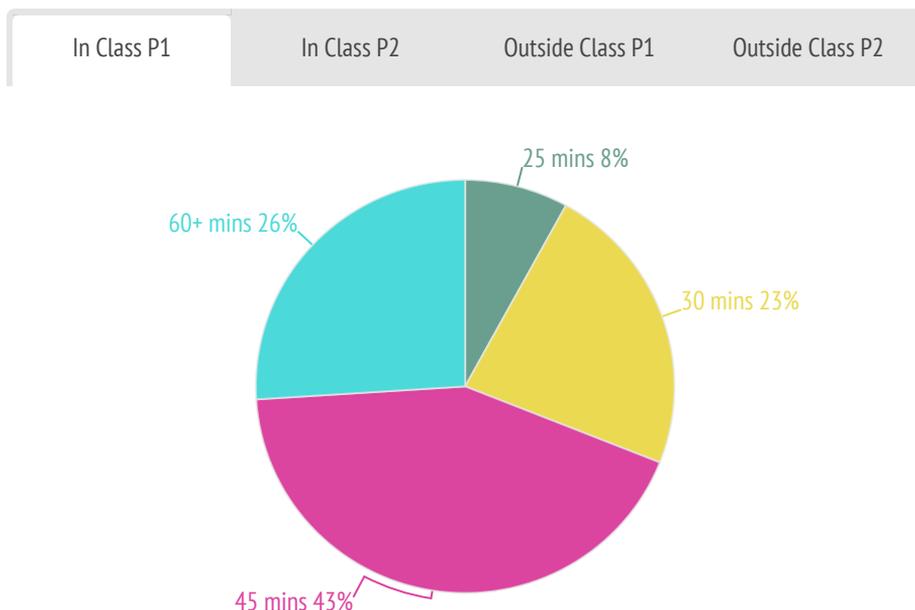
60+ mins 26%

30 mins 23%

45 mins 43%

Chart 7 shows the duration of access for students both inside and outside of classes in Phases 1 and 2. In class, most students (47%) are now accessing the lab for 45 minutes, so a slight increase from Phase 1. Outside of class, most usage (44%) is for less than 30 mins, so students have shorter sessions.

Relating to activities in the computer lab, 75% of students are using word processing software in classes, and internet browsing is also a popular activity in classes, with 70% of respondents stating this. Across the schools, 58% of students are able to use a machine on their own, whilst 19% share with another classmate. This is an improvement on Phase 1, where only 38% of students were accessing a computer on their own.

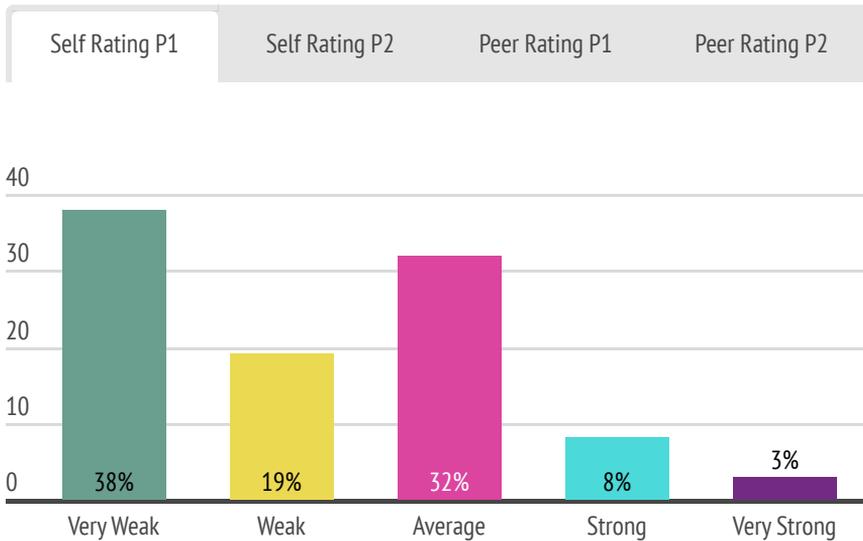**Iradukunda Josue,** Secondary 5 Student *at Busanza*

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

**Hafashimana Benjamin,** Secondary 3 Student *at Rutabo*

"The computers have helped with my learning. I have discovered more things like how blood circulates in the human body."

