



E-readiness of Schools in Kenya

A large-scale, multiple methods evaluation

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Executive Summary

Background

Recent evidence suggests there is a lack of alignment between information and communication technology (ICT) in education and improving learning outcomes for learners with disabilities. This has resulted in a lack of emphasis on finding out how technology can help teachers to support learners' access as well as actual learning in a more inclusive and equitable manner (Lynch et al. 2021).

The Government of Kenya (GOK) is committed to harnessing the potential of ICT to ensure that no one is excluded, especially persons with disabilities. In 2016, the GOK launched its Digital Literacy Programme based on the conviction that technology has the power to bring systemic change in education. In 2019, the Ministry of Education (MOE) Directorate of Special Needs Education (DSNE) initiated an "E-Readiness Survey" to assess ICT access and utilisation in mainstream and special schools in Kenya, supporting implementation of MOE's Sector Policy for Learners and Trainees with Disabilities.

Research Questions

The purpose of the overall project was to measure the level of access to and utilization of ICT in schools where learners with disabilities are enrolled in primary and secondary schools in Kenya.

The following research questions helped us to focus on specific areas on how ICT is being used to support learners in public schools in Kenya.

- i. What ICT resources are available in public schools?
- ii. What is the level of teachers' ICT skills?
- iii. What is the extent of ICT utilization in schools?
- iv. What do Learners' Voices tell us about their experiences of ICT in schools?

Methods

Data were collected by 34 trained enumerators from both MOE and eKitabu from 18th June to 22nd July 2023. The survey tools were designed and hosted on a digital platform ([KOBO](#); for links to data collection instruments, please see [Appendix 1](#)).

A list of 215 schools was provided by the MOE with schools already mapped out as primary or secondary by county from 23 counties in Kenya. 183 primary schools and 32 secondary schools participated. Of 215 schools visited, 204 supported children with disabilities (95%).

In addition to the Head Teacher of each school taking part, one classroom teacher from each school was recruited to complete a survey during a face-to-face school visit. In primary school, the teacher was picked at the discretion of the enumerator from grade 1-6 / JSS / pre-vocational depending on the school type. For secondary schools the teacher selected was either teaching Computer Studies or an ICT support person.

A series of in-person Focus Group Discussions (FGDs) were conducted by members of MoE and eKitabu as part of a larger mixed-methods study to evaluate the current "e-readiness" of Kenyan schools that include learners with disabilities (see Haga et al., 2023). Between June and August 2023, thirty-four FGDs were held, involving 336 learners (147 girls and 189 boys). Each focus group, typically comprising 10 learners, took place in schools. Fifteen FGDs were conducted in English ($n = 140$ learners), fifteen FGDs in Swahili ($n = 150$ learners), and four FGDs in Kenyan Sign Language ($n = 40$ learners). FGD schedules can be found in [Appendix 2](#).

Findings

i. What ICT resources are available in public schools?

There are clear positives; for example, almost half of Primary Schools and almost two-thirds of Secondary School had dedicated ICT Rooms. However, there were some concerns raised about how 'available' these were (e.g., students had infrequent or low-frequency access).

However, only 14% of Primary School and 17% of Head Teachers reported that their ICT devices had Assistive Technologies. This is a major concern, particularly given that approximately 95% of schools were supporting learners with at least one type of additional need / disability.

ICT devices are vulnerable due to lack of up-to-date anti-virus protection. This aligns with Head Teacher data that flags Computer Viruses and Malware as an issue that has been escalated to them.

Internet connectivity is "Highly Reliable" only in a small proportion of school sites; the vast majority have only "Fairly Reliable" or "Not Reliable" connectivity. In an increasingly Cloud-based computing environment, this will pose serious challenges, in terms of access to relevant platforms and Apps and other web-based content. There are also issues around storage and retrieval on Cloud-based platforms if connectivity is not robust.

ii. What is the level of teachers' ICT skills?

Overall, there is clear evidence that a substantial proportion of school leaders have received ICT training. Typically, training had been provided in partnership with the MoE and / or KISE. Where there is perhaps scope for improvement is in the cascade or broadening of training and capacity among classroom teachers.

Head Teachers were asked if their teachers received any training on assistive devices and technologies to support learners with different categories of disabilities. Only 27% of Primary School Head Teachers and 32% of Secondary School Head Teachers responded "Yes". This is despite approximately 95% of all schools indicating that they support learners with disabilities within the enrolments. Even within the Schools where the Head Teachers had responded that staff had received some specialist training in Assistive Technologies, this was very limited. When extrapolated to the entire population of teachers working with learners with disabilities, these proportions are tiny fractions.

iii. What is the extent of ICT utilization in schools?

There is a mixed picture when it comes to the issue of ICT utilization in schools. For example, it is positive that 75% of Primary School Head Teachers reported that their school taught basic computer skills. However, of that 75%, only 45% reported that these classes were available to All Learners.

There is room for development of ICT usage for lesson preparation and for tracking learner development. At primary school-level, 60% of Head Teachers report using ICT for lesson preparation, 91% for lesson delivery, 71% for analysing assessment results, but 0% tracking learners' progress. At secondary school-level, 80% of Head Teachers report using ICT for lesson preparation, 87% for lesson delivery, 87% for analysing assessment results, but 0% tracking learners' progress.

The lack of implementation of formal ICT Guidelines is a focal concern. This has issues for infrastructure security, device safety and lifespan, as well as user safety and well-being. Nearly half (44%) and more than half (59%) of secondary school Head Teachers indicated that no formal ICT Guidelines were implemented.

iv. What do Learners' Voices tell us about their experiences of ICT in schools?

Data from Learner FGDs aligns very closely with the results of both Head Teacher and Classroom Teacher surveys. Most students explicitly mentioned the absence of assistive technologies. Students mentioned limited use of ICT devices in teaching and learning. However, most learners reported lessons are enjoyable and interesting when teachers use ICTs. Students from VI & hearing impaired (HI) secondary schools were the clearest beneficiaries, particularly in relation to subjects like biology, geography, history, and agriculture. Students prefer learning with ICT devices, finding it more engaging than traditional methods.

Conclusions and Recommendations

This report summarises and synthesises data from a large-scale evaluation of ICT and e-readiness within the Kenyan public school system. Importantly, there is consistency in datasets gathered from different stakeholder groups (school leaders, classroom teachers, individual learners) via multiple methods (surveys, FGDs).

Major strengths of the e-readiness study were the inclusion of multiple beneficiaries (e.g., school leaders, classroom teachers, individual learners) and the use of multiple methods (e.g., surveys, FGDs). The scale of the data collection – and the recruitment of beneficiaries from such a diverse set of geographies – is also a positive; the datasets can be interrogated further, depending on the specific issues to be explored (e.g., sub-analyses of datasets from particular regions; datasets from particular teacher demographics / biographics; datasets related to schools who support a certain profile of learners with additional support needs for learning).

