The Turing Trust

Monitoring & Evaluation Report
Malawi, April 2018

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This report would not have been possible without the hard work of the team from our partners in Malawi, Centre for Youth and Development (CYD) who visited the schools to collect the data.

Cover photos:

Front: Katoto Secondary School, Mzuzu, Malawi

Back: Mzuzu Government Secondary School, Malawi

Executive Summary

- 39 schools visited in March 2018 (10 control - without PCs, 4 with computers from other donors and 25 with computers from the Turing Trust (TT) / Centre for Youth and Development (CYD).

- At the time of the survey schools that had received computers from TT / CYD had had them for an average of 9.8 months (range 1-15 months).

- Questionnaires administered to headteachers, teachers and students using KoboCollect with data recorded on tablets in real time and uploaded automatically on return to base.

- Questionnaires were completed by 36 headteachers or their representatives (3 Heads of Department, 2 Senior Teachers and 1 Teacher), 35 teachers (of whom 20 were IT teachers) and 307 students.

- The schools in each group were comparable in terms of location, the proportion of schools that were boarding schools, the number of pupils and teachers and gender balance. However, 60% of the schools in the control group were private, compared with only 28 % of the schools in the TT/ CYD computers group.

- None of the 30 headteachers / principals interviewed had a qualification in ICT. Only 6 out of 41 (15%) of the teachers interviewed had any kind of qualification in ICT. However, 20 of the 35 (57%) teachers answering the teacher questionnaire were teaching computer studies. Some schools did not have an ICT teacher at all.

- Only 3/20 (15%) teachers taught only ICT. The other 85% were also involved in teaching other subjects, such that almost every other subject in the curriculum was covered by supposed "ICT" teachers.

- Of the 20 ICT teachers only 25% held qualifications relevant to teaching ICT. However, only 1 had a degree in ICT and so would have been counted as a 'qualified' ICT teacher in the eyes of the Ministry of Education, Science and Technology (MOEST).

- Some teachers said that they were only able to teach computer basics rather than the full ICT curriculum

- 43% of teachers used the computers to teach subjects other than ICT.

- Nearly three times as many students in the TT/CYD group were planning to study computer studies / ICT as in the control group

- 26% of the schools who had received computers from TT / CYD did not have an ICT policy or guidelines.

Views of the headteachers and their representatives on the impact of computers in the school

In both groups with computers headteachers thought the impact had been positive. In the TT/ CYD group, there were significantly positive effects on:

- the motivation of students (83%)

- the motivation of teachers (70%)

- the ability of teachers to deliver the curriculum (74%)

- the ability of the students to learn the curriculum (65%)

The effects on teacher recruitment and retention and on community engagement with the school were less marked, but still positive in 78% and there were no reports of any negative effects. It should be noted that in Community and Government schools the headteachers do not have the power to recruit their own teachers and so the presence of ICT equipment would not be able to have an impact on the recruitment of teachers. In the Private schools who had received computers 100% of headteachers thought that the PCs helped them in recruiting teachers and 86% believed the PCs had a positive impact on retaining teachers.

Staff from Lidoma Private Secondary School, Mzimba District, Malawi

Highlights from the teacher survey for the TT/CYD group

- 18/23 (78%) teachers used the computer laboratory for teaching.

- 10/23 (43%) teachers used the computers for teaching subjects other than ICT.

- Only 3 of the ICT teachers interviewed were full time dedicated ICT teachers. The other 15 'ICT' teachers were also involved in teaching other subjects, which limits the time they are available to teach ICT.

- Lesson duration 30-45 minutes for 61% of teachers interviewed.

- More than 20% of lessons in the computer laboratory are disrupted by problems with the electricity in 89% of schools.

- The average class size in the TT/CYD group was 59, with an average of 3.5 students sharing a PC in class.

- The main use of the computer laboratory is to teach basic computer skills and the ICT curriculum and to show presentations / videos as part of the lesson. Several of the non-ICT teachers used the computer laboratory to help demonstrate lessons in their subjects (which included agriculture, geography, biology and history).

- 78% of the ICT teachers had <u>not</u> had any training in the basic repair and maintenance of computers or in networking, beyond the training that had been given by TT .

- Only 33% of ICT teachers have any experience of using Linux or Ubuntu operating systems and none had any experience of using Mac operating systems.

- 35% of teachers interviewed had <u>not</u> had any training on the use of computers to help teach lessons, beyond that given by TT .

- Teacher satisfaction with the computer laboratory was good with all teachers agreeing that they enjoyed using the ICT equipment and software and that it had had a positive effect on the motivation and enthusiasm of the students. 96% thought that it had had a positive effect on the students' ICT skills and 91% thought that it had had a positive effect on students' literacy and numeracy. There were a few teachers who did not agree that the computers were easy to use, or that it made the curriculum easier to deliver or their job as a teacher easier.

- Satisfaction with computer maintenance was not as good. Whilst 78% thought that the PCs were reliable, 52% did not think that the PCs were easy to maintain.

- The main challenges to integrating ICT into the classroom were not having enough computers for the number of students in the class and problems with the electricity.

- Teacher training was identified as the main need for improvement (78% of responses), followed by the need for more computers, a projector, a network and improved maintenance and repair.

Teachers from Multicareer Private Secondary School, Mzuzu, Malawi

Highlights from the student survey

- The average age of the students interviewed in the control (17.6 years) and TT/CYD group (17.3 years) was comparable.

- The gender balance was equal in both groups.

- Access to computers for students in the control schools was only 31% with most (24%) accessing them at home. Access to computers in the TT/CYD group was 91% with only 8% of students accessing a computer at home.

- Access to the internet was very limited in all groups (Control 33%, TT/CYD computers 14%). Students in the control group accessed the internet either at home, at an internet café or using a mobile phone, whereas some students (6%) in the TT/CYD computers group were also able to access the internet at school. The differences are likely to be related to the higher proportion of private schools, and so wealthier students, in the control group.

Lunjika Adventist Secondary School, Mzuzu, Malawi

Use of computers at school in the TT/CYD group

- 157 of the 210 students interviewed in this group attended an ICT class. Some schools were phasing in ICT classes, so not all forms were included initially.

- 87% of students always or often used the computers during their ICTs class, with only 1 student saying they had never used a computer during their ICT class

- ICT classes were usually once per week (47%) or 2-3 times per week (50%).

- Classes lasted 30-45 minutes (56%) or longer (43%).

- Only 33% of students used computers for subjects other than ICT.

- 54% of students were able to use the computers outside school hours, for an average of 1.9 days per week and 1.7 hours per day.

- The most common uses of the computers out of school hours were for students to practise their computer skills and typing, with a few searching for information.

- 44% of students said they were not able to use the computers as often as they would like with the main reasons given being not having enough computers, problems with the electricity supply (with 32/36 students saying this happened more than 40% of the time) and the computer laboratory either not being open at all or for long enough.

- Student satisfaction with the computers was also high. All (100%) of those who had used computers in Mathematics, English and Science lessons thought that they made learning those subjects easier (although the numbers who used computers for these subjects were relatively small; <10% of all students asked). Most students also agreed that:

  - Using a computer makes learning more enjoyable (98%)

  - Using a computer in school makes learning easier (95%)

  - Using a computer in school makes learning ICT easier (98%)

  - Using a computer in school improves my academic performance at school (94%)

Students' plans

- All students in the control group and 207/210 in the TT/CYD computers group were planning to go to university .

- There were some differences between the control and TT/CYD computers groups in the subjects they were planning to study at university:

	Control, 67 students	TT/CYD computers 210 students (% of 239 subjects)
Computer studies / ICT	4%	11%
English	4%	12%
Mathematics	9%	16%
Physics	22%	10%
Biology	14%	15%

- After the introduction of PCs in schools nearly 3 times as many students showed an interest in studying ICT at university. Similarly, ICT became much more popular, rising from 7th= (with English and Nursing) to the 4th most likely subject for potential study at university.

- There were fewer differences between the groups in terms of career choices. Perhaps surprisingly, access to computers did not seem to increase the number of students planning a career in ICT. The only difference between the groups of more than 5% was for teaching (control 6%, TT/CYD computers 15%). However, this needs to be interpreted carefully as there were more private schools in the control group which may also influence this finding.

Here are a few of the responses to the question "What has been the most significant change in the school as a result of the ICT equipment?"

"Performance of students in national examinations. For example in the last year's exams all students passed which was not the case before coming of the computers"

Head of Science, Lidoma Private Secondary School

"Great change in students' motivation, they are working hard"

Head teacher, Njerenjere Private Secondary School

"Students learn computer skills with hands on experience and these skills will be essential to them in their tertiary education"

Head teacher, Nkhomboli Community Day Secondary School

Overall, there is general approval for the project and evidence of a positive impact in those schools that have received computers. This monitoring and evaluation exercise has also highlighted some areas that require further work from both the Turing Trust / CYD and from the schools themselves.

Recommendations for the Turing Trust / CYD

- Improved teacher training
- Improved systems for responding to maintenance and repair issues
- Ensure that e-library widely available, including in schools without a local network
- Focus on primary objective of ensuring students' access to computers to be able to learn basic skills.
- Lobby Education Division to send computer studies teachers to schools where we have deployed computers and to avoid rotating such teachers to schools without computers.
- In the longer-term work towards more computers per school

Recommendations for TT/ CYD to work with schools to address

- Electricity problems
- Try to prioritise schools with more experienced ICT teachers
- Supporting unqualified ICT teachers to teach ICT and undertake basic maintenance of PCs
- Using the computer laboratory for teaching other subjects apart from ICT
- Improving access for students out of hours
- Improving the use of the e-library
- Developing systems for recording the use of the computer laboratory at each school

Contents

Background information

The Turing Trust (TT) working in partnership with Centre for Youth and Development (CYD), based in Mzuzu, Malawi, are supporting secondary schools in the Northern Region of Malawi with PCs. The aim is to improve the ICT skills of 60,000 students. The project started in April 2016 and our first shipment of PCs arrived in Mzuzu in December 2016. By the time of this monitoring and evaluation exercise, computer laboratories, each with 20 PCs, had been set up in 34 schools. The roll out of computers was designed to allow the use of "control schools" who have not yet received computers, but who will receive them 3 years into our Scottish Government funded project. A sample of control schools was included in this monitoring and evaluation exercise to gather basic data about these schools. Inclusion in the exercise at this stage was to ensure that the control schools were comparable to those schools that had already been given computers.

One of the outcome measures for this project, that was not included in this survey but which will be reported separately, is a comparison of ICT exam results between control schools and those that have received computers.

Methodology

Questionnaires were designed using KoboToolbox for researchers. This tool was chosen as it allows offline data collection, that can then be uploaded once the enumerator returns to internet connectivity. This avoids the problems associated with double data entry and allows timely review and validation of the data collected.

Questionnaires were designed to be administered to the headteacher, teachers and students in each school. The headteacher and teacher questionnaires also included a geolocation question and the headteacher questionnaire included photographs of the school sign and computer laboratory. All interviewees confirmed their informed consent to participating in the survey with an electronic signature. All questionnaires included skip logic, so interviewees were only asked the questions that were relevant to them. Each interview was designed to last 10-15 minutes.

The key areas of interest were:

For all schools:
- Background information on the school
- Background information on the teaching staff
- Students access to computers and the internet
- Students plans for further study / career

For those schools with computers:
- Use of the computers during and out of school hours
- Teacher training on the use of computers to help teach their lessons
- Effect that the ICT equipment has had on the attitudes and performance of the teachers and students
- Maintenance of the computers

All interviewees were invited to make comments at the end of the questionnaire. These were recorded by the enumerators electronically.

All questionnaires used are available in the appendices to this report.