Chart 8: Student IT Confidence

| Self Rating P1 | Self Rating P2 | Peer Rating P1 | Peer Rating P2 |

| Very Weak | Weak | Average | Strong | Very Strong |
| 38% | 19% | 32% | 8% | 3% |

Across both phases, students were asked to rate their ability with computers, and also rate their peers. Chart 8 shows that the majority of students (36%) now classify themselves as having 'Average' computer skills, with 30% stating their skills are 'Good' or 'Very Good.' Students generally rate their peers as now having better computer skills, with 40% rating their peers as having 'Average' skills and 19% having 'Very Strong' skills. Self Rating has significantly improved from Phase 1.

Chart 9 shows assistive technology access; generally device access has improved in Phase 2, with on average, 54%of students having used headphones, speakers or the projector.

Chart 9: Assistive Technology Access

| Phase 1 | Phase 2 |

Headphones	63%
Projector	30%
Speakers	28%
Printer	14%
None	11%
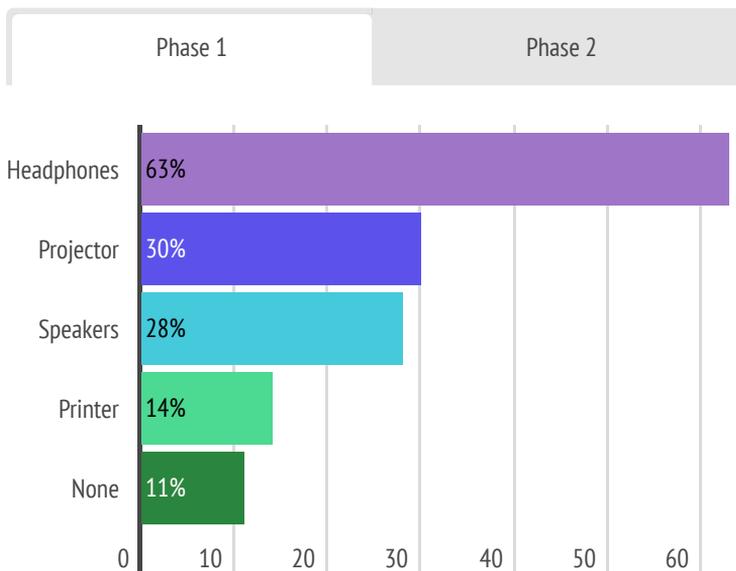
Metrics Survey

The School Metrics survey was completed by school principals in November 2022, a year after the first metrics survey was completed. The data relates to the 2021 academic year, whilst the data in Phase 1 relates to metrics from the 2019 academic year.

On average across the schools, teacher attendance has increased, with 99.98% of total school days being attended by teachers. Teacher Retention across all schools rose by 1.2% with Gitanda having the lowest rate with 18% of their teachers leaving the school in the 2021 academic year. Student attendance has maintained above 99%.

Regarding grades, almost all schools now utilise Best Grade software which digitises the process of grading students, through a database. This has made the process of grading students simpler. Average grades across schools are quite poor but improved by almost 11% with the average STEM score being 64%. The average score for Maths is 64%, Science is 60%, and English is 67%. 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 207 school days, an average of 51 teachers, and an average of 1,928 students. The 3 schools with the largest student cohorts are Busanza, Musave, and St. Vincent Palloti.