There are several recommendations to consider if future research of this type is to be undertaken. First and foremost, at the point of identifying research funding, recruit an

independent evaluation team (through tender, if necessary). The evaluation team can contribute to the design of the data collection methodologies and materials and can ensure that rigorous ethical procedures are implemented. “Baking in” the evaluation team at the outset can help to ensure that research funding is used most effectively; that is; streamlining data collection instruments, developing standard operating protocols for field researchers, developing procedures that encourage ‘richness’ in data (especially qualitative data), and sharing out the workload associated with executing such large-scale research projects.

Future research – particularly longitudinal research – could aim to relate aspects of school infrastructure, teacher readiness, learning environment, and individual differences with learner outcomes (e.g., local and national assessments). Furthermore, given the multi-faceted and complex relationship between individual demographic and biographic characteristics, such a longitudinal exploration would benefit from including measures of psycho-social development and health and wellbeing (especially mental health and wellbeing) as part of understanding how to promote healthy and successful learners and school leavers. The social, cultural, and economic benefits of promoting health and education are well-established.

There is cause for optimism, particularly given the appetites of educators to embrace additional training specific to ICT, Assistive Technology, and Special Needs Education / Inclusive Education.

Existing Disseminations

Haga, F., Omboto, C., Lynch, P., & Hand, C.J. (2023). How e-ready are teachers of learners with visual impairments? Results from a national school survey in Kenya. Paper presented at the *1st ICEVI Africa Conference*, Nairobi, Kenya, October 2023.

Haga, F., Omboto, C., Lynch, P., & Hand, C.J. (2024). Learners with Visual Impairments' Experiences of Information and Communications Technology and Assistive Technology in Kenya. Paper presented at the *ICEVI World Conference*, Ahmedabad, India, November 2024.

List of Abbreviations

DLP	Digital Literacy Programme
DSNE	Directorate of Special Needs Education
FGD	Focus Group Discussion
FBO	Faith-Based Organisations
GOK	Government of Kenya
ICT	Information Communication and Technology
KISE	Kenya Institute of Special Education
MOE	Ministry of Education
MMR	Mixed Methods Research
NGO	Non-Governmental Organisations
SNE	Special Needs Education
TVET	Technical and Vocational Education and Training
UNESCO	United Nations Educational, Scientific and Cultural Organisation
UNCRPD	United Nations Convention on the Rights of Persons with Disabilities

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Background

Recent evidence suggests there is a lack of alignment between information and communication technology (ICT) in education and improving learning outcomes for learners with disabilities. This has resulted in a lack of emphasis on finding out how technology can help teachers to support learners' access as well as actual learning in a more inclusive and equitable manner (Lynch et al. 2021).

The joint World Health Organization and UNICEF report, "Global Health on Assistive Technology" (2022), emphasizes the role of Assistive Technologies (ATs) as an enabler for children with functional impairments, e.g., cognition, communication, self-care, hearing, mobility, and vision. AT includes products and services that enable users to succeed in learning. As Information and Communications Technology (ICT) evolves, there is a growing acknowledgment of its ability to improve learning experiences and broaden educational opportunities for a range of learners. Nevertheless, individuals with visual impairments (VI) face distinctive challenges in accessing and making effective use of ICT. In Kenya, where educational opportunities for learners with disabilities are developing, understanding the experiences of learners with VI around ICT and AT is paramount for fostering inclusive education.

The Government of Kenya (GOK) is committed to harnessing the potential of ICT to ensure that no one is excluded, especially persons with disabilities. In 2016, the GOK launched its Digital Literacy Programme based on the conviction that technology has the power to bring systemic change in education. In 2019, the Ministry of Education (MOE) Directorate of Special Needs Education (DSNE) initiated an "E-Readiness Survey" to assess ICT access and utilisation in mainstream and special schools in Kenya, supporting implementation of MOE's Sector Policy for Learners and Trainees with Disabilities.

Information and Communications Technology (ICT)

ICT encompasses tools and technologies that enable access to information via telecommunication. ICT encompasses devices such as personal computers, laptops, tablets, mobile phones, as well as infrastructure like transport systems, televisions, and network technologies. The pivotal role of ICTs in enhancing the educational process stems from the flexibility inherent in computer operations and supportive tools (Rony, 2017). ICT should also facilitate access for learners with disabilities, aids learning, and provides a platform for trainees with disabilities to upskill.

Research has focused on the use of ICT to support learners with VI in learning environments, throughout their educational journey from initial stages to university access. Assistive technologies (AT), aimed at addressing the functional needs of individuals with disabilities, play a pivotal role. Learners with VIs perceive this as a collaborative endeavour (Pacheco et al., 2018).

Individuals with VI typically possess the same cognitive aptitudes as sighted individuals. However, those with VIs often face distinct learning challenges due to their inability to process visual information. Tools and resources, such as specialized computer software, screen readers, braille technologies, electronic magnifiers, voice assistants, mobile apps, etc. are crucial for facilitating inclusion in education (Mboshi, 2018).

E-Readiness in Kenya

E-readiness (electronic readiness) is 'a measure of the degree to which a country is prepared to partake in electronic activities and, thus, benefit from ICT in education' (Dada, 2006). The World Summit on the Information Society (2003, 2005), set goals that were to be achieved in the education sector by year 2015. E-readiness encompasses a teacher's ability to skilfully and confidently employ digital tools to enhance the learning experience. For teachers working with learners with disabilities, this readiness extends to accommodating diverse needs and ensuring equal access to technology-driven learning (Ghavifekr & Rosdy, 2015). E-readiness for teachers of learners with visual impairments refers to their ability to effectively use technology and digital tools to provide accessible and quality education to learners who are blind or have low-vision. This readiness involves a combination of skills, knowledge, resources, and support systems.

The GOK, through MOE and in collaboration with partners and beneficiaries, has since 2006 made several undertakings towards integrating ICT into education. The MOE has invested in the provision of ICT infrastructure, internet connectivity, capacity development and digital content under the Digital Literacy Programme, commonly known as DLP. MOE policy documents have supported ICT in education and training but have not adequately addressed pertinent issues related to policy formulation, capacity development, digital content and infrastructure in the ICT integration process. To date, no formal assessment has been carried out to establish the extent of ICT access and utilization in schools to advance inclusive and equitable quality education. Therefore, it is against this backdrop that this study was conducted.

ICT Resources in Schools with Learners with Disabilities

"The United Nations Convention on the Rights of Persons with Disabilities (2006), in Article 24, emphasizes the need for persons with disabilities to have the right to education without discrimination and on the basis of equal opportunity" (United Nations, 2006, Article 24).

This implies that accessible ICT is vital for teaching and learning. There has been a growing awareness of the importance of inclusive education for learners with disabilities in mainstream schools. Many educational institutions and governments have been making deliberate efforts to improve ICT infrastructure to cater to the needs of these categories of learners. Many schools have been integrating various assistive technologies to support learners with disabilities in accessing the curriculum as well as participating in school life. These technologies include screen readers, text-to-speech software, speech recognition tools, alternative input devices, and more. Such tools are designed to enable learners with disabilities to access and engage with educational content equally and more effectively.