Data recording

All enumerators were provided with tablets and their own log in details to [KoboToolbox](). Initial training was provided by the CYD project manager and all enumerators visited the first school together to ensure adequate support and consistency in administering the questionnaires.
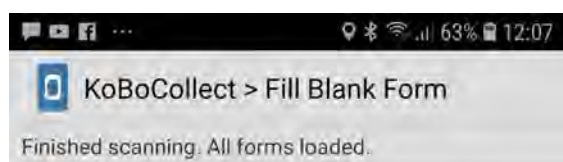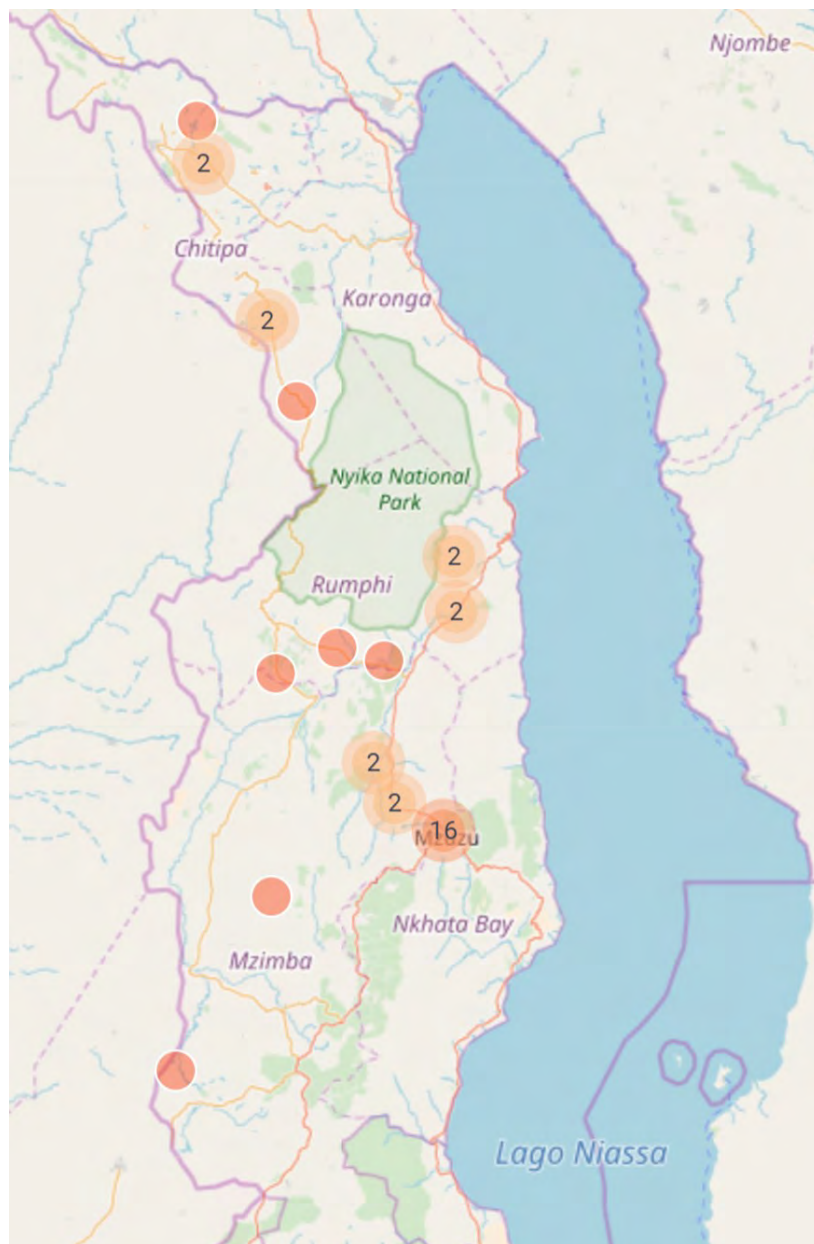
Data analysis

All data was uploaded from the tablets as soon as the enumerators were able to connect to the internet. Data was downloaded as an Excel spreadsheet and analysed in Excel. Data was reviewed as soon as it had been uploaded and any discrepancies queried with the data collection team in Malawi. All head teacher and teacher questionnaires included a question on location using GPS, allowing the production of a map showing the location of all the schools visited.

Results

A total of 39 schools were visited during March 2018. The number and type of responses obtained is detailed below. The schools that had received computers from other sources were included in our list of control schools at the start of the project and are still keen to receive computers from TT / CYD in the final year of this project. However, as the students do have access to at least some computers at school, the results from this group have been presented separately. At the time of the survey schools that had received computers from TT / CYD had had them for an average of 9.8 months (range 1-15 months).

Questionnaire	Number of responses			
	Control	Computers from other sources	Computers from TT / CYD	Total
Head teacher	9	4	23	36
Teacher	10	3	22	35
Student	68	29	210	307

The headteacher questionnaires were answered by headteachers / principals whenever possible (30). The remaining headteacher questionnaires were answered by a head of department (3), a senior teacher (2) and a teacher (1).

Background information on the schools

District	Number of schools visited		
	Control	Other computers	TT / CYD computers
Chitipa	1	0	6
Mzimba	2	1	4
Mzuzu	3	1	12
Nkhata Bay	1	0	0
Rumphi	3	2	3

	Number of schools (Percentage of group)		
	Control	Other computers	TT / CYD computers
School location			
Rural	6 (60%)	3 (75%)	11 (44%)
Semi / peri-urban	0 (0%)	0 (0%)	3 (12%)
Urban	4 (40%)	1 (25%)	11 (44%)
Day or boarding school			
Day school	7 (70%)	2 (50%)	20 (80%)
Boarding school	3 (30%)	2 (50%)	5 (20%)
Type of school			
Community	4 (33%)	1 (25%)	15 (60%)
Government	0 (0%)	2 (50%)	3 (12%)
Private	6 (60%)	1 (25%)	7 (28%)

The results in the tables below about pupil and teacher numbers and whether the school had an ICT policy are based on responses to the headteacher questionnaires. The number of responses in each group is given in parentheses. The answers to the questions are given as the average (range).

	Average number of pupils (range)		
	Control (n=9)	Other computers (n=4)	TT / CYD computers (n=23)
Total			
Male	215 (0-480)	238 (0-438)	237 (45-588)
Female	143 (0-400)	334 (200-473)	192 (36-567)
Form 4			
Male	81 (0-232)	53 (0-108)	79 (12-300)
Female	59 (0-166)	98 (0-146)	58 (8-204)
Pupils with disability			
Male	2 (0-8)	2 (0-8)	1 (0-6)
Female	1 (0-6)	2 (0-4)	1 (0-9)

Note: there were 3 single sex schools included in this survey, which slightly skew the average pupil numbers in the control and "other computers" groups. The control group included 1 boys and 1 girls only school and the "other computers" group included 1 boys only school. All the schools in the TT / CYD group were mixed sex schools.

	Average number of teachers (range)		
	Control (n=9)	Other computers (n=4)	TT / CYD computers (n=23)
Male	10 (6-16)	11 (9-13)	10 (5-22)
Female	1 (0-4)	8 (2-18)	5 (0-37)

Average pupil to teacher ratio (range)		
Control (n=9)	Other computers (n=4)	TT / CYD computers (n=23)
36 (15-66)	31 (24-35)	30 (8-56)

Views on the impact of computers in the school (headteacher questionnaire)

This question was only relevant to those schools that had computers and was answered by 4 in the "other computers" group and 23 in the group that had received computers from the Turing Trust / CYD.

	Significantly positive effect	Slightly positive effect	No effect	Slightly negative effect	Significantly negative effect
Effect on the ability of teachers to deliver their curriculum					
Other computers	3	0	1	0	0
TT/CYD computers	17	5	1	0	0
Effect on the motivation of the teachers					
Other computers	2	2	0	0	0
TT/CYD computers	16	7	0	0	0
Effect on the ability of the students to learn the curriculum					
Other computers	3	1	0	0	0
TT/CYD computers	15	6	2	0	0
Effect on the motivation of the students					
Other computers	3	0	1	0	0
TT/CYD computers	19	3	1	0	0
Effect on teacher recruitment					
Other computers	2	1	1	0	0
TT/CYD computers	11	7	5	0	0
Effect on teacher retention					
Other computers	2	1	1	0	0
TT/CYD computers	9	10	4	0	0
Effect on community engagement with the school					
Other computers	1	1	2	0	0
TT/CYD computers	7	11	5	0	0

The most significant change in the school due to the ICT equipment (headteacher questionnaire)

This question was only asked if the school had already received computers. It was asked as an open question with free text responses that were then categorised as part of the data analysis. Some interviewees identified more than one change as being the most significant change in the school due to the ICT equipment. The table on the next page includes all responses.

	Other computers (n=4)	TT / CYD computers (n=23)
Improved student motivation	2 (50%)	9 (39%)
Use of computers to prepare exams	0	6 (26%)
Improved student computer literacy	2 (50%)	5 (21%)
Improved access to information / teaching materials	0	3 (13%)
Increase in number of students able to study ICT	0	3 (13%)
Improved teacher computer literacy	0	2 (9%)
Increase in student enrolment / numbers	0	2(9%)
Improved teacher motivation	0	2 (9%)
Reduced teacher workload	0	2 (9%)
Community interest in learning computer skills	0	2 (9%)
Reduced student absenteeism	0	1 (4%)

This showed the most significant perceived changes were improved student motivation, followed by the ability to prepare exams using the computers and improved student computer literacy. It should be noted that teachers use PCs to type out student tests that are then printed (sometimes in the school, sometimes elsewhere) rather than students doing tests on the PCs in a digital format.

Overall, the changes were all perceived as being positive and there is no doubt that computers are seen by both the schools and the community as being a vital part of a student's education. This is well illustrated by the quotes below:

"There's a big motivation from the community. They are encouraging the students to attend computer lessons and take them seriously."

Head of Department, Nthalire Community Day Secondary School

"Number of students has increased because many students, one requirement they're looking for before enrolment its whether that particular school offers computer lessons or not."

Principal, Chasefu Seventh Day Secondary School

Further improvements in the ICT equipment, resources or training identified

This question was also asked as an open question with free text responses that were then categorised as part of the data analysis. This question was answered by all (head)teachers with computer laboratories at their school answering the headteacher questionnaire. In a few interviews headteachers were not available so the most senior teacher responded in their stead.

	Other computers (n=4)	TT / CYD computers (n=23)
More computers	2	11
Larger / separate computer laboratory	1	0
Projector	0	4
Printer	0	5
Local Area Network	0	2
Internet	1	4
Laptops for teachers / administration	0	2
Faster PCs	0	1
Improved maintenance and repair	0	1
Qualified ICT teacher	0	1
Teacher training	0	11
Encouragement for students to study ICT	1	0

It is obvious from the table above that the main requirements were an increased number of computers and teacher training. The Turing Trust / CYD provides each school with 20 computers. From the data given by the teachers (below) the average class size for these schools was 59, with an average of 3 students sharing a computer. However, at present only 8 of the 35 schools that TT / CYD are working with would have the space to accommodate more PCs, and even these 8 schools are unlikely at this stage to be able to support enough staff to use a larger computer laboratory effectively.

Other comments

At the end of the survey interviewees were asked if they had any other comments. This was recorded as free text and as with previous questions categorised as part of the data analysis. Not all interviewees had additional comments to make as these had often been covered by the previous questions. In the control group (n=9), 6 of the interviewees specifically commented that they were keen to have ICT equipment in their school soon and expressed approval of the project in anticipation of the benefits it could bring to their students. Only one head teacher (11% of the control group) was concerned that his school was not able to receive computers as they could not afford the maintenance payments. This gives us confidence that our maintenance fees are affordable for the vast majority of what are often financially challenged schools.

	Other computers (n=3)	TT / CYD computers (n=23)
General approval of the project	1	15
Teacher training needed	0	1
Additional teacher needed	1	0
Helping students to improve computer literacy	0	1
Helping teachers to teach computer curriculum	0	1
Improved student motivation	0	1
Ubuntu not user friendly	1	0
More resources needed		
PCs	1	4
Surge protectors	0	1
Internet	0	2
Improved maintenance and repair	0	1

The comments were once again mainly positive, but there are concerns about maintenance and repair. A quote from one of the schools that received computers at the end of 2016 suggests that the computers are having an impact on students:

"It's a very positive move as it has brought motivation among students, some have developed interest in pursuing careers in ICT."

Principal, Chasefu Seventh Day Secondary School

Background information on the head teachers / principals / teachers interviewed

	Head teachers / principals (n=30)	Teachers
Age range		
25 or below	0	4 (10%)
26-35	4 (13%)	22 (54%)
36-45	7 (23%)	11 (27%)
46 or more	19 (63%)	4 (10%)
Gender		
Male	30	35 (85%)
Female	0	6 (15%)*
Mean number of years teaching (range)	20 (2-35)	9 (1-28)
Highest level of education		
Master's degree	1 (3%)	2 (5%)
Bachelor's degree	16 (53%)	27 (66%)
Advanced diploma	5 (17%)	3 (7%)
Diploma	7 (23%)	5 (12%)
Certificate	1 (3%)	3 (7%)
Secondary education (volunteer)	0	1 (2%)
Field of study		
Applied Sciences	1 (3%)	5 (12%)
Business / Management	3 (10%)	4 (10%)
Education	9 (30%)	14 (34%)
Humanities / Social sciences	17 (57%)	8 (20%)
ICT / Information sciences	0	6 (15%)**
Mathematics	4 (13%)	5 (12%)
Natural Sciences	3 (10%)	5 (12%)

Note: Responses to the question about field of study were gathered as free text and then allocated to categories as part of the data analysis. Several teachers and head teachers had studied more than one subject during their education.

* Whilst efforts were made to include female teacher views, the gender divide is currently overwhelming in Malawian secondary school teachers and is typical in the Northern Region.

** It should be noted that none of the headteachers held an ICT qualification and only 6 of the 41 teachers interviewed had any qualification related to teaching ICT. Of these 2 were teaching only computer studies, 3 were teaching other subjects as well as ICT and 1 was teaching mathematics but not ICT. Of the 20 ICT teachers interviewed, only 25% held qualifications relevant to teaching ICT. However, only 1 had a degree in ICT and so would have been counted as a 'qualified' ICT teachersin the eyes of the Ministry of Education, Science and Technology (MOEST).