Overall ICDL Results

The tables below shows the total results for all ICDL assessments, from a total cohort of 47 and the results from Phase 2, from a cohort of 23 teachers

Total ICDL Results

MODULE TYPE	MODULE	NUMBER OF PASSES	NUMBER OF FAILS	HIGHEST SCORE	AVERAGE PASS SCORE
Base	Computer Essentials	33	26	94%	82%
Base	Documents	33	24	97%	85%
Base	Online Essentials	37	17	91%	81%
Base	Spreadsheets	28	24	97%	85%
Intermediate	ICT In Education	26	21	94%	81%
Intermediate	Presentations	27	11	94%	83%
Intermediate	Online Collaboration	16	2	90%	82%
Intermediate	Cybersecurity	4	0	86%	79%

Phase 2 ICDL Results

MODULE TYPE	MODULE	NUMBER OF PASSES	NUMBER OF FAILS	HIGHEST SCORE	AVERAGE PASS SCORE
Base	Computer Essentials	15	0	91%	81%
Base	Documents	14	1	97%	85%
Base	Online Essentials	18	5	91%	81%
Base	Spreadsheets	11	0	97%	83%
Intermediate	ICT In Education	8	0	94%	80%
Intermediate	Presentations	7	0	86%	81%
Intermediate	Online Collaboration	16	2	90%	82%
Intermediate	Cybersecurity	4	0	86%	79%

School Summaries

Musave Catholique

Musave is regarded as one of the weaker schools in the project and is a relatively poorer school. One of the teachers who had previously been ICDL trained had left the school and the new teachers who joined were trained by the principal. It seems that students here are less confident in their ICT skills and have less structured and guided time on the computers, opting to spend their time playing games. The lab itself is more constrained in terms of space, so a second lab is being setup in a classroom next-door; this will allow some of the equipment to be moved into the second room creating 2 spacious labs rather than one densely packed lab. Additionally, a new head of ICT has been appointed which will hopefully bring more structure to the lab's usage.

Nyiragiseke

Nyiragiseke is one of the poorest schools in the project and is situated in a rural area South of Kigali. Due to their location, they have had power issues which has affected the reliability of the computer lab. As such, students at Nyiragiseke have had less exposure to the computers and equipment. A new headteacher has joined the schools and has helped to solve some of the power issues, but the school still lacks internet connectivity.

Nyabagendwa

Nyabagendwa is one of the better performing schools in the project. The History teacher Angelot Nsengiyumva is very committed to the project and the computer lab. The school has good internet connectivity which is provided for free by the REB for a year, and the teachers use the lab to teach their respective subjects. There is no specific ICT teacher, so the trained teachers take the lead with regards to training students in the computer lab. Students seemed very confident using the computers which is a testament to their teachers' commitment.


Rutabo

Rutabo is the best performing school in the project till now. They use the lab for ICT at Primary level and Junior Secondary level (S1-S3). They also hope to extend ICT to Senior Secondary levels (S4-S6). In particular, the computer lab is used regularly for Chemistry and Biology and teachers who were trained in ICDL content have trained their fellow colleagues in ICT. Two of the teachers, Leoncie and Callixte trained all the teachers on how to use Best Grade software, which homogenises the grading system in the country.