Level of Teachers' ICT Skills in Schools with Learners with Disabilities

Training teachers to use ICT as pedagogical tools is a complex undertaking, and requires specific, applied knowledge, especially when teaching learners with disabilities. If teachers are not well prepared, this can present barriers to accessing the curriculum. For example, the integration of ICT to teach learners who are blind or have low vision has been recommended by many scholars such as Ramos and de Andrade (2014) and Stone et al. (2019). The use of these technologies makes it easier for learners with VI to access information and the curriculum and help them to become more independent learners. Teachers also need professional development on how new technologies work to be able to transfer knowledge into classrooms. Furthermore, learners cannot benefit from using ICT devices if teachers lack basic skills and competences in teaching using ICT devices for learners with visual disabilities (Johnson et al., 2016).

Level of ICT utilization in Schools with Learners with Disabilities

Use of technology makes teaching and learning more interactive and enjoyable as learners can freely access various sources of information as opposed to the traditional teaching model (Santos & Castro, 2021). For instance, the use of assistive technology empowers learners with disabilities, enhancing their access to the curriculum and improving the overall quality of their learning experiences. When learners utilize assistive technology, it leads to better retention of knowledge and higher productivity. Further, it develops a social platform for learners, establishing a positive environment for learning (Alkahtani, 2013). According to UNESCO (2012), teachers' digital literacy skills in teaching and learning create opportunities for all learners to develop, which in turn makes the learners to be creative and to be innovate. The level of information and ICT utilization in schools for learners with visual impairments can vary significantly depending on factors including the location, available resources, and the specific needs and priorities of the school and its learners.

The Government of Kenya is dedicated to leveraging ICT to ensure inclusivity, particularly for individuals with disabilities. In 2016, the GOK introduced the Digital Literacy Programme (DLP) and in 2019, the Directorate of Special Needs Education (DSNE), the Ministry of Education (MOE) conducted an "E-Readiness Survey" to evaluate ICT accessibility and usage in both mainstream and special schools across Kenya. This initiative aligns with the implementation of the MOE's Sector Policy for Learners and Trainees with Disabilities.

Rationale and Research Questions

The purpose of the overall project was to measure the level of access to and utilization of ICT in schools where learners with disabilities are enrolled in primary and secondary schools in Kenya.

The following research questions helped us to focus on specific areas on how ICT is being used to support learners in public schools in Kenya.

- v. What ICT resources are available in public schools?

- vi. What is the level of teachers' ICT skills?
- vii. What is the extent of ICT utilization in schools?
- viii. What do Learners' Voices tell us about their experiences of ICT in schools?

Head Teacher Surveys

Data collection

With an introduction letter from MOE, the data collection team consisting of MOE and eKitabu officers visited the sampled schools. In each county, the teams paid a courtesy call to the County Directors of Education (CDE) to be cleared to visit selected schools. Appropriate permissions and communications between education officials, schools, and the research team were in place at all stages of the evaluation project.

Data were collected by 34 trained enumerators from both MOE and eKitabu from 18th June to 22nd July 2023. The survey tools were designed and hosted on a digital platform ([KOBO](#); for links to data collection instruments, please see [Appendix 1](#)).

Enumerators administered the questionnaire to Head Teachers using password protected mobile devices. Enumerators engaged with Head Teachers to assist them in completing the online form, ensuring all sections were duly filled. Thereafter data was systematically submitted to the research server hosted by eKitabu.

Participating Schools and Head Teachers

A list of 215 schools was provided by the MOE with schools already mapped out as primary or secondary by county from 23 counties in Kenya. **Table 1** indicates that 183 primary schools and 32 secondary schools participated. Of 215 schools visited, 204 supported children with disabilities (95%).

Table 1. *Number of schools that participated in the e-readiness survey*

Level	Total	Type of school			
		Special	Integrated	Regular with Special Unit	Unspecified
Primary Schools	183	52	44	58	29*
Secondary Schools	32	17	9	6	0
Total	215	69	53	64	29

Note. * Primary Schools Unspecified includes 15 schools that were dual coded as both Special and Integrated.

Of Primary Schools visited, 28% identified as Special Schools, 24% as Integrated Schools, 32% as Regular Schools with Special Units, 8% were dual identified as Special / Integrated, and 8% were Unspecified. Of Secondary Schools visited, 53% identified as Special Schools, 28% as Integrated Schools, and 19% as Regular Schools with Special Units.

Table 2 presents the demographics and biographics of Head Teachers for Primary and Secondary Schools.

Table 2. Head Teacher demographics and biographics

Age	21-30 years	31-40 years	41-50 years	51-60 years	> 60 years	No Answer
Primary	0%	3%	30%	66%	2%	0%
Secondary	0%	9%	22%	69%	0%	0%
Service	0-5 years	5-10 years	11-15 years	16-20 years	> 20 years	No Answer
Primary	54%	26%	8%	3%	10%	0%
Secondary	34%	41%	13%	3%	9%	0%
Highest Qualification Obtained	Certificate in Education	Diploma in Education	Bachelor in Education	PG Diploma in Education	Master's in Education	PhD
Primary	2%	25%	58%	<1%	13%	2%
Secondary	0%	3%	63%	6%	25%	3%
Sex	Male	Female	Blank			
Primary	63%	37%				
Secondary	72%	25%	3%			
SNE trained?	Yes	No	Blank			
Primary	59%	40%	1%			
Secondary	63%	34%	3%			

A similar Age profile is shown for Head Teachers of both primary and Secondary Schools; 66% of Primary and 69% of Secondary Head Teachers are aged 51-60 years. In both groups, over 90% of Head Teachers are aged over 40 years. Only 3% of Primary and 9% of Secondary School Head Teachers are aged under 40 years.

80% of Primary and 75% of Secondary Head Teachers have less than 10 years' service. Less than 13% of all Head Teachers have more than 16 years' service.

Secondary Head Teachers tended to have attained higher levels of academic qualification than Primary Head Teachers. 27% of Primary Head Teachers reported that their highest level of qualification was below Bachelor's level, compared with only 3% of Secondary Head Teachers. 58% of Primary Head Teachers had attained a Bachelor's level degree compared to 63% of Secondary Head Teachers. Secondary Head Teachers were more likely than Primary Head Teachers to have attained a Postgraduate Diploma (6% vs. <1%) or a Master's degree (25% vs. 13%). Similar proportions of Head Teachers across groups had attained a doctoral-level degree (approx. 3%).

Overall, 128 Head Teachers across primary and secondary schools (60%) had received SNE training, whereas 84 (39%) did not. At the primary school level, 59% of Head Teachers were SNE trained. At the secondary school level, 63% of Head Teachers were SNE trained.

Head Teacher Survey Findings

Head Teacher SNE Training

Head Teachers were asked if they had received specialist SNE training, and if so, in which domains did the specialism apply. This data is summarised in **Table 3**.