Subjects taught by the teachers interviewed and
the use of the computer laboratory for teaching

Subject	Number of teachers teaching a subject			Number of teachers using the computer laboratory to teach a subject	
	Control (n=9)	Other computers (n=3)	TT / CYD computers (n=23)	Other computers (n=3)	TT / CYD computers (n=23)
Agriculture	1	0	4	0	1
Bible Knowledge	1	0	0	0	0
Biology	2	0	6	0	2
Chemistry	1	0	3	0	1
Chichewa	3	0	0	0	0
Computer Studies	0	2	18	1	18
English	3	0	4	0	2
Geography	1	0	5	0	2
History	2	0	5	0	1
Life Skills Education	1	0	3	0	0
Mathematics	5	3	8	1	1
Physics	2	1	3	1	0

Overall, 20 teachers interviewed used the computer laboratory for teaching (2/3 in the other computers group and 18/23 in the group that had received computers from the Turing Trust / CYD).

Only 3/35 (9%) teachers interviewed were teaching only computer studies. All others teaching ICT (91%) were also teaching a wide range of other subjects, compromising the time available to focus on teaching ICT. Some of those teachers without ICT qualifications were teaching basic computer skills rather than the formal computer studies curriculum.

Average Class Size

	Control (n=10)	Other computers	TT / CYD computers (n=22)
Average number of students in class (range)	46 (35-60)	45 (40-50)	59 (15-150)

All computer laboratories to date have been set up with 20 PCs. Whilst this does mean that students often have to share a PC in class, only eight schools have been identified that would be able to accommodate sufficient PCs to allow one per student.

The use of the computers for teaching (20 responses)

All teachers were asked what ICT equipment they used. Some teachers use the computers to help with their teaching or preparing examinations. Questions about the using the computer laboratory for teaching were only asked if the teachers had said that they taught lessons in the computer laboratory.

	Other computers (n=2)	TT / CYD computers (n=18)
Average number of lessons taught in the computer lab by an individual teacher each week (range)	8 (3-12)	2 (1-4)
Average length of lessons taught in the computer lab		
30-45 minutes	0	11
46-60 minutes	2	5
76-90 minutes	0	1
More than 90 minutes	0	1
Percentage of lessons taught in the computer lab disrupted because of problems with electricity		
<20%	1	2
20-39%	0	8
40-59%	1	4
60-79%	0	2
>80%%	0	2
ICT equipment used for teaching	All teachers: n=3 (ICT teachers: n=2)	All teachers: n=23 (ICT teachers: n=18)
PCs	3 (2)	20 (16)
Laptops	2 (1)	3 (3)
Tablets	0 (0)	1 (1)
Projector	2 (1)	11 (9)
Printer	1(1)	8 (8)
How the computer laboratory is used to teach lessons	All teachers: n=2 (ICT teachers: n=1)	All teachers: n=18 (ICT teachers: n=15)
To teach basic computer skills	2 (1)	16 (14)
To teach ICT curriculum	2 (1)	7 (7)
To deliver presentations to the students	1 (1)	7 (6)
To help demonstrate lessons	2 (1)	9 (7)
To use videos on the computers as part of your lesson	0	7 (7)
For students to research issues	0	2 (2)
For students to solve problems	0	2 (2)
For students to develop their own digital content	0	2 (2)
Number of students sharing a PC (range)	3	3.5 (1-10)

Students' access to computers out of hours
(26 responses from teacher questionnaire)

	Other computers (n=3)	TT / CYD computers (n=23)
Yes	1	16
No	2	5
Don't know	0	2
Average number (range) of days per week students	5 (5)	2.4 (1-6)
Average number (range) of hours per day students	2 (2)	1.7 (1-4)

Training and experience of teachers

Training in using computers to help teach lessons (all teachers)

	Control (n=9)	Other computers (n=3)	TT / CYD computers (n=23)
During education / training	6	2	12
Other training course	0	0	3
Internal training in school	0	1	3
None	3	0	8

Lunjika Adventist Secondary School, Mzuzu, Malawi

Training and experience of ICT teachers from schools with computers

	Other computers (n=2)	TT / CYD computers (n=18)
Training in maintenance and repair of computers		
During education / training	1	4
Other training course	0	0
None	1	14
Training in networking computers		
During education / training	1	3
Other training course	0	1
None	1	14
Experience of operating systems		
Windows	2	18
Mac OS	0	0
Linux	1	2
Ubuntu	2	4

Technician replacing RAM

Satisfaction of the teachers using the computer laboratory

Teachers were asked to give their opinion of each of the following statements (26 responses: other computers n=3, TT / CYD computers n=23)

	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree	Not applicable
I enjoy using the ICT equipment and software.						
Other computers	3	0	0	0	0	0
TT/CYD computers	18	5	0	0	0	0
The ICT equipment and software have been easy to use.						
Other computers	1	2	0	0	0	0
TT/CYD computers	9	11	0	3	0	0
The computer laboratory makes my job as a teacher easier.						
Other computers	2	0	1	0	0	0
TT/CYD computers	12	10	0	1	0	0
Using the computer laboratory has made it easier to deliver the curriculum						
Other computers	3	0	0	0	0	0
TT/CYD computers	11	10	0	2	0	0
Using the computer laboratory has had a positive effect on the enthusiasm and motivation of the students.						
Other computers	3	0	0	0	0	0
TT/CYD computers	18	5	0	0	0	0
Using the computer laboratory has had a positive effect on the literacy and numeracy levels of the students.						
Other computers	2	1	0	0	0	0
TT/CYD computers	12	9	1	1	0	0
Using the computer laboratory has had a positive effect on the ICT skills of the students.						
Other computers	3	0	0	0	0	0
TT/CYD computers	16	6	1	0	0	0
Using the computer laboratory has enhanced the students' overall academic performance.						
Other computers	0	1	1	1	0	0
TT/CYD computers	4	11	4	4	0	0
The computer laboratory helps community engagement with the school						
Other computers	0	1	0	0	1	1
TT/CYD computers	2	10	0	9	0	2

Where there were negative comments, the issues identified included:

- Problems with electricity
- Lack of an ICT teacher at the school
- Lack of teachers leading to insufficient time for teaching
- Operating system other than Windows
- Using Libre Office rather than Microsoft Office
- Too many students per PC. Commented that more PCs at the school might allow them to enrol members of the community in ICT lessons as well as the students

Satisfaction of the teachers with computer maintenance and repair

	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
The PCs have been reliable					
Other computers	1	2	0	0	0
TT/CYD computers	4	14	2	3	0
The PCs are easy to maintain					
Other computers	0	0	0	3	0
TT/CYD computers	2	7	2	9	3
The PCs are repaired or replaced quickly enough if there is a problem					
Other computers	0	1	0	1	1
TT/CYD computers	2	8	2	8	4

Maintenance and repair is an important issue and this survey has identified the need for improvement in our current service. On further enquiry, it was evident that many of the problems with the maintenance of the computers related to the unreliable power supply from the grid. However, we did also identify a need for surge protectors in some schools, despite this being one of our initial requirements. Our maintenance contract includes return to base for repairs. However, this was problematic for some schools in terms of both cost and transport. It was also found that with staff changes in schools this knowledge was often lost, meaning that schools were not being pro-active in getting their repairs done for free as part of the maintenance contract. There was also a call for more training for teachers on maintenance and repair.

Changes in teaching since the set up of the computer laboratory

All teachers in the "other computers" group and 20/23 teachers in the group who had received computers from the Turing Trust / CYD said that there had been changes in the way that they teach since the set up of the computer laboratory. Comments were gathered as free text and then categorised during data analysis as there were several common themes, with the answers also relating to changes in outcomes as well as in teaching methods.

	Other computers (n=3)	TT / CYD computers (n=20)
Changes in teaching		
Teaching methods have changed (eg use of projector)	1	2
Teaching is simpler / more effective	0	6
Computers used for typing exams	0	2
Computers used for record keeping	0	2
Changes in outcomes		
Improved student performance	1	2
Improved student IT literacy	1	3
Improved student motivation	1	7
Increased uptake of computer studies	0	3
Improved school attendance / enrolment	0	3
Improved performance in national exams**	0	1

Overall, 88% of teachers reported improved teaching methods after being able to regularly use computers.

**The impact of computers on performance in national exams will be the subject of a further report, as at the time of data collection national exam results since the schools had received computers had not been published for the vast majority of schools. However, the comment of a teacher from one of the first schools to receive computers from the Turing Trust / CYD in response to this question was very encouraging.

"Performance of students in national examinations. For example, in the last year's exams all students passed which was not the case before coming of the computers."

Head of Science, Lidoma Private School, Mzimba, Malawi

Main challenges to integrating ICT into the classroom

We were keen to explore the issues and so this question was also asked as an open question with free text responses that were then categorised as part of the data analysis. This question was answered by all teachers answering the teacher questionnaire.

	Other computers (n=3)	TT / CYD computers (n=23)
Not enough computers	2	9
Electricity / power supply problems	1	9
Students have no previous experience / technophobia	1	4
No qualified ICT teacher	0	3
Computer laboratory not adequate	0	3
No internet	0	3
Time constraints	0	2
Problems with repair and maintenance	0	2
Different software to that on the syllabus	1	1
No projector	0	1
No books covering computer studies	0	1
No training on using computers for teaching	1	0
Girls lack of interest**	0	1
Students who join late have difficulty catching up	0	1

From this table it is evident that the overriding issues are not having enough computers and problems with the power supply.

**The comment about girls' lack of interest was one spontaneous comment from a male teacher and demonstrates the institutional bias and barriers Malawian girls face in trying to learn digital skills. This has been further studied by the Turing Trust with the University of Edinburgh. Please see: Granaasen, A. L. (2017). Gender Inequality in Computer Education: Challenges and Restrictions to Meaningful Computer Access and Use for Female Secondary School Students in Northern Malawi, for more information.

Further improvements in the ICT equipment, resources or training identified

This question was also asked as an open question with free text responses that were then categorised as part of the data analysis. This question was answered by all teachers with computer laboratories at their school answering the teacher questionnaire.

	Other computers (All teachers: n=3; ICT teachers: n=2)	TT / CYD computers (All teachers: n=23; ICT teachers: n=18)
More computers	1 (1)	7 (6)
Larger / separate computer laboratory	1 (1)	3 (2)
UPS	0	2 (2)
Projector	0	7 (5)
Printer	0	3 (3)
Network	0	7 (7)
Internet	0	1 (1)
E-library	0	1 (0)
Different OS in line with syllabus**	1 (0)	2 (2)
Improved maintenance and repair	0	5 (4)
Books on computer studies	1 (0)	1 (0)
Qualified ICT teacher	0	1 (1)
Teacher training	1 (1)	18 (14)

The answers to this question to some extent duplicated some of the answers given to the question about the challenges integrating ICT into the classroom – in particular, the need for more computers. What stands out from this question however is the need for teacher training - particularly as this was a free text question. 78% of the teachers identified the need for more teacher training. This is something that was also identified in the answers to the head teacher's questionnaire. It is evident that many of the teachers have very little experience in using ICT themselves, but they are eager to learn more and to be able to teach their students effectively. It is also worth remembering that of the 20 teachers teaching ICT, only 6 had any qualifications related to ICT.

**There was some confusion about operating systems and other software. For the schools in the "other computers" group, the problems related to the Ubuntu operating system, whereas for the schools in the TT / CYD group, the difficulties related to the use of Libre Office instead of Microsoft Office.

Other comments

At the end of the survey interviewees were asked if they had any other comments. This was recorded as free text and as with previous questions categorised as part of the data analysis. Not all teachers had additional comments to make as these had often been covered by the previous questions. In the control group (n=9), 7 of the interviewees specifically commented that they were keen to have ICT equipment in their school and 7 expressed approval of the project in anticipation of the benefits it could bring to their students.

There were some comments that are worth highlighting about the impact that the computers are having:

"The project has improved the way lessons are delivered so much that without the project, teaching & learning would be in jeopardy."

Computer trainer, Ekwendeni Community Day Secondary School

"I appreciate what you have done to us, it's not an easy thing to provide us with computers in this rural area. Even our neighbouring schools which have no computers admire us."

Laboratory supervisor / Librarian, Edingeni Community Day Secondary School

	Other computers (n=3)	TT / CYD computers (n=23)
General approval of the project	2	8
Teacher training needed	0	5
ICT teacher needed	1	1
Will provide increased employment for ICT teachers	0	1
More ICT teachers need to be trained	0	1
Helping students to improve computer literacy	0	1
Suggested introduction of student competition with prizes	0	1
Community use possible if have more computers	0	1
More resources needed		
PCs	0	3
Projector	0	2 (1 replacement)
OS in line with curriculum	0	1
Internet	0	2
Improved maintenance and repair	0	5

The other comments often duplicated the answers from previous questions – but the overall themes remained the same, with a focus once more on the importance of teacher training and timely maintenance and repair.