Busanza

Busanza is one of the more prosperous schools in the project. They have a stable internet connection and have smart classrooms for students from S4-S6. The computer lab is mainly used by students in S1-S3. Two of the teachers at Busanza seem very committed, Jean-Claude who is a History teacher and Elie Umuhire who leads ICT for S1-S3. The school also has an ICT volunteer from Japan who helps with extra-curricular activities in the lab and has better technical skills.
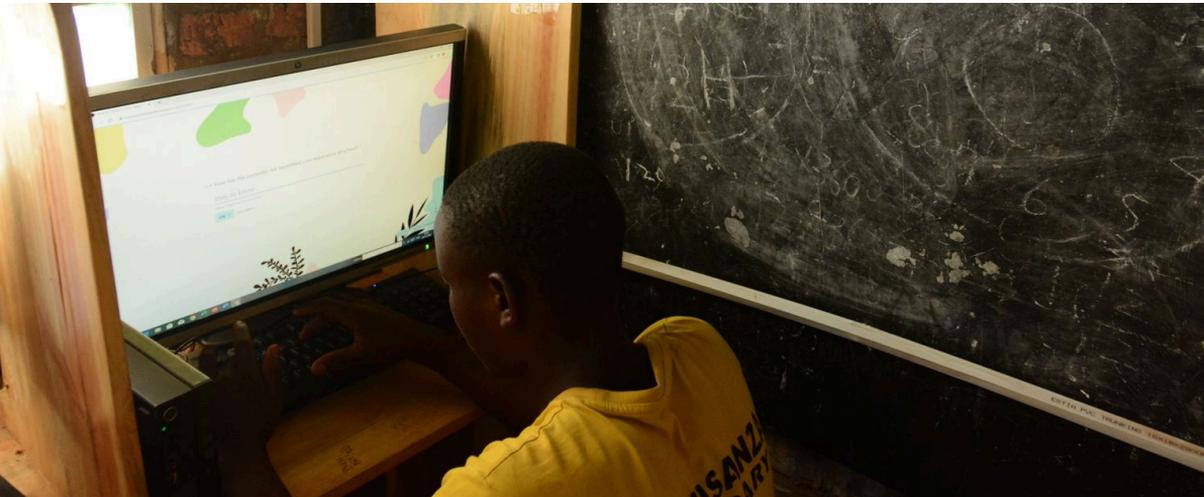

St. Vincent Palloti

St. Vincent is a good performing school which has internet access. They have 1 ICT teacher training students both at Junior (S1-S3) and Senior (S4-S6) Secondary level. The teachers are competent at using the lab and projecting for lessons, and they are very happy with their training and certification from ICDL. The lab itself is very clean and spacious and the school is keen for a further 4 teachers to be trained in ICDL next year. Generally, the students seem motivated to use ICT.
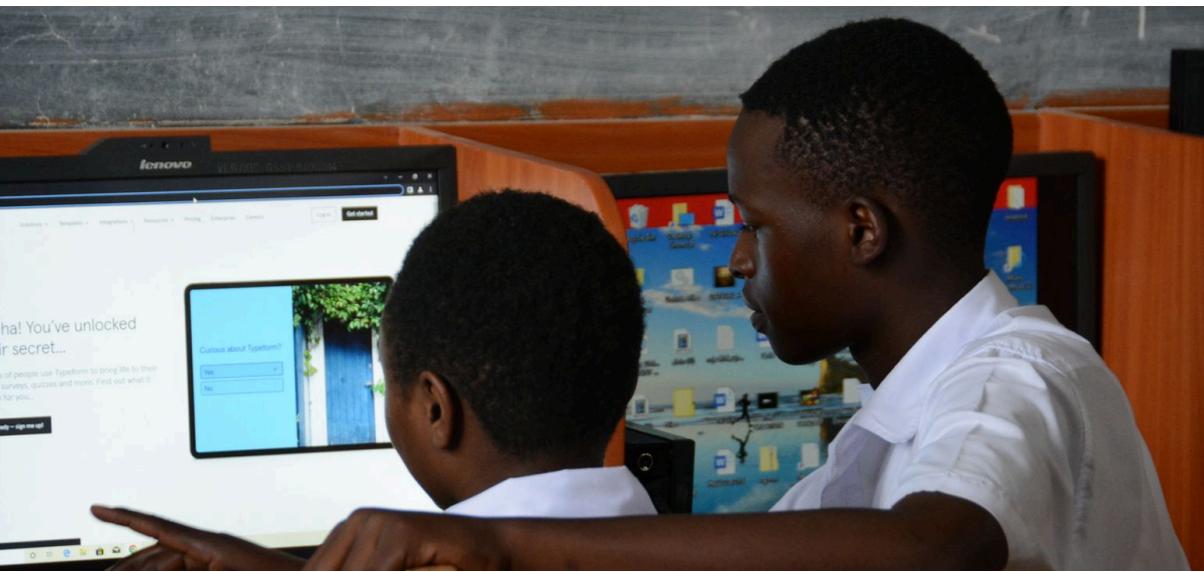
Gitanda