Table 3. Domain of Head Teacher SNE Specialism

SNE Specialism	Yes	No
Primary	59%	40%*
Secondary	63%	34%”
If Yes, Area of Specialism	Primary	Secondary
Hearing Impairment / Deafness	28%	50%
Visual Impairment / Blindness	9%	10%
Intellectual and Developmental Disabilities	19%	5%
Physical Impairment	10%	10%
Specific Learning Disabilities^	3%	0%
Cerebral Palsy	1%	0%
Speech and Language Difficulties	4%	0%
Autism	2%	0%
Inclusive Education	38%	25%
Other	3%	5%

Note. * 2 participants did not respond. “ 1 participant did not respond. ^ includes dyslexia, dyscalculia, dysgraphia.

There is similar proportionality in Head Teacher specialist training across Primary and Secondary Schools. The most common specialisms are around Hearing Impairment (from Low Hearing to Deafness; 28% of Primary Head Teachers, 50% of Secondary Head Teachers) and Inclusive Education (38% of Primary Head Teachers, 25% of Secondary Head Teachers).

Where Head Teachers reported that their school supported a learner with a disability, they were asked to give specific details of the type of disability / disabilities. This data is summarised in **Table 4**.

Table 4. Proportion of schools with enrolment of learners with disabilities; Primary (n=183) and Secondary (n=32)

Disability / Impairment	Primary Schools		Secondary Schools	
	Number	Proportion	Number	Proportion
Hearing Impairment	69	39%	15	52%

Visual Impairment	51	29%	9	31%
Deaf-blindness	5	3%	0	0%
Physical Impairment	93	53%	15	52%
Intellectual / Developmental	135	76%	9	31%
Specific Learning Disabilities*	39	22%	7	24%
Cerebral Palsy	44	25%	6	21%
Speech and Language Disability	48	27%	10	34%
Multiple Disabilities	67	38%	7	24%
Autism	48	27%	3	10%
Albinism^	9	5%	4	13%

*Note. * Includes dyslexia, dyscalculia, dysgraphia. ^Potential Visual Impairment, sensitive skin. Please note that the school numbers do not add up to 183 / 32 / 215, as the same school often 'appears' under multiple counts.*

There is clear diversity and complexity of the domains incorporated by both Primary and Secondary Schools. One point of note is that there is a substantially higher proportion of Primary School Head Teachers reporting that they support learners with Intellectual / Developmental Disabilities (76%) vs. Secondary School Head Teachers (31%). Further investigation is needed to understand whether this difference is due to differences in diagnostic processes in the 7 years or so between when current secondary school learners would have been in primary and the present day. This data might represent attrition of learners from formal education. This data might represent a genuine proliferation of Intellectual / Developmental Disabilities within the population.

Given the nature of Head Teacher specialisms and the proportion of schools supporting cohorts of learners with highly diverse needs, there is a mismatch between specialisms, as well as an overall lack of specialist SNE training among Head Teachers. This is particularly evident when comparing the proportion of Head Teachers with specialisms in Physical Impairment, Intellectual / Developmental, Specific Learning Disabilities, Cerebral Palsy, Speech and Language Disability, and the proportion of schools supporting such learners.

Number of Teachers

Head Teachers were asked how many teachers worked at their schools. This data is summarised in **Table 5**.

Table 5. Number of Teachers per School.

Number of Teachers	Male	Female
Primary	1,008 (36%)	1,814 (64%)
Secondary	378 (53%)	328 (46%)
Employed by	Teachers Service Commission	Board Of Management
Primary	2,628 (93%)	200 (7%)
Secondary	570 (81%)	137 (19%)

The data on the number of teachers shows a clear gender disparity between the proportions of classroom teachers and the proportion of Head Teachers who are male or female.

Number of Learners

A breakdown of learner populations is provided in **Table 6**.

Table 6. Learner populations across schools included in Head Teacher surveys

		Total n	Mean	St. Dev.	Median	Overall
Total Enrolment	Primary	80,003	442	440	273	100%
	Secondary	13,110	423	507	312	100%
With Disability	Primary	14,109	79	85	53	18%
	Secondary	3,899	126	148	73	30%
Without Disability	Primary	65,086	374	455	250	81%
	Secondary	7,942	256	514	0	71%
Female Enrolment	Primary	37,710	215	224	137	47%
	Secondary	7,220	241	500	78	55%
Female with Disability	Primary	6,620	37	47	22	8%
	Secondary	2,921	97	231	34.5	22%
Male Enrolment	Primary	38,012	218	217	137.5	48%
	Secondary	5,830	194	237	124	45%
Male with Disability	Primary	7,386	42	41	30	9%
	Secondary	2,177	73	89	37.5	17%

At Primary School level, approximately 18% of the enrolment within schools surveyed were reported to be living with a disability. At Secondary School level, approximately 30% of the enrolment within schools surveyed were reported to be living with a disability. The proportions of male and female children with disabilities were reasonably similar at both primary and secondary levels.

Where Head Teachers reported that their school supported a learner with a disability, they were asked to give specific numbers of learners with each disability or multiple disabilities. This data is summarised in **Table 7**.

Table 7. Number of learners with disabilities

Disability / Impairment	Primary Schools		Secondary Schools	
	Number	Proportion	Number	Proportion
Hearing Impairment	3,429	4%	1,479	11%
Visual Impairment	1,492	2%	1,142	9%
Intellectual / Developmental	4,799	6%	160	1%
Physical Impairment	1,635	2%	1,072	8%
Specific Learning Disabilities*	2,754	3%	300	2%
Cerebral Palsy	764	1%	168	1%
Specific Learning Disabilities*	2,006	3%	359	3%
Autism	793	1%	35	<1%
Albinism	71	<1%	63	<1%
Multiple Disabilities	1,836	2%	177	1%
Other^	138	<1%	41	<1%

*Note. * Includes dyslexia, dyscalculia, dysgraphia. ^ Other includes Autism and Albinism. Please note that the total does not match 14,109 / 3,889, as the same individual often 'appears' under multiple counts (i.e., counted under Hearing Impairment and Visual Impairment rather than solely as Multiple Disabilities).*

Proportionally, there are almost thrice as many children with Hearing Impairment at secondary level (11%) as primary level (4%) within the schools sampled. Proportionally, there are almost four times as many children with Visual Impairment at secondary level (9%)

as primary level (2%) within the schools sampled. Proportionally, there are six times as many learners with Intellectual / Developmental disabilities at primary level (6%) than secondary level (1%). Note. this data could reflect changes in diagnostic standards / procedures in the years between current secondary school children being primary aged vs. present day; it might also reflect attrition of children with such disabilities from formal schooling between primary and secondary levels. Proportionally, there are almost four times as many children with Physical Impairment at secondary level (8%) as primary level (2%) within the schools sampled. There are comparable proportions (i.e., between <1 and 3%) of learners at primary and secondary schools who are identified as living with:

- Specific Learning Disabilities*
- Cerebral Palsy
- Specific Learning Disabilities*
- Autism
- Albinism
- Multiple Disabilities

Power

Data was collected from Head Teachers in relation to power supply to schools. This data is summarised in **Table 8**.