Broken Computers

Whilst this was not asked through the KoboCollect questionnaires it is relevant to discuss this here. At the time of this M&E data collection, TT / CYD had distributed 680 PCs to 34 schools. At this point the PCs had been in schools for an average of for an average of 9.8 months (range 1-15 months). There were 179 PCs (26%) that had been returned to CYD for repairs. From this an estimated 130 were expected to be beyond repair, usually relating to problems with the unreliable electricity supply. More efforts need to be made to ensure schools have and maintain the required surge protection.

Background information on the students interviewed

Information is presented as the number of responses (% of responses in that group).

	Control (n=67)	Other computers (n=30)	TT / CYD computers (n=210)
Average age in years (range)	17.6 (13-24)	16.1 (14-20)	17.3 (13-24)
Gender		NB 1 all-girls school	
Male	34 (51%)	9 (30%)	106 (50%)
Female	33 (49%)	21 (70%)	104 (50%)
Form			
Form 1	8 (12%)	4 (13%)	41 (20%)
Form 2	15 (22%)	8 (27%)	36 (17%)
Form 3	13 (19%)	11 (37%)	59 (28%)
Form 4	31 (46%)	7 (23%)	74 (35%)
Boarder or day pupil			
Boarder	20 (30%)	26 (87%)	48 (23%)
Day pupil	47 (70%)	4 (13%)	162 (77%)
Access to a computer			
Yes	21 (31%)	28 (93%)	191 (91%)
No	46 (69%)	2 (7%)	19 (9%)
Where students access a computer			
Home	16 (24%)	6 (20%)	17 (8%)
School	0 (0%)	26 (87%)	190 (90%)
Internet cafe	4 (6%)	1 (3%)	9 (4%)
Other (Friends house / Church)	2 (3%)	0 (0%)	0 (0%)
Access to the internet			
Yes	22 (33%)**	6 (20%)	29 (14%)
No	45 (67%)	24 (80%)	181 (86%)
Where students access the internet			
Home	11 (16%)**	2 (7%)	12 (6%)
School	0 (0%)	6 (20%)	12 (6%)
Internet cafe	10 (15%)**	1 (3%)	2 (1%)
Mobile phone	13 (19%)**	0 (0%)	8 (4%)
Other (dongle)	0 (0%)	0 (0%)	1 (0%)

Access to computers for students in the control schools was only 31%, with most of those accessing computers at home. Access for students attending schools who had received computers from the Turing Trust was 91% with most of those students accessing the computers at school.

**Access to the internet was very limited for all students (33% in the control group, 20% in those attending schools with computers from other sources and only 14% in those attending schools who had received computers from the Turing Trust / CYD). However, the control group included a greater proportion of private schools. Therefore it is likely that these students are slightly wealthier and therefore able to afford internet access at home or in internet cafes.

Use of ICT by students at school

None of the students interviewed who attended control schools had an ICT class or an ICT club, nor were they able to access computers at school out of hours and so were not asked further questions about this. Note there was missing data for 5 students on the use of computers for subjects other than ICT and subsequent questions.

Use of ICT by students during lessons

	Other computers (n=30)	TT / CYD computers (n=210)
Students attending an ICT class		
Form 1		
Yes	4	36
No	0	5
Form 2		
Yes	7	28
No	1	8
Form 3		
Yes	8	39
No	3	20
Form 4		
Yes	6	54
No	1	20
Total		
Yes	**25**	**157**
No	5	53
Use of computers during the ICT class		
Always	19	85
Often	5	51
Occasionally	1	16
Rarely	0	4
Never	0	1
Frequency of ICT class		
Once per week	2	74
2-3 times per week	18	78
4-5 times per week	5	4
Average duration of ICT class		
Less than 30 minutes	0	1
30-45 minutes	21	88
46-60 minutes	0	37
61-75 minutes	0	7
76-90 minutes	2	18
More than 90 minutes	2	5

	Other computers (n=30)	TT / CYD computers (n=210)
Use of computers for subjects other than ICT		
Yes	9	67
No	21	138
Frequency computers are used in non-ICT classes		
Once per week	4	35
2-3 times per week	3	30
4-5 times per week	2	2
Non-ICT subjects that computers are used for		
Agriculture	2	15
Bible Knowledge	0	1
Biology	3	12
Business Studies	0	1
Chemistry	2	15
Chichewa	0	6
English	1	17
Geography	6	18
History	3	2
Life Skills	1	0
Mathematics	0	2
Physics	2	6
Social studies	0	1
Other	2	13

Reasons that students did not use the ICT equipment during lessons included:

- Computers were received after the enrolment date for the national ICT exams, and so students were not able to enrol to take computer studies this academic year.
- No qualified ICT teacher at the school, as the government had moved some ICT teachers to fill other posts, as there is a general shortage of ICT teachers.
- Some schools decided to phase in ICT lessons and so only allowed students in particular forms (generally the more senior students) to use the computer laboratory.

Students' use of computers outside normal school lessons

	Other computers (n=30)	TT / CYD computers (n=210)
ICT Club at school		
Yes	2	6
No	28	199
Use of computers outside school hours		
Yes	16	110
No	14	95
Average (range) number of days per week computers are used outside school hours	2.3 (1-5)	1.9 (0-5)
Average (range) hours per day computers are used outside of school hours	1.1 (1-2)	1.7 (0-5)
Computer use outside school hours		
As an intranet café (local access to information using e-library)	6	14
Printing documents	0	7
Practising computer skills	3	53
Typing / word processing	6	27
Learning	3	10
Playing games	3	7
Other (assignments, reading books & course notes, listening to music)	0	6
Are students able to use the computers as often as they would like?		
Yes	21	115
No	9	90
Reasons students are not able to use computers as often as they would like		
There are not enough computers	4	40
The computers are not always working	1	7
There isn't always electricity	2	36
The computer laboratory is never open out of school hours	1	21
The computer laboratory is not open for long enough out of school hours	3	31
I don't have free time to use the computers out of school hours	0	4
No ICT teacher available to supervise often enough	0	7
Only some forms allowed to use the computers	0	5
Other	4	10
Percentage of time students are not able to use computers because of problems with electricity		
<20%	0	1
20-39%	2	3
40-59%	0	22
60-79%	0	9
>80%%	0	1

Satisfaction of students using the computer laboratory

Students were asked to give their opinion of each of the following statements (other computers n=30, TT / CYD computers n=205). If computers were not used to teach a particular subject, students were not asked to give an opinion on whether the computers made a difference to learning that subject. The data for 5 students from a school that had received computers from the Turing Trust / CYD was missing.

	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree	Not applicable
Using a computer in school makes learning more enjoyable.						
Other computers	21	9	0	0	0	0
TT/CYD computers	122	79	3	0	0	1
Using a computer in school makes learning easier.						
Other computers	18	10	2	0	0	0
TT/CYD computers	108	86	6	4	0	1
Using a computer in school makes learning Maths easier.						
Other computers	0	0	0	0	0	0
TT/CYD computers	2	0	0	0	0	0
Using a computer in school makes learning English easier.						
Other computers	1	0	0	0	0	0
TT/CYD computers	11	6	0	0	0	0
Using a computer in school makes learning Science easier.						
Other computers	4	0	0	0	0	0
TT/CYD computers	18	8	0	0	0	0
Using a computer in school makes learning ICT easier.						
Other computers	15	12	1	0	1	1
TT/CYD computers	102	98	4	0	0	1
Using a computer in school improves my academic performance at school.						
Other computers	8	16	2	2	1	1
TT/CYD computers	91	101	6	6	0	1

Students' Plans

University
All students in the control and other computers groups were planning to go to university as were 207/210 students in the group who had received computers from the Turing Trust / CYD. The remaining 3 students replied maybe to this question.

Subjects students are planning to study at university
Note that some students gave more than one subject and so the total number of subjects is greater than the number of students. Results are given as the number of students planning to do the subject and percentage of the number of subjects in that group.

	Control (67 students, 83 subjects)	Other computers (30 students, 42 subjects)	TT / CYD computers (210 students, 239 subjects)
Accountancy	1 (1%)	1 (2%)	5 (2%)
Agriculture	6 (7%)	0 (0%)	4 (2%)
Banking	0 (0%)	1 (2%)	0 (0%)
Biology	12 (14%)	6 (14%)	36 (15%)
Chemistry	5 (6%)	1 (2%)	9 (4%)
Computer studies / ICT	**3 (4%)**	**2 (5%)**	**26 (11%)**
Engineering	2 (2%)	1 (2%)	3 (1%)
English	**3 (4%)**	**2 (5%)**	**29 (12%)**
Food and Nutrition	2 (2%)	0 (0%)	0 (0%)
Forestry	0 (0%)	0 (0%)	1 (0%)
Geography	2 (2%)	2 (5%)	17 (7%)
History	2 (2%)	2 (5%)	12 (5%)
Home Economics / Hotel & Catering / Hospitality	2 (2%)	0 (0%)	3 (1%)
Humanities	2 (2%)	1 (2%)	8 (3%)
Journalism	0 (0%)	1 (2%)	0 (0%)
Law	1 (1%)	1 (2%)	3 (1%)
Life Skills	1 (1%)	0 (0%)	5 (2%)
Marketing	1 (1%)	0 (0%)	0 (0%)
Mathematics	**8 (9%)**	**3 (7%)**	**39 (16%)**
Medicine	4 (5%)	4 (10%)	3 (1%)
Natural Resource Management	0 (0%)	1 (2%)	0 (0%)
Nursing	3 (4%)	2 (5%)	4 (2%)
Physics	**18 (22%)**	**3 (7%)**	**23 (10%)**
Science	1 (1%)	3 (7%)	1 (0%)
Secretarial Skills	0 (0%)	1 (2%)	0 (0%)
Security	1 (1%)	1 (2%)	0 (0%)
Social and Development Studies	2 (2%)	2 (5%)	6 (3%)
Surveying	0 (0%)	1 (2%)	0 (0%)
Teaching	0 (0%)	0 (0%)	1 (0%)

The subjects that showed the most difference between the groups have been highlighted. Comparing the control group with the group that has been given computers by the Turing Trust / CYD, nearly three times as many students who have had access to computers plan to study Computer Studies / ICT. However, it is possible that the increased number planning to study Computer Studies / ICT may have included some who would otherwise have studied Physics. It is also interesting that having access to computers appears to increase the number wanting to study English and this may be something to follow up and make more detailed enquiries in subsequent surveys.

Students' Career Plans

3 students in the TT / CYD computers group gave 2 possible careers which have been included in the analysis. Percentages are given as the percentage of the total careers in each group. Other includes a wide variety of careers planned by only 1-2 students each, varying from catering and motor mechanics to poet, activist or politician.

	Control (67 students, 67 careers)	Other computers (30 students, 30 careers)	TT / CYD computers (210 students, 213 careers)
Accountancy	3 (4%)	3 (10%)	12 (6%)
Agriculture	3 (4%)	1 (3%)	2 (1%)
Economics / Finance	1 (1%)	1 (3%)	7 (3%)
Engineering	5 (7%)	3 (10%)	7 (3%)
ICT	7 (10%)	1 (3%)	19 (10%)
Journalism	2 (3%)	2 (7%)	10 (5%)
Law	2 (3%)	4 (6%)	15 (7%)
Medicine	14 (21%)	5 (17%)	35 (17%)
Nursing	13 (19%)	5 (17%)	38 (18%)
Police / Army	3 (4%)	1 (3%)	14 (7%)
Teaching	**4 (6%)**	**1 (3%)**	**31 (15%)**
Other	10 (15%)	3 (10%)	20 (9%)

There were fewer differences between the groups in terms of career choices and in particular, access to computers didn't appear to increase the number of students planning a career in ICT. It is not clear why access to computers should increase the number of students planning a career in teaching and this may require more detailed investigation in subsequent surveys.

Other comments

There were technical issues recording and uploading students' comments during the electronic data collection. Comments were therefore recorded by hand and a representative sample is shown below. The students' comments reflected similar comments made by the headteachers and teachers.

"Since ICT is advancing and most things today require ICT knowledge, it is good to have computers and learn about ICT as it can also help us connect with different people from all over the world"

"Computers have been of great help to us. Prior to this donation, we had a computer lab with only 6 working computers. This meant a number of students had to share one computer during practical lessons and this significantly affected students' performance as revealed by their poor showing during national examinations. But after receiving this donation, we have seen a substantial improvement in results considering last year's results."

"All the form four students, myself inclusive, are not learning Computer Studies because there is no qualified teacher for the subject, the teacher assigned to teach form one students has basic knowledge that she cannot teach our syllabus"

"I want to be a nurse as such I want to know how to use a computer because my sister told me that they use computers to write their assignments in university."