Gitanda is the poorest and most remote school in the project. They currently have Primary students and Junior Secondary students (S1-S3) using the ICT lab. They have Wi-Fi internet connectivity, but the connection is poor. The school has a small student cohort with only 1 class per grade, and there are no grades beyond S3 at the school. Due to the school's remote location, there are limited options for students once they graduate from S3, as there are no other schools located in the proximity. They also have high staff turnover due to the challenges faced by the school. Considering all this, Gitanda has continued to do a good job with assistance from the REB and due to the commitment of their principal. Gitanda is the only school not using Best Grade but the principal is encouraging the teachers to use the computer lab with their students. One of the criteria for their performance evaluation is to use the computer lab once a week.

Cyimbazi
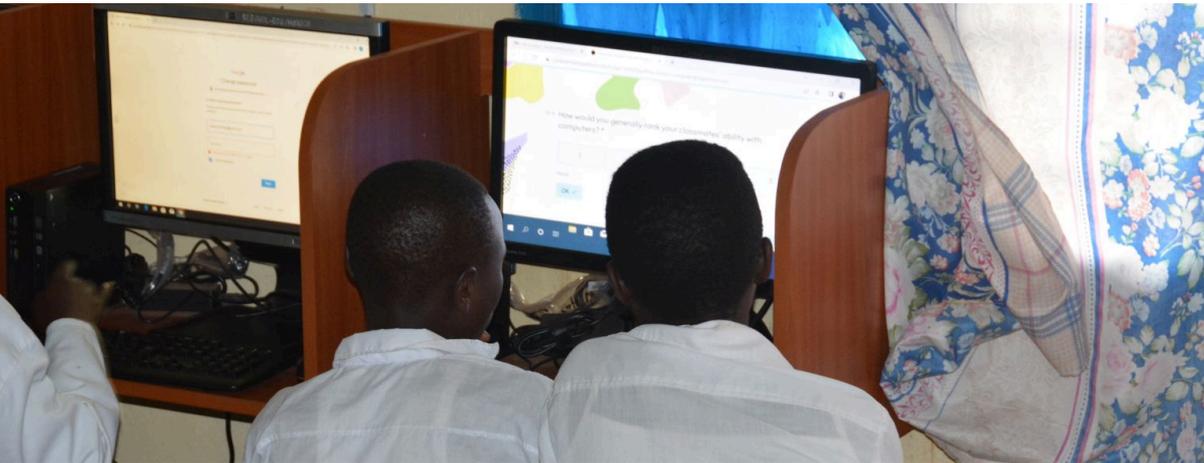
Cyimbazi falls in the middle of the schools in terms of performance. The school lacks internet and recently had a new headteacher start. It is one of the larger schools in terms of cohort size and has students from S1-S6. They offer TVET (Technical and Vocational Education and Training) to older students and generally use the computer lab very often. They use the lab for a wide range of subjects in addition to ICT.
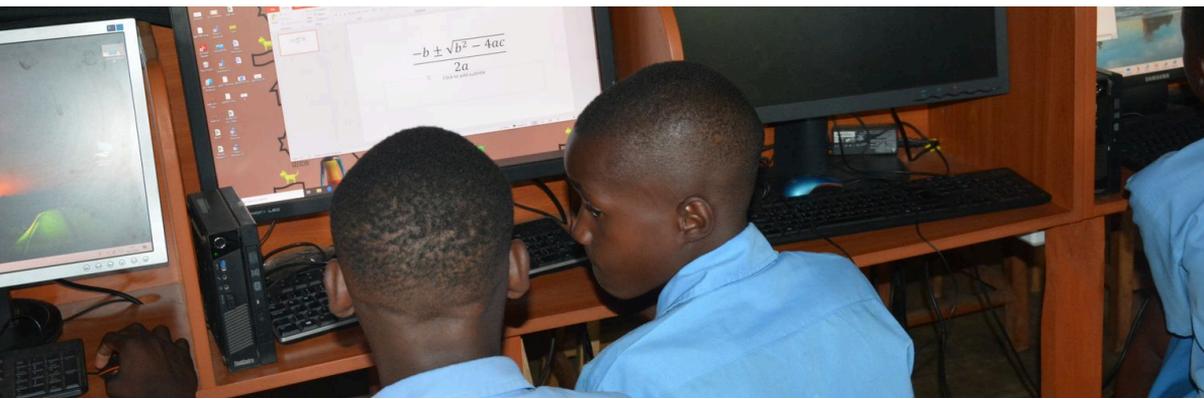
Case Studies