Table 8. *Power supply to schools*

	Primary			Secondary		
	Yes	No	Blank	Yes	No	Blank
Is your school connected to power?	89%	3%	8%	88%	6%	6%
Does your school have a backup source of power?	13%	78%	9%	25%	66%	9%
Does your school have power surge protection equipment?	11%	79%	9%	41%	53%	6%

There is generally good evidence that schools are well-connected with electricity; however, only approximately 9 out of 10 confirm connectivity. There is generally a lack of backup power, particular in Primary Schools. There is a lack of surge protection equipment, particularly in Primary Schools.

ICT Equipment and Facilities

45% of Primary School Head Teachers reported that their School had a dedicated ICT Room. For those Primary Schools with dedicated space, 84% made it available for all staff, whereas 16% made it available only to ICT teachers. 23% of Primary Head Teachers indicated that learners (per class) could access the ICT space Daily, 48% Weekly, 13% Once A Month, 5% Termly, and 12% Never.

63% of Secondary School Head Teachers reported that their School had a dedicated ICT Room. For those Secondary Schools with dedicated space, 80% made it available for all staff, whereas 20% made it available only to ICT teachers. 44% of Secondary Head Teachers indicated that learners (per class) could access the ICT space Daily, 44% Weekly, 4% Once A Month, and 8% Never.

Head Teachers were asked how ICT facilities and equipment were secured. This data is summarised in **Table 9**.

Table 9. ICT resource security

	Primary School			Secondary School		
	Yes	No	Blank	Yes	No	Blank
Burglar-proof doors and windows	75%	11%	14%	72%	9%	19%
CCTV cameras	3%	84%	13%	19%	63%	19%
Security Guards	51%	35%	14%	38%	44%	19%
Fire Equipment and Fire Exit	10%	76%	14%	41%	41%	19%

In general, about three-quarters of both Primary and Secondary Schools use burglar-proof doors and windows to secure their ICT resources. There is, however, a lack of CCTV camera coverage, particularly at Primary sites. Worryingly, there is a lack of Fire Equipment and Fire Exits, particularly at Primary sites.

At Primary School sites, ICT equipment and facilities were managed by Headteachers in 15% of cases and ICT teachers in 85% of cases. Maintenance was reported to take place on a Need-Basis at 56% of sites, Monthly at 8% of sites, Termly at 14% of sites, Annually at 9% of sites, and Never at 14% of sites.

At Secondary School sites, ICT equipment and facilities were managed by Headteachers in 8% of cases and ICT teachers in 92% of cases. Maintenance was reported to take place on a Need-Basis at 56% of sites, Monthly at 7% of sites, Termly at 30% of sites, Annually at 4% of sites, and Never at 4% of sites.

Head Teachers were asked about the source of their ICT equipment. This data is summarised in **Table 10**.

Table 10. Source of ICT equipment.

Source	Primary	Secondary
Ministry of Education	93%	67%
NGOs	16%	44%
FBOs	0%	7%
Private companies	4%	22%
Parents/families	9%	26%

The MOE is a crucial source of equipment, especially at Primary School level. At Secondary School level, there is greater resource provision via Private Companies and through Parents / Families.

Operating System data is summarised in **Table 11**.

Table 11. Operating system usage

Operating System	Primary	Secondary
Windows 8/10/13/16 Windows XP	91%	96%
Linux (Ubuntu or any other) Windows 7	7%	7%
Android	3%	0%

Note. Percentages may not add up to 100% as certain Schools may have selected more than one OS.

Windows Operating systems are heavily utilised at both Primary and Secondary levels, with over 90% of both Schools sites using these systems.

Only 14% of Primary School Head Teachers reported that their ICT devices had assistive technologies. Of that 14% who responded positively to this question reported that: 42% had speech synthesis software, 67% had screen reader software (e.g., Job Access with Speech; JAWS; Non-Visual Desktop Access; NVDA), and 29% had screen magnification solutions (e.g., Supernova, Lunar software). These AT are specifically designed to give learners with visual impairment access to learning materials.

Only 17% of Secondary School Head Teachers reported that their ICT devices had assistive technologies. Of that 17% who responded positively to this question reported that: 40% had speech synthesis software, 60% had screen reader software, but none had screen magnification solutions. Again, all are dedicated to supporting learners with visual impairment.

Only 22% of Primary School Head Teachers reported that their facility had up-to-date anti-virus software installed on devices; this figure rose to 60% of Secondary School Head Teachers.

40% of Primary School Head Teachers reported that their facility had internet connectivity. Of connected Primary School sites, Modem was selected as a means of connection by 25% of Head Teachers, Hotspot connected to mobile carrier satellite was selected by 48%, and Fiber Optic Cable was selected by 44% of Head Teachers (n.b., these figures do not add up to 100% as certain Head Teachers selected multiple connectivity options). 29% of Primary Head Teachers reported reloading data / subscriptions on a Need-Basis, 10% Daily, 38% Monthly, 5% Annually, and 18% Never (n.b., it is unclear whether Never means that they have Unlimited data, or whether they never reload their data). 27% of Primary Head Teachers describe their connectivity as Highly Reliable, 55% as Fairly Reliable, and 19% as Not Reliable.

68% of Secondary School Head Teachers reported that their facility had internet connectivity. Of connected Secondary School sites, Modem was selected as a means of

connection by 19% of Head Teachers, Hotspot connected to mobile carrier satellite was selected by 48%, and Fiber Optic Cable was selected by 48% of Head Teachers (n.b., these figures do not add up to 100% as certain Head Teachers selected multiple connectivity options). 29% of Secondary Head Teachers reported reloading data / subscriptions on a Need-Basis, 4% Daily, 54% Monthly, 4% Annually, and 8% Never (n.b., it is unclear whether Never means that they have Unlimited data, or whether they never reload their data). 25% of Primary Head Teachers describe their connectivity as Highly Reliable, 58% as Fairly Reliable, and 17% as Not Reliable.

15% of Primary School Head Teachers reported that they had support from parents on the ICT programs in the school. Of that 15%, 62% reported that this support took the form of financial support (e.g., infrastructure development, security of ICT Equipment, replacement of ICT equipment), 33% reported support via equipment purchases, and 19% reported support of another form.

19% of Secondary School Head Teachers reported that they had support from parents on the ICT programs in the school. Of that 19%, 50% reported that this support took the form of financial support (e.g., infrastructure development, security of ICT Equipment, replacement of ICT equipment), 50% reported support via equipment purchases, but none reported support of another form.

Budget

53% of Primary School Head Teachers reported that they have a budget allocation for ICT. Of these schools, 52% reported that this budget was less than KES 10,000, 38% reported that it was between KES 10,001-50,000, 7% of budgets were between KES 50,001-100,000, and 3% were between KES 100,001-500,000.