"I would like to thank your organization for donating computers to our school and I pray you should do the same to more schools"

"It would have been better if we had more computers because the current number of computers is not enough compared to the number of students willing to learn computers"

Misuku Community Day Secondary School, Malawi

"I had no knowledge about using computers, as a result it was very difficult to even grasp simple computer concepts but I am becoming computer literate now and this will help me a lot because I will be able to apply the learnt skills during my tertiary education"

"We have one Computer Studies teacher who is also pursuing further studies at Mzuzu University, this affects computer classes because he comes periodically to deliver lessons"

"As much as we appreciate the donation of computers, we also wish we had internet connection to enable us have a wider base of relevant information to assist us academically"

"We have a working computer lab but we are not happy with the operating system we are using. Apparently the donor gave us the computers on condition that we use Ubuntu but this is having a negative impact as the computer studies curriculum is tailored to Windows operating system."

Discussion

The discussion will focus on the comparison between the control schools who have not received computers from any source and the schools that have received computers from TT/CYD. The only comment that is worth making about the schools that had received computers from other sources is that 3 of these had received computers with Ubuntu as the operating system and both students and teachers found this difficult to use.

Data collection

This was the first time that we had used KoboToolbox and KoboCollect to collect data in the field using tablets. This had several advantages including geolocation for each school, the ability to collect electronic signatures to confirm consent to participate in the survey and the avoidance of errors that could otherwise be introduced with double data entry. There was an initial problem in downloading the forms, which was found to be because the android devices had been completely discharged and so the time had been automatically reset. Once this had been reset, the forms downloaded without any difficulty. The team in Malawi also had some difficulty in uploading comments made by students and so decided to record these by hand. In retrospect, there were also 5 student forms submitted where only partial data was uploaded and so it seems likely that the issue may have been an interrupted internet connection at the time of the attempted upload.

Data quality

Overall the data quality was good. There were a few submissions where the school code had been entered incorrectly – however, it was possible to rectify these using the information on location and the photo of the school sign.

There was one student form that had been uploaded in duplicate, and this was identified by cross checking the signature. There was one further student survey where the school was not confirmed and so this was not included in the analysis or this report. There were a total of 6 outliers for the responses to how many hours per day were students able to access the computers outside school hours and these were excluded for the analysis. Overall, using KoboToolbox for data collection worked well and proved to be a reliable tool in the field that we will use for further data collection as the project progresses.

The key areas of interest for this monitoring and evaluation exercise were:

For all schools:

- Background information on the school
- Background information on the teaching staff
- Students access to computers and the internet
- Students plans for further study / career

For those schools with computers:

- Use of the computers during and out of school hours
- Teacher training on the use of computers to help teach their lessons
- Effect that the ICT equipment has had on the attitudes and performance of the teachers and students
- Maintenance of the computers

All schools

The background information on the schools confirmed that the control groups and the TT/CYD computers group were comparable in all but 1 respect. 60% of the schools in the control group were private compared with 28% of those in the TT/CYD computers group. This may have impacted on the results obtained relating to access to computers and the internet at home with more students in the control group being able to access computers at home (24% vs 8%) and the internet at home (16% vs 6%). It may also have impacted on student's career choices, in that students in the control group were less likely to want to become teachers (6% vs 15%).

The background information on the teaching staff demonstrated that few of the teachers were qualified in ICT (0% of the 30 headteachers and 15% (6) of the 41 teachers interviewed). Despite this, 20 of the 35 teachers answering the teacher questionnaire were teaching computer studies. There were some comments from teachers that they were only able to teach computer basics rather than the full ICT curriculum, and there were also comments from students about the lack of an ICT teacher. This is known to be a challenge in Malawi, particularly since computer studies has become a nationally examined subject for all forms in secondary school (Forms 1-4) since September 2017 if the school has computers. Until that time, it was only available for students in Forms 3 and 4 in schools with computers.

Students' access to computers outside of school was very low (control 31%, TT/CYD computers 11%) and access to the internet outside school was also low (control 33%, TT/CYD computers 11%). This compares with the figures of 6% of households with a computer and 11% of households with access to the internet in 2017 published by the United Nations specialized agency for information and communication technologies (International Telecommunication Union).

These results reinforce the need to establish computer laboratories in all secondary schools in Malawi.

All students in the control group and 207/210 in the TT/CYD computers group were planning to go to university. Being able to use a computer is an essential skill in tertiary education in Malawi whatever subject you are studying. There are a number of reasons for this, some as simple as the need to submit printed rather than handwritten assignments. There were some differences in the subjects that students were planning to study. More students in the TT/CYD computer group were planning to study Computer Studies / ICT (11% vs 4% in the control group), English (12% vs 4%) and Mathematics (16% vs 9%), whereas fewer were planning to study Physics (10% vs 22%). It seems possible at lease that some of the students who might have planned to study Physics had switched to Computer Studies / ICT once they had a chance to use computers at school. It is less clear why using computers might encourage more students to study English at university and this might be worth more detailed enquiry.

There were fewer differences between the groups in terms of their career plans and, in particular, no difference in the percentage of students planning a career in ICT. There was a greater proportion of students in the TT/CYD computers group who were planning to teach (15% vs 6% in the control group). However, as discussed previously this may have been related to the different types of schools in the 2 groups with an increased proportion of private schools in the control group.

Schools with TT / CYD computers

The results showed that 43% of teachers used the computers to teach subjects other than ICT – but mainly used them to deliver presentations or show videos, rather than asking students to use them to find information or prepare their own work. The average number of lessons each teacher taught in the computer laboratory was 2 per week, usually lasting 30-45 minutes, and more than 20% of these are disrupted by problems with the electricity supply. It is also apparent from both the teachers' and students' surveys that each computer is often shared among 3 or more students, so it is difficult for every student to get hands on experience.

Of those students who had an ICT class it was reassuring that 87% always or often used the computers in class. However, only 33% used the computers for subjects other than ICT and there is a need to train and encourage other subject teachers to incorporate computers into their teaching. Only 54% of students were able to use the computers outside normal school hours and 44% of students said that they would like to be able to use the computers more often. The main barriers to using the computers more out of school hours were not having enough computers, problems with the electricity supply (with 32/36 students saying this happened more than 40% of the time) and the computer laboratory either not being open at all or for long enough.

The students were generally using the computers for practising what they had learnt in lessons and learning to type. Only a few were using the computers for searching for information or playing games. As teachers were mainly using the computers to teach computer skills or to deliver lesson content, further training of both teachers and students is needed to extend computer use for the basics to a tool for discovering information.

Only 35% of all the teachers interviewed had had any training on incorporating computers into their teaching and for those that had, this had usually been a part of their own education and training. Similarly, for the ICT teachers, only 22% had been trained on the basic repair and maintenance of computers and only 33% had any experience of using Linux or Ubuntu operating systems. None had used the Mac operating system.

Satisfaction with the computers was generally good from headteachers, teachers and students. There were significant positive effects on student motivation and enthusiasm, teachers' motivation and the ability of teachers to teach and students to learn. The computers were often used to prepare exam papers. There were some comments about the community helping to motivate the students to learn ICT, and most of the headteachers thought that the computers helped with community engagement with the school. Perhaps not surprisingly, the challenges identified and improvements required by all those interviewed centred around the need for more PCs so that students don't have to share during classes, a more reliable power supply, improved teacher training and better maintenance and repair services. There were also calls for a projector and network, and a qualified ICT teacher in schools that didn't already have one.

Nkhata Bay Secondary School, Malawi

Muhuju Community Day Secondary School, Rumphi, Malawi

Recommendations

Whilst the overall feedback was positive, this monitoring and evaluation exercise has also highlighted some areas that require further work from both the Turing Trust / CYD and from the schools themselves.

Recommendations for the Turing Trust and CYD

- Improving teacher training

- Improving systems for responding to maintenance and repair issues

- Ensuring that the e-library is more widely available, including in schools without a local network

- Focus on the primary objective of ensuring students' access to computers to be able to learn basic skills.

- Lobby the Education Division to send computer studies teachers to schools where we have deployed computers and to avoid rotating such teachers to schools without computers.

- In the longer-term work towards more computers per school

Recommendations for TT and CYD to work with schools to address

- Electricity problems

- Try to prioritise schools with more experienced ICT teachers

- Supporting unqualified ICT teachers to teach ICT and undertake basic maintenance of PCs

- Using the computer laboratory for teaching other subjects apart from ICT

- Improving access for students out of hours

- Improving the use of the e-library

- Developing systems for recording the use of the computer laboratory at each school

Appendices

Appendix 1 - Comments made by Head Teachers or their representatives

Schools with computers

What has been the most significant change in the school as a result of the ICT equipment?	What further improvements in the ICT equipment, resources or training would you like to see?
TT / CYD Computers	
Number of students has increased because many students, one requirement they're looking for before enrolment its whether that particular school offers computer lessons or not	1.Increase in the number of computers as the students are many and to share a computer renders some students spectators . 2.We would like you to help us organise teacher training, so that more teachers are trained as the teacher who was qualified to teach computer has been taken up by the government, and there was no proper handover. the teacher helping with the teaching now is occupied with school at Mzuzu university, at times he is available and sometimes not.
1.Teachers, students are able to use a computer. 2. Students motivation to be using the computer lab. 3. Teachers are suggesting to start offering computer studies class so that students should be writing exams. 4. Teachers are able to type exams.	1. Further training of teachers is needed. 2. Need extra computers at least 30 the better.
We are able to type and print our own examination. Teachers can download and access more information as regard their work. Students are excited to interact with the computers in any way to improve their performance.	We need printers. There is also a need for training especially on the care and simple maintenance of the ICT materials
1. Teachers computer literacy has improved	1. Free Wi-Fi 2. More computers
We can offer lessons to all classes unlike in the past when only form four was offered	Training for our teachers Additional computers
1. Both Learners and teachers have been motivated 2. We have been able to use softcopy materials	1. We would like to see a projector 2. Printer
1. Students can now learn computer studies which is also a motivation to them.	1. Computer studies teacher training 2. More computers because currently 5 students share one computer when learning
Management of exams has been easier and assessment has improved significantly	Training of teachers in the use and application of ICT facilities.
It has assisted learners to acquire information using computers	Additional computers
Motivation of the form ones to learn ICT has gone high	Recruitment of ICT specialist teacher.
Great change in students' motivation, they are working hard	1. Laptops for teachers 2. If teachers have laptops it would be easier to prepare lessons
Students are now motivated	1. More computers 2. Replacements of computers that are not working

What has been the most significant change in the school as a result of the ICT equipment?	What further improvements in the ICT equipment, resources or training would you like to see?
TT / CYD Computers	
Much enthusiasm from teachers and students	We would like internet connection
1. We have seen that students are becoming more computer literate. 2. The students are happy, because the gap has been bridged ,computers were only found in high schools and other expensive schools.	1.We need to have more computers, because of the few computers students are forced to go in phases to attend computer classes. 2.We need equipment like a printer and a projector 3.We would be glad if we are connected to the Internet as this would help students search for vital information on the web.
1.Students learn computer skills with hands on experience and these skills will be essential to them in their tertiary education 2.Community members are interested in learning computer skills	1.We want equipment for power point presentation because the projector we're using is down 2.On top of the twenty computers, we would love if a Laptop is given to the school for administrative purposes.
Students absenteeism has been prevented because of computers.	1. More computers 2. printer 3. projector 4. local area network
1.Students are able to access information on the PCs using computer software 2.Teacher workload has been minimized as the computers make it easier for students to access notes and class exercises, you don't have to write on the board.	We need faster performing machines, because the computers take long to respond to the command's.
There's a big motivation from the community. They are encouraging the students to attend computer lessons and take them seriously	We would like more computers because students are many
To the side of teachers there has been an improvement as Exams were manually produced then but this time around we just type using computers	We want more teachers trained as the only teacher who had computer knowledge is continuing his Education at the university as a result, students are not learning computer
The computers coerced us to buy a printer which I think it couldn't have happened if it we not for these computers. We are able to prepare exams in good time.	The problem is with the software system, some of the us are not familiar with some we might need some training in that area
1. Mode of lesson delivery as teachers they use projector instead of writing on a chalk board. 2. Motivation of students to use the lab.	1. We need training of teachers as of now we don't have A qualified computer study teacher and that is a reason why we don't teach computer studies but we teach students the basics of how best they can use the computers. 2. If you can provide scanner
A rise in enrolment	Help us to train the teachers
1. This time around we have managed to type exams using these computers than before. 2. Even some students were involved in typing exams of lower classes	1. We would have loved if we were trained in computers because most of us are illiterate in computers 2. More computers because 20 computers are not enough for students 3. Local area network 4. Projector

What has been the most significant change in the school as a result of the ICT equipment?	What further improvements in the ICT equipment, resources or training would you like to see?
Other computers	
Most students are now motivated that they are now computer literate	We would like internet and an additional of computers
Students have become computer literate	Extra room as the current room is very small
Some students are now computer literate	A lot of students to be encouraged to take computer class
The hunger for computer has risen	We would like to be given computers

All Schools - other comments

TT/CYD Computers	TT/CYD Computers
Its a very positive move as it has brought motivation among students, some have developed interest in pursuing careers in ICT.	1.Thankful for the computers as soon we have a new teacher is means students from remote areas will have access to a computer. 2. Policy makers need to expand the project because
We really appreciate the effort by CYD. More computers and or Laptops are needed since Chibavi Community	
We are thankful for the donation	It's just a word of gratitude to the donors, prior to this donation we had students graduating with no knowledge of ICT which has changed now. Now that we have these machines here we have seen students develop interest in ICT education and expressing interest to pursue studies in this area.
We would like access to internet.	
If possible provide us with white board	
If the recommendations given to you on this survey can be done, we can be happy.	1. The project must continue to cover most schools. 2. If you can increase number of computers the better at least 40 per school
Thank you because the computers are a vital thing on our campus	Thankful for the opportunity. As it is one way of marketing our schools.
Continue the project to help other schools so that we have a better education system in Malawi.	1. I would like to thank you for coming. 2. As of now we have three computers that are not working, that is the most challenge that we have.
Computers are very good as far as the new curriculum is concerned.	
Truly appreciate CYD for being thoughtful. We will take care of this valuable property	
Thanks for the project, it's really helping both students and teachers to learn and teach the curriculum respectively.	
We want internet at the school, if we are given the infrastructure then we can sustain the initiative.	
1. Am thankful for your coming. 2. we are great full for your help of computers because it helps us to motivate students to work hard at school.	
We're very thankful for the computers, and if there's a possibility of giving us more PC's we would welcome the development.	
We are interested in training so that we deliver the right things to our learners.	