Leoncie Tuyishimire, Primary Maths & Sciences Teacher at Rutabo

Leoncie uses the lab regularly to teach Maths and Sciences to her students. She was responsible along with fellow teacher Callixte in training all teachers at Rutabo to use Best Grade software, which digitises student grading and makes grading more efficient, since data is entered into a database.

Quote: "The project has helped me to strengthen ICT skills gained from training, accessing digital content and integrating ICT into everyday teaching and learning activities."

Elie Umuhire, Secondary 1 & 2 ICT Teacher at Busanza

Elie was the third best performing teacher in ICDL assessment, passing all 8 modules first time with an average score of 80%

Quote: "Thanks to the involvement of the project, It will overcome the challenge of many people who don't have skills in ICT, in Rwandan education. It's an important time because the academic calendar changed more which caused the students to sit for a whole extra year."

Case Studies

Solange Mukantwari, Primary 4-6 Teacher at Rutabo

Solange was the top performing teacher in ICDL assessment, passing all 8 modules first time with an average score of 88%. It should be noted, this is the first time a woman has been the top performer across men and women in a Computer Aid project.

Quote: "We have been using the computers with students, helping them to know some computer components. There have been a lack of ICT tools for us and student dropouts, so we hope this will improve that"

Angelot Nsengiyumva, Secondary History Teacher at Nyabagendwa

Angelot was trained in ICDL this Summer, passing 5 of the modules. He really enjoyed the training and found it very useful. He now uses the computer lab regularly for his history classes. He is particularly skilled using PowerPoint and often makes PowerPoint presentations to teach his students, adding notes to each slide to guide his remarks, without the students being able to see.

Quote: "Training was very beneficial because it helped me to improve my future teaching by using digital content."

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

In Phase 3 of the project, students in Secondary grade S3 (ages 14-15) will be trained and tested in the ICDL Computer Essentials module. This process will help us to understand levels of ICT literacy among students at the schools. We have chosen grade S3 since these students will have had the highest exposure to the ICT curriculum in the computer labs and also because some schools don't offer ICT to S4 and above. In addition, we are looking to add ICDL to the general examination for students at the end of the school year in June 2023. We are currently discussing with the headteachers about the best process to implement this.

Phase 3 will also allow teachers who are yet to pass all ICDL modules offered, to have further training and opportunities at assessment. This will help to close the gap in teacher attainment between schools and should benefit students across the schools, since they will have lessons with more thoroughly trained teachers.

Summary

In summary, the Rwanda Digital Schools project has progressed in Phase 2, particularly with widening teacher training to a new cohort of 23 teachers, 57% of which passed 5 or more modules. Additionally, students have had greater exposure to the equipment through ICT lessons in their respective computer labs, and are generally accessing the computer lab more regularly for classes as shown in the survey data.

Other subjects have also utilised the equipment and computer labs to provide more engaging and interactive lessons, including History, Biology, Chemistry and English.