53% of Secondary School Head Teachers reported that they have a budget allocation for ICT. Of these schools, 18% reported that this budget was less than KES 10,000, 29% reported that it was between KES 10,001-50,000, 24% of budgets were between KES 50,001-100,000, 24% were between KES 100,001-500,000, and 6% were over KES 500,000.

A breakdown of budgetary sources is provided in **Table 12**.

Table 12. Budgetary Sources

	Primary	Secondary
Ministry of Education	70%	43%
School Sponsors	6%	10%
Parents	10%	27%
National Government Constituencies Development Fund	2%	3%
County Government	1%	0%
Income Generating Activities	3%	0%
Donors / Partners	9%	20%

The MOE is the main source of ICT budget for 70% of Primary Schools and 43% of Secondary Schools. Parents are highlighted as a source by 27% of Secondary Schools and 10% of Primary Schools. Donors / Partners are highlighted by 20% of Secondary Head Teachers and 9% of Primary Head Teachers.

Curriculum

75% of Primary School Head Teachers reported that their school taught basic computer skills. Of that 75%, 45% reported that these classes were available to All Learners, 54% to Some Learners. Furthermore, 32% of Primary Head Teachers indicated that Staff participated in this training. 39% of Primary Head Teachers indicated that there was a timetable for allocating usage of ICT facilities.

63% of Secondary School Head Teachers reported that their school taught basic computer skills. Of that 63%, 21% reported that these classes were available to All Learners, 79% to Some Learners. Furthermore, 16% of Secondary Head Teachers indicated that Staff participated in this training. 50% of Secondary Head Teachers indicated that there was a timetable for allocating usage of ICT facilities. 40% of Secondary Head Teachers indicated that Computer Studies was an examinable subject at their school.

Head Teachers were also asked how ICT is used teaching and learning. A breakdown across primary- and secondary-levels is provided in **Table 13**.

Table 13. *Use of ICT in teaching and learning*

	Primary	Secondary
Lesson Preparation	60%	80%
Lesson Delivery in the Classroom	91%	87%
Analysis of Assessment Results	71%	87%
Tracking Learners' Progress	0%	0%

At primary school-level, 60% of Head Teachers report using ICT for lesson preparation, 91% for lesson delivery, 71% for analysing assessment results, but 0% of tracking learners' progress. At secondary school-level, 80% of Head Teachers report using ICT for lesson preparation, 87% for lesson delivery, 87% for analysing assessment results, but 0% of tracking learners' progress.

Administration

86% of Primary and 100% of Secondary Head Teachers indicated that ICTs were used for administration in their school. A breakdown of how / where ICTs were used – within the schools were Head Teachers indicated that they *were* used is provided in **Table 14**.

Table 14. *School usage of ICTs in Administration*

	Primary	Secondary
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Student Records	98%	96%
School Finance	62%	71%
School Inventory	53%	79%
Security*	5%	32%
Human Resource Management	50%	57%

Note. * Security includes e.g., CCTV, Biometric access, access to school facilities

In schools where ICT is used for Administration, there is over 96% utilisation at both Primary and Secondary levels for Student Records. However, there is less utilisation for School Finance Management, School Inventory, Security, or Human Resource Management. It is particularly noteworthy that only 32% of Secondary School Head Teachers indicated that ICTs were used for Security, and only 5% of Primary School Head Teachers.

Head Teachers were asked about ICT human support in their schools. At primary school-level, 26% reported that their school has an ICT Head of Department, 27% have an ICT Panel Leader, and 76% have a Key Resource Teacher for ICT or ICT Champion. At secondary school-level, 33% reported that their school has an ICT Head of Department, 19% have an ICT Panel Leader, and 74% have a Key Resource Teacher for ICT or ICT Champion.

95% of Head Teachers at primary-level reported that they maintained an inventory of ICT equipment within the school. In 49% of those schools, responsibility for managing inventory lay with the Head Teacher, 10% with a Storekeeper, 46% Deputy Head Teacher, and 4% Class Teachers. 94% of Head Teachers at secondary level reported that they maintained an inventory of ICT equipment within the school. In 41% of those schools, responsibility for managing inventory lay with the Head Teacher, 53% with a Storekeeper, 19% Deputy Head Teacher, and 0% Class Teachers.

Online Safety

12% of Primary School Head Teachers reported that online safety and security concerns been reported to them; this rose to 28% of Secondary School Head Teachers. Of those who reported that online safety and security concerns *had* been reported, a breakdown of what these concerns related to is presented in **Table 15**.

Table 15. Online Safety and Security Concerns

	Primary	Secondary
Online Bullying	16%	13%
Inappropriate or Obscene Content	32%	38%
Data Manipulation	5%	25%
Computer Viruses or Malware	68%	88%

The prevalence of Online Bullying was surprisingly comparable across Primary (16%) and Secondary (13%) levels. This was also the case for Inappropriate or Obscene Content, with 32% of Head Teachers at Primary and 38% at Secondary level indicating that this had been flagged as a concern. Data Manipulation was far more prevalent at Secondary (25%) than Primary level (5%). The most obvious concern indicated by Head Teachers is in relation to Computer Viruses or Malware – 68% of Primary and 88% of Secondary Head Teachers flagged this as a concern. This ties with the Head Teacher data regarding a lack of up-to-date anti-virus or protective software.

Head Teachers were asked if there were formal ICT guidelines used in their schools. A breakdown of data from the schools who do implement guidelines is presented in **Table 16**.

Table 16. ICT Guideline implementation

	Primary	Secondary
ICT in Education & Training Policy (2021)	13%	14%
Digital Literacy Programme guidelines	31%	14%
School ICT policy	27%	28%
UNESCO Guidelines for ICT in Education (2022)	4%	7%
None	44%	59%

It is concerning that almost half (44%) of primary schools and over half (59%) of secondary schools do not implement any formal ICT guidelines.

Head Teachers were asked to explain how they ensure information security and data privacy in their schools. A breakdown of this data is provided in **Table 17**.

Table 17. Information security measures

	Primary	Secondary
Use of passwords on computing devices	74%	97%
Burglar-proof doors on dedicated ICT rooms	52%	55%
Fingerprint or biometric access to the dedicated ICT room	2%	0%
CCTV	3%	24%
None	11%	0%

It is worrying that 11% of Primary Head Teachers report that there is no information security measures in place at their site, and that only 74% of Primary Head Teachers report using password-protected devices. All Secondary Head Teachers report taking some form of information security precautions, with 97% using password-protected devices. Approximately half of sites at both primary and secondary-level report using burglar-proof doors on dedicated ICT rooms.

ICT Training

82% of Primary School Head Teachers indicated that they had been trained in ICT integration in education; of those who had been trained, 15% were at Certificate level, 2% at Diploma level, and 83% had participated in ICT in Education workshops.

77% of Secondary School Head Teachers indicated that they had been trained in ICT integration in education; of those who had been trained, 17% were at Certificate level, 4% at Diploma level, and 78% had participated in ICT in Education workshops.