Lidoma Private Secondary School

Other computers

Looking forward to your assistance even though many donors do not like assisting private institutions.

We need an extra Teacher to help teach the students

We need the support of computer so that we also go technological as a school. Our school is expanding but it cannot afford computers. We have room to accommodate computers. The ones we have are running on Ubuntu

Our Time Private Secondary School, Mzuzu, Malawi

Control

We need computers in the school, we attended a seminar at Katoto secondary school were a representative from CYD told us about the project, but some of the conditions we really can't manage like paying the set amount of money.

1. The improving access to ICT in secondary schools project is long overdue.
2. We want it even today.

1. We would be very glad if you can give us computers as you said you have a project of improving access to ICT in secondary schools.
2. We have problems in preparing exams like typing and printing of exams, we go to the district just to type and print exams which is so expensive.
3. We need students to be learning computer studies
4. If we can have computers lesson preparations can be simple for us.
5. Finally I would like to thank you for your coming.

This donation will help students and the community around to have access to ICT knowledge.

1. We are in the process of coming up with a computer lab, by November this year it will be finished and we will need computers. So don't just collect data your coming will rescue us.

1. It's very important to distribute computers as technology is growing
2. It might increase number of students enrolling to our school

1. We appreciate for recognising our school as a control school because there are a lot of schools in Malawi but you chose our school.
2. We need computers because now the technology is advanced and computer knowledge is needed so that we should not be left behind.

Kamphenda Community Day Secondary School, Rumphi, Malawi

Appendix 2 - Comments made Teachers

Schools with computers

What has changed in the way you teach students since the set-up of the computer laboratory?	What are the main challenges you have encountered to integrating ICT into the classroom?	What further improvements in the ICT equipment, resources or training would you like to see?
TT/CYD computers		
	Power supply problems	Having a qualified ICT teacher
1. Students are motivated they are able to do hands on lessons	The type of software isn't the one in the syllabus	1. Teacher training 2. Change of OS 3. More computers 4. Printer
Use of power point, for example, has brought about the anticipated zest and enthusiasm for learning	1. Limited resources 2. Lab size	1. More computers 2. Construction of a bigger lab 3. A need for training at a cluster level
Individual access to computers which has enhanced attendance in school	We are limited to the resources we have and its mostly theoretical because we have no internet. And power problem's	Actual training of teachers Actual equipment in line with the syllabus Updating of the software as we are still using windows XP
Performance of students in national examinations. For example, in the last year's exams all students passed which was not the case before coming of the computers	1. Girls attitude, they show no interest unlike boys	1. Projector 2. Teacher training
Now students are learning computer studies than before	1. The laboratory is not good 2. Students who join late are behind than those who started earlier	1. Separate computer laboratory 2. Training in teaching computer studies 3. More computers 4. Local area network 5. Teaching equipment like floppy disks, magnetic tape etc. 6. Sockets
Students are able to use the computers on their own	Other rooms have no sockets	Replacement of those computers which are not working, if possible organise a training for us to know more, I additional we need projectors.
1. Performance of students 2. Motivation of students to take computer studies 3. Always students want to be in the lab.	1.Shortages of pcs to the extent that students share pcs to ratio of 3 students to 1 computer 2.I am not a qualified computer teacher so when am teaching I skip other topics like programming I only go for simple topics.	1.Projector. 2. Uninterrupted power supply devices as school cannot afford buying them. 3. Printer. 4. Networking devices such as ethernet cables.

What has changed in the way you teach students since the set-up of the computer laboratory?	What are the main challenges you have encountered to integrating ICT into the classroom?	What further improvements in the ICT equipment, resources or training would you like to see?
TT/CYD computers		
There's more curiosity in the students. The computers are an incentive	Most students don't have the basic knowledge and its difficult to capture information because the subject is not available in primary school	Additional of computers, the ratio is too much. We have a thousand students and 20 computers would not be enough
We are now using new computers but before we were using old computers	1. Computer studies books 2. Time for teaching because there are inadequate teachers	1. Books 2. Trained teachers 3. Two laboratories
	1. Computers are not enough 2. Electricity problems	Have teacher training now and then because technology changes everyday
Before these computers, it was difficult to teach computer studies but now it's easy because I can easily teach them while they practically use computers	1. Inadequate computers 2. There are no internet services 3. Power interruptions	1. Extra computers 2. Maintenance of computers that are not working 3. Teacher training in maintenance 4. Local area network
Speed in teaching, it helps to finish the curriculum quickly by teaching practical lessons than theory	1. Number of computers and students are not matching 2. power interruption.	1. PC Maintenance should be done in time 2. We need local area network. 3. We need more computers.
Motivation, now students are more eager to learn and are more committed to learning the curriculum	Some students have never used the computers so it becomes difficult for them to learn fast, u tell them one thing today you ask them the same thing tomorrow they fail to do that thing .	1.We need a printer and projector 2.We would love if we had a local area network.
1. We are able to demonstrate some lessons through videos using a projector like Romeo and Juliet movie. 2. Record keeping for teachers 3. Easy preparing of our work 4. Students skills in computer basics 5. Motivation of students	1. Electricity problems 2. There is no trained ICT teacher 3. Less computers 4. Repairing and maintenance of broken computers	1. Basic computer maintenance training 2. Quick response when we report a problem 3. More computers
We save time when it comes to teaching as notes are installed in the computers and we have much time specifically for teaching. Teachers also have ample time to set up exams since they can access the lab anytime.	Time constraints as our timetable is tight.	1. There is need for inset training 2. Need for projector to help us reaching. 3. We also need e-library.
	Lack student background information	Teacher in service training
The students are more interested and motivated to learn	The computer are not enough so they scramble	Training in ICT

What has changed in the way you teach students since the set-up of the computer laboratory?	What are the main challenges you have encountered to integrating ICT into the classroom?	What further improvements in the ICT equipment, resources or training would you like to see?
TT/CYD computers		
1. Students are able to use a computer like being able to type. 2. Lesson delivery has been simplified.	1. Absence of internet 2. Shortage of PCs 3. The lab is small	1. Having more PCs 2. Further training for ICT teachers 3. Having access to the internet
We are now able to use computers in typing exams than before.	We don't have a computer studies teacher	1. Local area network 2. Printer 3. Project 4. A training for a computer studies teacher
The use of projector makes presentation of lesson easy	1. Lack of more knowledge of using the computers	1. More lessons about using the computer.
More students are coming to this school meaning computer lessons are important	Electrical problems	Training
1. Students are now are accessing computers and they learning than before	1. Shortage of computers 2. Electricity problems 3. We don't have a projector to demonstrate lessons and cables are not enough	1. I need to be trained in computers so that I should be able to teach the curriculum 2. Projector 3. Local area network 4. Quick response when we report a problem
Other computers		
The teaching method itself because we are now able to demonstrate lessons using a projector and students are able to practise while am teaching.	1.Some students have technophobia 2. Electricity problem 3. Computers are not enough	1. Expansion of computer laboratory 2. Addition of ICT equipment 3. Teacher end user training
Students actually gather information using Internet, for academic purposes	The computers were given by the donors, and the donors recommended that we should be using Ubuntu operating system which is not in line with what the syllabus requires as windows is the recommended OS by the syllabus so this confuses students.	The donor community should have a look at syllabus requirements and also help with appropriate materials e.g book's
1. Motivation of the students 2. Improved reasoning and logic skills 3. Manipulation skills 4. Enthusiasm and creativity among students	1. Shortage of ICT equipment as there are only four working PC's 2. Lack of applied science incentive training where teachers meet and discuss techniques of teaching students.	We want an increase in ICT equipment

All Schools - other comments

TT/CYD computers

The project is helpful but its problematic when a school has no qualified ICT teacher

1. There is need of OS which is in line with the curriculum
2. There is need of extra computers so more students can benefit.

The project has improved the way lessons are delivered so much that without the project, teaching & learning would be in jeopardy.

We would like to have a projector

1. I appreciate your coming because now I know that things are going to change.
2. I need computer studies training as soon as possible

Yes, we thank you for your initiative so that we also have computers in this school.

1.Training of teachers is needed as for example I myself I studied Humanities teaching computer is just my wish.
2. You should introduce some competition among the students who study computer and giving gifts to the winners to encourage others.

Our school has high enrolment and 20 computers causes fights, they scramble.

1. Am just a volunteer so if I may be paid.
2. I need computer studies training

The project is helpful

1. I would like to thank you for coming
2. If you can help us with maintenance of computers that are not working and extra computers, we can be very happy.

1. The interview has been good.
2. It is difficult for us to bring computers to Mzuzu for maintenance because it's too far and costly for us.

1.Continue the program, take it to other schools because it's very beneficial as its evident with us
2.The program has helped in job creation because when a school has the ICT equipment definitely that school will employ teachers to teach the computers it that case Jobs are being created.

We need extra 20 computers as the enrolment is very high and teaching a big group is a bit hard.

TT/CYD computers

1. We are grateful for the support of computers.
2. I would be grad if a projector can be replaced.
The Rachel software is no longer working because the PC that it was installed in stopped working

The project is helping the students

There's need for quick maintenance and also internet

1. The ratio of ICT teachers to students is bigger 1:100. 2. If we can have more computers, we can even start enrolling even community members. 3. I suggest for more training of ICT teachers to facilitate ICT teaching.

1. It was good to have this interview
2. I can be happy to have a training in computers so that I can be able to teach computer studies

We would like internet connection so that it is easier to teach.

1. I appreciate what you have done to us, its not an easy thing to provide us with computers in this rural area. Even our neighbouring schools which have no computers admire us.

Njerenjere Private Secondary School,
Mzuzu, Malawi

Other computers

1. The project is good because we need to have knowledge of computers since in this generation everything is computerised
2. When you are implementing this project make sure that ICT teacher is available because if you don't do that your project may not achieve what you want.

Thanks for the work your organization in doing.

Because of shortage of resources such as flash disk, and PC's students learn computer studies just to appreciate the subject, but I would love if the government make policies so that ICT equipment is found in government schools as the world is fast moving technologically.

Malo Private Secondary School,
Mzimba, Malawi

Control

We would love to have ICT equipment in the school

I would love if computers can be installed so that we should have a working lab, we need to motivate students with computer studies

1. The Improving access to ICT in secondary schools project is a welcomed development and we are looking forward to have it here, and we are ready for it.
2. Am happy with this interview

Considering the current trend in technology, I think it would be best if we were to benefit from this project. For instance, I myself is doing education degree at Mzuzu University but I'm struggling to do my school because of I can't comfortably use the computer.
This project could be the only leeway my students can avoid the struggle I'm going through.

1. The project is good because when you look at the world now, computers are key to everything.

1. If we can have computers will increase computer illiterate to our learners.
2. It will also increase school enrolment.
3. Technology is everywhere so to have a computer lab is a need.

We really need the computers because they do help in many areas. The computers will help in instilling the students with modern technological aspects.

It would be a great thing to have computers at this institution as it would mean a great step ahead.

Royal Private Secondary School,
Mzuzu, Malawi

Appendix 3 - Headteacher questionnaire used

NB: questions in lighter type are those dependent on skip logic, and so only appear if relevant according to previous responses. The names of interviewers have been replaced by initials.