49% of Primary School Head Teachers indicated that their school provides training for its teachers on ICT. Within those schools that offered training, 57% responded that this took place Termly, 12% Twice Yearly, and 31% Yearly. Within those Primary schools that offered training, 44% responded that this was offered to All Teachers, 32% to Some Teachers (apart from the ICT teacher), and 24% Only the ICT Teacher.

39% of Secondary School Head Teachers indicated that their school provides training for its teachers on ICT. Within those schools that offered training, 50% responded that this took place Termly, 33% Twice Yearly, and 17% Yearly. Within those Secondary schools that offered training, 13% responded that this was offered to All Teachers, 63% to Some Teachers (apart from the ICT teacher), and 25% Only the ICT Teacher.

Head Teachers were asked if their school partners with organizations outside the school to train teachers in ICT. 44% of Primary School Head Teachers and 33% of Secondary School Head Teachers reported that they did work with other organisations. A breakdown of partnership organisations is provided in **Table 18**.

Table 18. Partnership Organisations

	Primary	Secondary
Ministry of Education	86%	40%
KISE	10%	60%
eKitabu	10%	20%
iMlango	0%	0%
Safaricom	1%	20%
inABLE	6%	0%
Computers for Schools Kenya	4%	20%

The data reveals the importance of partnerships with MOE at both levels. There is greater evidence of partnership working with KISE, eKitabu, Safaricom, and Computers for Schools Kenya at secondary level.

Training to use Assistive Technologies

Head Teachers were asked if their teachers received any training on assistive devices and technologies to support learners with different categories of disabilities. Only 27% of Primary School Head Teachers and 32% of Secondary School Head Teachers

responded “Yes”. This is despite approximately 95% of all schools indicating that they support learners with disabilities within the enrolments.

Head Teachers were asked to breakdown what assistive technologies teachers have been trained on. This data is summarised in **Table 19**. Please note – these percentages reflect the proportion of Yes responses from the School Head Teachers who had responded that their teachers *had* received training in assistive devices.

Table 19. Specific Assistive Device training

	Primary	Secondary
Digital White Cane	9%	20%
Motorized Wheelchair	2%	10%
Audiology	29%	30%
PEEK eye acuity assessment	0%	20%
Orientation and Mobility	31%	10%
Screen-readers	13%	20%
Refreshable Braille Device	16%	30%
Live Transcribing	4%	10%
Close Captions	7%	10%
Sign Language Interpreters	27%	30%
Speech Recognition	18%	30%
Smart Text	9%	10%
Vision Magnifiers	2%	10%
Smart Brailers	9%	0%
Braille Translation Software	7%	10%
Braille Note Touch	4%	10%

Even within the Schools where the Head Teachers had responded that staff had received some specialist training in Assistive Technologies, this was very limited. When extrapolated to the entire population of teachers working with learners with disabilities, these proportions are tiny fractions. At both Primary and Secondary School levels, there was better evidence of training in Assistive Technology to support Audiology and Sign Language Interpretation; however, all other domains were very limited.

Teacher Surveys

Data collection

One teacher from each school was recruited to complete a survey. The data was collected during a face-to-face session and entered via a digital device. In primary school, the teacher was picked at the discretion of the enumerator from grade 1-6 / JSS / pre-vocational depending on the school type. For secondary schools the teacher selected was either teaching Computer Studies or an ICT support person.

Enumerators administered the questionnaire to teachers using mobile devices. Enumerators engaged with teachers to assist them in completing the online form, ensuring all sections were duly filled. Thereafter data was systematically submitted to the research server hosted by eKitabu.

Participating Teachers

A breakdown of teacher demographics, biographics and qualifications is presented in Table 20.

Table 20. Teacher demographics and biographics

Age	20-29 years	30-39 years	40-49 years	50-59 years	> 60 years	No Answer
Primary	4%	22%	37%	36%	1%	0%
Secondary	21%	52%	21%	6%	0%	0%
Service	0-5 years	5-10 years	11-15 years	16-20 years	> 20 years	No Answer
Primary	54%	26%	8%	3%	10%	0%
Secondary	34%	41%	13%	3%	9%	0%
Highest Qualification Obtained	Certificate in Education	Diploma in Education	Bachelor in Education	PG Diploma in Education	Master's in Education	PhD
Primary	10%	52%	33%	1%	4%	0%
Secondary	0%	12%	82%	0%	6%	0%
Sex	Male	Female				

Primary	54%	46%	
Secondary	70%	30%	
SNE trained?	Yes	No	Blank
Primary	75%	24%	1%
Secondary	52%	48%	0%

Note. SNE trained - participant responses to the question: *“Have you undergone any specialized training in SNE?”*

The Age profile of Primary and Secondary Teachers is quite different; 36% of Primary Teachers surveyed were over 50 years, compared with only 6% of Secondary Teachers surveyed. Alternatively, 21% of Secondary Teachers surveyed were under 30 years old, compared with only 4% of Primary Teachers surveyed. Broadly, 74% of Primary Teachers surveyed were aged over 40 years, whereas 73% of Secondary Teachers surveyed were under 40 years of age.

80% of Primary and 75% of Secondary Teachers have less than 10 years' service. Less than 25% of all Teachers surveyed have more than 16 years' service.

Secondary Teachers tended to have attained higher levels of academic qualification than Primary Teachers. 62% of Primary Teachers reported that their highest level of qualification was below Bachelor's level, compared with only 12% of Secondary Teachers. 33% of Primary Teachers had attained a Bachelor's level degree compared to 82% of Secondary Teachers. Similar proportions of Teachers across groups had attained a Masters level degree (approx. 5% of total sample).

At primary school level, 75% of Teachers were trained in SNE. At secondary school level, 52% of Teachers were trained in SNE.

Teacher Survey Findings

Teacher Training in SNE

Teachers were asked if they have specialist SNE training, and if so, in which domains did the specialism apply. This data is summarised in **Table 21**.

Table 21. Domain of Teacher SNE Specialism

SNE Specialism	Yes	No
Primary	75%	24%
Secondary	52%	48%
If Yes, Area of Specialism	Primary	Secondary
Hearing Impairment	26%	59%
Visual Impairment	20%	24%
Deaf-blindness	11%	6%
Physical impairment	16%	12%
Intellectual and Developmental Disabilities	43%	24%
Specific Learning Disabilities	15%	6%
Cerebral Palsy	9%	6%
Speech and Language Difficulties	9%	6%
Multiple Disabilities	32%	12%
Autism	14%	6%
Albinism	5%	6%

Note. ^ includes dyslexia, dyscalculia, dysgraphia.

Of the Primary Teachers who indicated that they had specialist SNE training, 43% were trained in Intellectual and Developmental Disabilities, 32% in Multiple Disabilities, 26% in Hearing Impairment. Of the Secondary Teachers who indicated that they had specialist SNE training, 59% were trained in Hearing Impairment, 24% in Visual Impairment, 24% were trained in Intellectual and Developmental Disabilities. Across each group, there was limited evidence in specialist training to support learners with Cerebral Palsy (approx. 8% overall), Speech and Language Difficulties (approx. 8% overall), Autism (approx. 10% overall), or Albinism (approx. 6% overall).