New Malawi Head Teacher Questionnaire 2018

Name of interviewer

○ VV
○ AC
○ JK
○ SM
○ ON
○ YM
○ Other

If other, please give your name

_____

What is the school code?
Please give the school code from the tracker

S-000
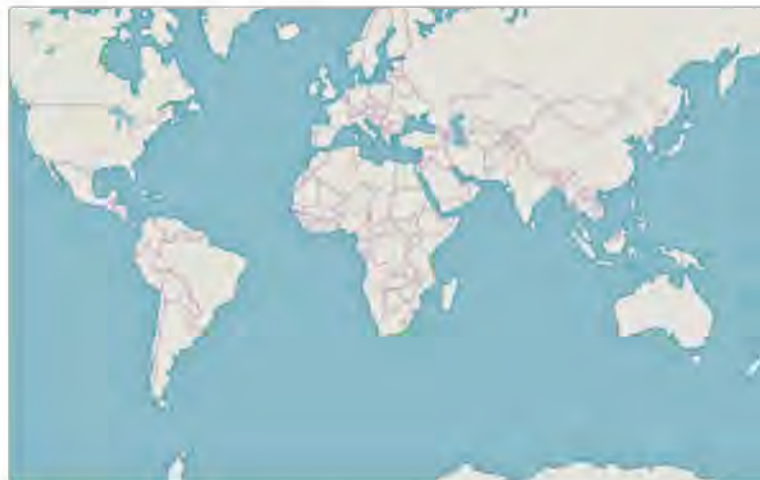_____

Please add your location
Press record location, wait for your location to load and then press record location again

latitude (x.y °)

_____

longitude (x.y °)

_____

altitude (m)

_____

accuracy (m)

_____

Please take a photo of the school buildings, with school sign if possible

Click here to upload file. (< 5MB)

Please explain to the interviewee that this is a short questionnaire we are conducting in order to assess the impact of CYD / The Turing Trust's work. This is very important for us to be able to continue and improve on the work we have already done. It will take less than 15 minutes of their time. All of the information they provide will be used only for the stated purpose by the team, will be stored anonymously and securely. Once all the data has been collected and analysed, we will share our findings with all schools who have participated in the survey and publish them in our annual report.

Headteacher questionnaire (2)

Please confirm that the interviewee understands the explanation above and consents to participating in this survey

○ OK

Signature of interviewee
Interviewee can sign on the phone / tablet

School Information

What region is the school located in?

○ Northern

○ Central

○ Southern

What district is the school in?

○ Chitipa

○ Karonga

○ Likoma

○ Mzimba

○ Mzuzu

○ Nkhata Bay

○ Rumphi

Headteacher questionnaire (3)

What district is the school in?

- Dedza
- Dowa
- Kasungu
- Lilongwe
- Mchinji
- Nkhotakota
- Ntcheu
- Ntchisi
- Salima

What district is the school in?

- Balaka
- Blantyre
- Chikwawa
- Chiradzulu
- Machinga
- Mangochi
- Mulanje
- Mwanza
- Neno
- Nsanje
- Phalombe
- Thyolo
- Zomba

How would you describe the location of the school?

- Urban
- Semi / peri-urban
- Rural

What type of school is this?

- Community
- Government
- Grant-aided
- Private

Headteacher questionnaire (4)

What level of school is this?

○ Primary school

○ Secondary school

Is this a day school or boarding school?

○ Day school

○ Boarding school

Does this school have a working computer lab?

○ Yes

○ No

How many male students attend this school?

_____

How many female students attend this school?

_____

How many male students are there in Form 4?

_____

How many female students are there in Form 4?

_____

How many male students with a disability are in the school?

_____

How many female students with a disability are in the school?

_____

How many male teachers are in the school?

_____

How many female teachers are in the school?

_____

Interviewee information

Please give the first 2 letters of your first name and the first 2 letters of your surname
If interviewee does not wish to give their initials, please leave as default

XXXX

Headteacher questionnaire (5)

Are you male or female?

◯ Male

◯ Female

What is your age range? (Leave blank if he / she would prefer not to say)

◯ 25 or below

◯ 26-35

◯ 36-45

◯ 46 or more

How many years have you been teaching?

Please give the nearest whole number of years

_____

What is your role in the school?

◯ Coordinator

◯ Head of Department

◯ Head teacher

◯ Principal

◯ Senior teacher

◯ Supervisor

◯ Teacher

◯ Vice Principal

How many years have you been working in your current role?

Please give nearest whole number of years in their current role

_____

What is the highest level of education you have obtained?

◯ Advanced Certificate

◯ Advanced Diploma

◯ Bachelor's Degree

◯ Certificate

◯ Diploma

◯ Doctorate Degree

◯ Junior/Senior Secondary Education

◯ Master's Degree

◯ Postgraduate Qualification

Headteacher questionnaire (6)

What was your field of study? 54

_____

ICT information

Please explain that the following section contains questions about the effect that the ICT equipment has had on the attitudes and performance of the teachers and students. The options for each are: significantly positive effect, slightly positive effect, no effect, slightly negative effect and significantly negative effect.

Has the ICT equipment affected the ability of teachers to deliver their curriculum?

○ Significantly positive effect

○ Slightly positive effect

○ No effect

○ Sightly negative effect

○ Significantly negative effect

Has the ICT equipment affected the motivation of the teachers?

○ Significantly positive effect

○ Slightly positive effect

○ No effect

○ Sightly negative effect

○ Significantly negative effect

Has the ICT equipment affected the ability of the students to learn the curriculum?

○ Significantly positive effect

○ Slightly positive effect

○ No effect

○ Sightly negative effect

○ Significantly negative effect

Has the ICT equipment affected the motivation of the students?

○ Significantly positive effect

○ Slightly positive effect

○ No effect

○ Sightly negative effect

○ Significantly negative effect

Headteacher questionnaire (7)

Do the ICT facilities help with teacher recruitment?

○ Significantly positive effect

○ Slightly positive effect

○ No effect

○ Sightly negative effect

○ Significantly negative effect

Do the ICT facilities help with teacher retention?

○ Significantly positive effect

○ Slightly positive effect

○ No effect

○ Sightly negative effect

○ Significantly negative effect

Do the ICT facilities help with community engagement with the school?

○ Significantly positive effect

○ Slightly positive effect

○ No effect

○ Sightly negative effect

○ Significantly negative effect

Do you have an ICT policy or guidelines for the school?

○ Yes

○ Under development

○ No

What has been the most significant change in the school as a result of the ICT equipment?

_____

What further improvements in the ICT equipment, resources or training would you like to see?

_____

Do you have any other comments?

_____

Please take a photo of the computer lab showing the IT equipment with or without students.
If lab not set up yet, please take a photo of the room that will be used as a lab.

Click here to upload file. (< 5MB)

Headteacher questionnaire (8)

Please take a photo of the computer lab being used by students

If students not available, please take a second photo of the computer lab from a different angle. If lab not set up yet, please take a photo of the room that will be used as a lab.

Click here to upload file. (< 5MB)

Thank the interviewee for their time and explain that the results of the survey will help us to develop the IT resources we deliver to schools in Africa.

Appendix 4 - Teacher questionnaire used

NB: questions in lighter type are those dependent on skip logic, and so only appear if relevant according to previous responses. The names of interviewers have been replaced by initials.

New Malawi Teacher Questionnaire 2018

Name of interviewer

○ VV
○ AC
○ JK
○ SM
○ ON
○ YW
○ Other

If other, please give your name

_____

School Information

What is the school code?
Please give the school code from the tracker

S-000

Please add your location
Press record location, wait for your location to load and then press record location again

latitude (x.y °)

_____

longitude (x.y °)

_____

altitude (m)

_____

accuracy (m)

_____

What region is the school located in?

○ Northern

○ Central

○ Southern

Teacher questionnaire (2)

What district is the school in?

- ○ Chitipa
- ○ Karonga
- ○ Likoma
- ○ Mzimba
- ○ Mzuzu
- ○ Nkhata Bay
- ○ Rumphi

What district is the school in?

- ○ Dedza
- ○ Dowa
- ○ Kasungu
- ○ Lilongwe
- ○ Mchinji
- ○ Nkhotakota
- ○ Ntcheu
- ○ Ntchisi
- ○ Salima

What district is the school in?

- ○ Balaka
- ○ Blantyre
- ○ Chikwawa
- ○ Chiradzulu
- ○ Machinga
- ○ Mangochi
- ○ Mulanje
- ○ Mwanza
- ○ Neno
- ○ Nsanje
- ○ Phalombe
- ○ Thyolo
- ○ Zomba

Teacher questionnaire (3)

How would you describe the location of the school?

◯ Urban

◯ Rural

◯ Semi / peri-urban

What type of school is this?

◯ Community

◯ Government

◯ Grant-aided

◯ Private

What level of school is this?

◯ Primary school

◯ Secondary school

Is this a day school or a boarding school?

◯ Day school

◯ Boarding school

Does this school have a working computer laboratory?

Please tick No if computer lab being set up on this visit.

◯ Yes

◯ No

Please explain to the interviewee that this is a short questionnaire we are conducting in order to assess the impact of CYD / The Turing Trust's work. This is very important for us to be able to continue and improve on the work we have already done. It will take less than 15 minutes of their time. All of the information they provide will be used only for the stated purpose by the team, will be stored anonymously and securely. Once all the data has been collected and analysed, we will share our findings with all schools who have participated in the survey and publish them in our annual report.

Please confirm that the interviewee understands the explanation above and consents to participating in this survey

◯ OK

Teacher questionnaire (4)

Signature of interviewee

Interviewee can sign on the phone / tablet

Interviewee information

Please give the first 2 letters of your first name and the first 2 letters of your surname

If interviewee does not wish to give their initials, please leave as default

XXXX

Are you male or female?

- ◯ Male
- ◯ Female

What is your age range? (Leave blank if he / she would prefer not to say)

- ◯ 25 or below
- ◯ 26-35
- ◯ 36-45
- ◯ 46 or more

How many years have you been teaching?

Please give nearest whole number of years the interviewee has been teaching

What is your current role in the school?

Teacher questionnaire (5)

What is the highest level of education you have obtained?

- ◯ Advanced Certificate
- ◯ Advanced Diploma
- ◯ Bachelor's Degree
- ◯ Certificate
- ◯ Diploma
- ◯ Doctorate Degree
- ◯ Junior/Senior Secondary Education
- ◯ Master's Degree
- ◯ Postgraduate Qualification

What was your field of study?

_____

What standards do you currently teach?
Please tick all that apply

- Standard 1
- Standard 2
- Standard 3
- Standard 4
- Standard 5
- Standard 6
- Standard 7
- Standard 8

What forms do you currently teach?
Please tick all that apply

- Form 1
- Form 2
- Form 3
- Form 4

Teacher questionnaire (6)

What subjects do you teach?
Please tick all that apply

☐ Agriculture

☐ Bible Knowledge and Religious Education

☐ Chichewa

☐ English

☐ Expressive Arts

☐ ICT

☐ Life Skills

☐ Mathematics

☐ Science and Technology

☐ Social and Environmental Sciences

What subjects do you teach?
Please tick all that apply

☐ Agriculture

☐ Bible Knowledge

☐ Biology

☐ Business studies

☐ Chemistry

☐ Chichewa

☐ Computer studies

☐ Craft, Design and Technology

☐ Creative Arts

☐ English

☐ Geography

☐ History

☐ Home Economics

☐ Life Skills Education

☐ Mathematics

☐ Performing Arts / Music and Dance

☐ Physical Education

☐ Physics

☐ Religious and Moral Education

☐ Social Studies

Teacher questionnaire (7)

What is your average class size?
Please give the average number of students in the classes you teach

_____

Use of the computers for teaching

Do you sometimes teach lessons in the computer laboratory?

◯ Yes

◯ No

On average, how many lessons do you teach in the computer laboratory each week?

_____

On average, how long (in minutes) does a lesson in the computer laboratory last?

Less than 30 minutes

30-45 minutes

46-60 minutes

61-75 minutes

76-90 minutes

More than 90 minutes

Approximately what percentage of the lessons you teach in the computer laboratory are disrupted because of problems with the electricity?

Please give the approximate percentage of the number of lessons that are disrupted. For example if you only have problems with electricity once a week and you teach 10 lessons in the computer laboratory each week, this would be 10% and so the answer would be "less than 20%".

Less than 20%

20-39%

40-59%

60-79%

More than 80%

What ICT equipment do you use to help you teach?
Please tick all that apply

☐ PCs

☐ Laptops

☐ Tablets

☐ Projector

☐ Printer

☐ None

Teacher questionnaire (8)

What subjects do you teach in the computer laboratory?
Please tick all that apply

☐ Agriculture

☐ Bible Knowledge and Religious Education

☐ Chichewa

☐ English

☐ Expressive Arts

☐ ICT

☐ Life Skills

☐ Mathematics

☐ Science and Technology

☐ Social and Environmental Sciences

What subjects do you teach in the computer laboratory?
Please tick all that apply

☐ Agriculture

☐ Bible Knowledge

☐ Biology

☐ Business studies

☐ Chemistry

☐ Chichewa

☐ Computer studies / ICT

☐ Craft, Design and Technology

☐ Creative Arts

☐ English

☐ Geography

☐ History

☐ Home Economics

☐ Life Skills Education

☐ Mathematics

☐ Performing Arts / Music and Dance

☐ Physical Education

☐ Physics

☐ Religious and Moral Education

☐ Social Studies

Teacher questionnaire (9)

How do you use the computer laboratory to help you teach?
Please tick all that apply

☐ To teach basic computer skills

☐ To teach ICT curriculum

☐ To deliver presentations to the students, e.g. using PowerPoint

☐ To help demonstrate lessons

☐ To use videos on the computers as part of your lesson

☐ For students to research issues

☐ For students to solve problems, e.g. Maths problems

☐ For students to develop their own digital content, e.g. researched essays or presentations

Have you used the e-library / educational software on the computers?

◯ Yes

◯ No

◯ None available on the computers at this school

On average, how many students share a computer?

_____

Use of computers out of school hours

Do students have access to the computers out of school hours?

◯ Yes

◯ No

◯ Don't know

On average, how many days per week do the students have access to the computers out of school hours?

_____

On average, how many hours per day do the students have access to the computers out of school hours?

_____

Training and experience

Have you had any training in the maintenance and repair of computers?
Please tick as many as apply

☐ Yes, when the computers were installed

☐ Yes, I attended a CYD training course

☐ Yes, I attended another training course

☐ Yes, during my education / teacher training

☐ No

Teacher questionnaire (10)

Have you had any training in networking computers?
Please tick as many as apply

- [ ] Yes, when the computers were installed
- [ ] Yes, I attended a CYD training course
- [ ] Yes, I attended another training course
- [ ] Yes, during my education / teacher training
- [ ] No

Which operating systems do you have experience of using?
Please tick as many as apply

- [ ] Windows
- [ ] Mac OS
- [ ] Linux
- [ ] Ubuntu

Have you had any training in using computers to help teach your lessons?
Please tick as many as apply

- [ ] Yes, when the computers were installed
- [ ] Yes, I attended a CYD training course
- [ ] Yes, I attended another training course
- [ ] Yes, internal training in this school
- [ ] Yes, during my education / teacher training
- [ ] No

Satisfaction

Please explain to the interviewee that the following section contains statements that they will either strongly agree, agree, agree nor disagree, disagree, or strongly disagree with. If a teacher does not have any experience of using the ICT equipment in the school, use not applicable.

I enjoy using the ICT equipment and software.

- ◯ Strongly Agree
- ◯ Agree
- ◯ Neither Agree nor Disagree
- ◯ Disagree
- ◯ Strongly disagree
- ◯ Not applicable

Teacher questionnaire (11)

The ICT equipment and software have been easy to use.

○ Strongly Agree

○ Agree

○ Neither Agree nor Disagree

○ Disagree

○ Strongly disagree

○ Not applicable

The computer laboratory makes my job as a teacher easier.

○ Strongly Agree

○ Agree

○ Neither Agree nor Disagree

○ Disagree

○ Strongly disagree

○ Not applicable

Using the computer laboratory has made it easier to deliver the curriculum

○ Strongly Agree

○ Agree

○ Neither Agree nor Disagree

○ Disagree

○ Strongly disagree

○ Not applicable

Using the computer laboratory has had a positive effect on the enthusiasm and motivation of the students.

○ Strongly Agree

○ Agree

○ Neither Agree nor Disagree

○ Disagree

○ Strongly disagree

○ Not applicable

Using the computer laboratory has had a positive effect on the literacy and numeracy levels of the students.

○ Strongly Agree

○ Agree

○ Neither Agree nor Disagree

○ Disagree

○ Strongly disagree

○ Not applicable

Teacher questionnaire (12)

Using the computer laboratory has had a positive effect on the ICT skills of the students.

○ Strongly Agree

○ Agree

○ Neither Agree nor Disagree

○ Disagree

○ Strongly disagree

○ Not applicable

Using the computer laboratory has enhanced the students' overall academic performance.

○ Strongly Agree

○ Agree

○ Neither Agree nor Disagree

○ Disagree

○ Strongly disagree

○ Not applicable

The computer laboratory helps community engagement with the school

○ Strongly Agree

○ Agree

○ Neither Agree nor Disagree

○ Disagree

○ Strongly disagree

○ Not applicable

Maintenance

The PCs have been reliable.

○ Strongly Agree

○ Agree

○ Neither Agree nor Disagree

○ Disagree

○ Strongly disagree

○ Not applicable

Teacher questionnaire (13)

The PCs are easy to maintain.

- ◯ Strongly Agree
- ◯ Agree
- ◯ Neither Agree nor Disagree
- ◯ Disagree
- ◯ Strongly disagree
- ◯ Not applicable

The PCs are repaired or replaced quickly enough if there is a problem.

- ◯ Strongly Agree
- ◯ Agree
- ◯ Neither Agree nor Disagree
- ◯ Disagree
- ◯ Strongly disagree
- ◯ Not applicable

Comments

Has anything changed in the way that you teach the students since the set up of the computer laboratory?

- ◯ Yes
- ◯ No

What has changed?

_____

What are the main challenges you have encountered to integrating ICT into the classroom?

_____

What further improvements in the ICT equipment, resources or training would you like to see?

_____

Do you have any other comments?

_____

Thank the interviewee for their time and explain that the results of the survey will help us to develop the IT resources we deliver to schools in Africa.

Appendix 5 - Student questionnaire used

NB: questions in lighter type are those dependent on skip logic, and so only appear if relevant according to previous responses. The names of interviewers have been replaced by initials.

New Malawi Student Questionnaire 2018

Interviewer

○ VV
○ AC
○ JK
○ SM
○ ON
○ YM
○ Other

If other, please give your name

_____

School information

What is the school code?
Please give the school code as it appears in the tracker

S-000

_____

What region is the school in?

○ Northern

○ Central

○ Southern

What district is the school in?

○ Chitipa

○ Karonga

○ Likoma

○ Mzimba

○ Mzuzu

○ Nkhata Bay

○ Rumphi

Student questionnaire (2)

What district is the school in?

- Dedza
- Dowa
- Kasungu
- Lilongwe
- Mchinji
- Nkhotakota
- Ntcheu
- Ntchisi
- Salima

What district is the school in?

- Balaka
- Blantyre
- Chikwawa
- Chiradzulu
- Machinga
- Mangochi
- Mulanje
- Mwanza
- Neno
- Nsanje
- Phalombe
- Thyolo
- Zomba

Describe the location of the school

- ◯ Urban
- ◯ Rural
- ◯ Semi / peri-urban

What level of school is this?

- ◯ Primary
- ◯ Secondary

Is this a day school or a boarding school?

- ◯ Day school
- ◯ Boarding school

Student questionnaire (3)

Does this school have a working computer laboratory?

If computer lab being set up on this visit, please answer no

◯ Yes

◯ No

Please explain to the interviewee that this is a short questionnaire we are conducting in order to assess the impact of CYD / The Turing Trust's work. This is very important for us to be able to continue and improve on the work we have already done. It will take less than 15 minutes of their time. All of the information they provide will be used only for the stated purpose by the team and will be stored anonymously and securely. Once all the data has been collected and analysed, we will share our findings with all schools who have participated in the survey and publish them in our annual report.

Please confirm that the interviewee understands the explanation above and consents to participating in this survey

◯ OK

Signature of interviewee

Interviewee can sign on the phone / tablet

Student information

Student code – please give the first 2 letters of the student's first name and then the first 2 letters of the student's surname

If student does not want to give their initials, please leave default

XXXX

What is your age?

Please record the student's current age in years

Are you male or female?

◯ Male

◯ Female

Student questionnaire (4)

What standard are you in?

- Standard 1
- Standard 2
- Standard 3
- Standard 4
- Standard 5
- Standard 6
- Standard 7
- Standard 8

What form are you in?

- Form 1
- Form 2
- Form 3
- Form 4

Are you a day pupil or a boarder?

- ○ Day pupil
- ○ Boarder

Do you have access to a computer?

- ○ Yes
- ○ No

Where do you access a computer (please tick all that apply)

- ☐ Home
- ☐ School
- ☐ Internet cafe
- ☐ Other

If other, please give details of where you access a computer

_____

Do you have an Information and Communications Technology (ICT) / Computer Studies class?

- ○ Yes
- ○ No

Student questionnaire (5)

Do you use computers during the ICT / Computer Studies class?

- Always
- Often
- Occasionally
- Rarely
- Never

ICT information

How many times per week do you have ICT / Computer Studies class?

- Once per week
- 2-3 times per week
- 4-5 times per week
- More than 5 times per week

On average, how long in minutes does the ICT / Computer Studies class last?

- Less than 30 minutes
- 30-45 minutes
- 46-60 minutes
- 61-75 minutes
- 76-90 minutes
- More than 90 minutes

Do you use the computers during classes other than the ICT / Computer Studies class?

- ○ Yes
- ○ No

How many times per week do you use computers in other classes?

- Once
- 2-3 times per week
- 4-5 times per week
- More than 5 times per week

Student questionnaire (6)

What subjects do you use the computers for apart from ICT / Computer Studies?

Please tick all that apply

- Agriculture
- Bible Knowledge
- Biology
- Business studies
- Chemistry
- Chichewa
- Craft, Design and Technology
- Creative Arts
- English
- Geography
- History
- Home Economics
- Life Skills
- Mathematics
- Performing Arts / Music and Dance
- Physical Education
- Physics
- Religious and Moral Education
- Social Studies
- Other

What subjects do you use the computers for apart from ICT / Computer Studies?

Please tick all that apply

- Agriculture
- Bible Knowledge and Religious Education
- Chichewa
- English
- Expressive Arts
- Life Skills
- Mathematics
- Science and Technology
- Social and Environmental Sciences

On average, how many students usually share a computer?

_____

Student questionnaire (7)

Is there a ICT / Computer Club at school?

○ Yes

○ No

How many times per week does the ICT / Computer Club meet?

☐ Once per week

☐ 2-3 times per week

☐ 4-5 times per week

☐ More than 5 times per week

Have you used the computer laboratory out of school hours?

For example as an intranet cafe, or to see a movie

○ Yes

○ No

On average, how many days per week do you use the computer laboratory out of school hours?

_____

On average, how many hours per day do you use the computer laboratory out of school hours?

_____

What have you used the computer laboratory for when out of school hours?

Tick as many as apply

☐ As an intranet (local access to information) cafe

☐ Attending a movie night

☐ Printing documents

☐ Other (please specify)

What else have you used the computer laboratory for out of school hours?

_____

Are you able to use the computers as often as you would like?

○ Yes

○ No

Student questionnaire (8)

If you are not able to use the computers as often as you would like, please give reasons
Please tick all that apply

☐ There are not enough computers

☐ The computers are not always working

☐ There isn't always electricity

☐ The computer laboratory is never open out of school hours

☐ The computer laboratory is not open for long enough out of school hours

☐ I don't have free time to use the computers out of school hours

☐ Other (please specify)

Approximately what percentage of the time are you not able to use the computers because there isn't any electricity?
Please include the times you have been unable to use the computers and the times when your session has been interrupted because there isn't electricity.

☐ Less thant 20%

☐ 20-39%

☐ 40-59%

☐ 60-79%

☐ More than 80%

What other reasons are there that prevent you from using the computers as often as you would like?

_____

Internet access

Do you ever access the internet?

◯ Yes

◯ No

Where do you access the internet?

☐ At home

☐ At school

☐ At an internet café

☐ On a phone

☐ Other

Where else / how else do you access the internet?

_____

Student attitudes

Please explain to the interviewee that the following section contains statements that they will either strongly agree, agree, neither agree nor disagree, disagree or strongly disagree with. If a student doesn't have any experience of using the computer laboratory, please use not applicable.

Student questionnaire (9)

Using a computer in school makes learning more enjoyable.

- ◯ Strongly agree
- ◯ Agree
- ◯ Neither agree nor disagree
- ◯ Disagree
- ◯ Strongly disagree
- ◯ Not applicable

Using a computer in school makes learning easier.

- ◯ Strongly agree
- ◯ Agree
- ◯ Neither agree nor disagree
- ◯ Disagree
- ◯ Strongly disagree
- ◯ Not applicable

Using a computer in school makes learning Maths easier.

- Strongly agree
- Agree
- Neither agree nor disagree
- Disagree
- Strongly disagree
- Not applicable

Using a computer in school makes learning English easier.

- Strongly agree
- Agree
- Neither agree nor disagree
- Disagree
- Strongly disagree
- Not applicable

Using a computer in school makes learning Science easier.

- Strongly agree
- Agree
- Disagree
- Neither agree nor disagree
- Strongly disagree
- Not applicable

Student questionnaire (10)

Using a computer in school makes learning ICT easier.

- ○ Strongly agree
- ○ Agree
- ○ Neither agree nor disagree
- ○ Disagree
- ○ Strongly disagree
- ○ Not applicable

Using a computer in school improves my academic performance at school.

- ○ Strongly agree
- ○ Agree
- ○ Neither agree nor disagree
- ○ Disagree
- ○ Strongly disagree
- ○ Not applicable

Student plans

Do you plan to study at university?

Yes

Maybe

No

What subject would you like to study after school?

_____

What type of job / career do you plan to do?

_____

Do you have any other comments about the use of computers or about this survey?

None
_____

Thank the interviewee for their time and explain that the results of the survey will help us to develop the IT resources we deliver to schools in Africa.