ICT Resources

87% of Primary Teachers and 91% of Secondary Teacher surveyed indicated that they currently have regular access to ICT devices for teaching and learning in their school.

A breakdown of device availability is provided in **Table 22**.

Table 22. Device Availability.

	Primary	Secondary
Desktop Computers	31%	83%
Laptops	84%	67%
Tablets	76%	20%
Projectors	77%	83%
Smartphones	64%	50%
Radios	19%	13%
TVs	35%	40%
Interactive board	3%	0%
E-readers	4%	3%
Expanded Keyboards	1%	3%
Refreshable Braille Display / Portable Braille Computers	1%	0%
Headphones	5%	3%
Scanner	8%	50%
Servers	6%	10%
Networking Equipment e.g., Routers, switches, Access points	16%	23%
Evolution Wireless G4	2%	10%
Digital Wireless	5%	23%
Braille Input & Output Devices for Standard Computers	1%	0%
CCTV	2%	0%

Desktop computers are more available in secondary schools (83%) than primary schools (31%); laptops are more available in primary schools (84%) than secondary schools (67%), as are tablets (76% of primaries surveyed, 20% of secondaries), and smartphones (64% of primaries surveyed, 50% of secondaries). Secondary schools are better equipped than primaries for scanners (50% vs. 8%), networking equipment (23% vs. 16%), servers (10% vs. 6%), and digital wireless (23% vs. 5%).

Strikingly, there is a clear lack of Assistive Technologies: Interactive Boards (3% Primaries, 0% Secondaries), E-readers (4% Primaries, 3% Secondaries), Enlarged Keyboards (1% Primaries, 3% Secondaries), or Refreshable Braille Displays / Portable Braille Computers (1% Primaries, 0% Secondaries).

Teachers were asked what other ICT devices they would wish to have to improve on teaching & learning. This data is broken down in **Table 23**.

Table 23. Wishlist of devices to improve teaching and learning

	Primary	Secondary
Desktop Computers	56%	47%
Laptops	55%	75%

Tablets	51%	41%
Projectors	53%	72%
Smartphones	28%	19%
Radios	29%	19%
TVs	43%	31%
Interactive board	28%	47%
E-readers	29%	41%
Enlarged Keyboards	15%	22%
Refreshable Braille Display / Portable Braille Computers	11%	13%
Headphones	14%	22%
Scanner	29%	38%
Servers	22%	28%
Networking Equipment e.g., Routers, switches, Access points	41%	50%
Evolution Wireless G4	12%	25%
Text-to-Speech technology	14%	19%
Digital Wireless	23%	41%
Braille Input & Output Devices for Standard Computers	13%	13%
CCTV Magnifiers	15%	28%

Interestingly, some of the strongest demand reflects devices in which there is already evidence of provision, e.g., Desktop Computers, Laptops, Tablets, Projectors, Smartphones. There is less demand for Assistive Technologies, e.g., Enlarged Keyboards, Refreshable Braille Displays / Portable Braille Computers.

Teachers were asked to report for what purposes they use ICT devices. This data is broken down in **Table 24**.

Table 24. ICT utilisation – Teacher Survey

	Primary	Secondary
Preparation of schemes of work	56%	88%
Preparation of Individualized Education Plans	56%	56%
Preparation of Lesson Plans	61%	75%
Preparation of Merit Lists	50%	75%
Lesson Delivery	88%	94%
Personal Use	36%	72%
School Management System	45%	75%

There is evidence of greater utilisation of ICT at secondary school level, and that at secondary school level there is wider variety of domains in which ICT is being used. At

primary school level, 88% of teachers report using ICT as part of lesson delivery, but only around half report using ICT as part of preparation of schemes of work, Individualised Education Plans, Merit Lists, or as part of the School Management System. At secondary school level, 94% of teachers report using ICT as part of lesson delivery, 88% as part of preparation of schemes of work, 75% for Lessons Plans, Merit Lists, and as part of the School Management System, but only about 56% for Individualised Education Plans.

Teachers were asked about the frequency of different ICT utilisations. This data is summarised in **Table 25**.

Table 25. Frequency of ICT utilisation by teachers

	Level	Daily	Weekly	Monthly	Termly	Not At All
Lesson Preparation	Primary	18%	52%	16%	8%	5%
	Secondary	45%	39%	12%	3%	0%
Lesson Delivery	Primary	17%	50%	20%	7%	6%
	Secondary	27%	48%	15%	9%	0%
Learners' Records	Primary	10%	24%	30%	21%	13%
	Secondary	18%	42%	24%	12%	3%
Attendance	Primary	17%	20%	10%	10%	42%
	Secondary	15%	27%	9%	15%	33%
Learner Usage	Primary	14%	47%	18%	11%	8%
	Secondary	21%	48%	12%	9%	9%
Technical Support	Primary	11%	25%	32%	19%	12%
	Secondary	18%	27%	15%	24%	15%

In terms of Lesson Preparation, only 18% of Primary School teachers report using ICT daily, compared to 45% of Secondary Teachers. In terms of Lesson Delivery, only 17% of Primary School teachers report using ICT daily, compared to 27% of Secondary Teachers; however, approximately half of both sets of teachers reported using ICT Weekly for Lesson Delivery. There is more frequent use of ICT for keeping track of Learners' Records among Secondary Teachers: 60% of Secondary Teachers report doing this Daily or Weekly, compared with only 34% of Primary Teachers; furthermore, only 3% of Secondary Teachers report Never using ICT for this purpose, compared with 13% of Primary Teachers. The frequency of ICT usage for Attendance Monitoring is reasonably consistent across each level, with the exception that 42% of Primary Teachers report Never using ICT for this purpose compared to 33% of Secondary Teachers. 14% of Primary Learners use ICT Daily compared to 21% of Secondary Learners; approximately half of both groups of learners are using ICT Weekly. Secondary Teachers appear to have somewhat more frequent ICT support, with 18% reporting that this is available Daily, compared to 11% of Primary Teachers.

Teachers were asked, on a scale of 1 (strongly agree) to 5 (strongly disagree), their agreement with a series of statements regarding ICT. This data is broken down in **Table 26**.

Table 26. *Teachers' perspectives on ICT (n.b., lower scores indicate greater agreement)*

	Primary			Secondary		
	<i>M</i>	<i>SD</i>	<i>Mdn</i>	<i>M</i>	<i>SD</i>	<i>Mdn</i>
I get ICT technical support in my school	2.48	1.16	2.00	2.66	1.18	2.50
Learners have the necessary ICT literacy skills.	2.95	1.16	3.00	2.70	1.05	3.00
Training opportunities on ICT are available for teachers.	2.72	1.19	2.00	3.00	1.32	3.00
I have the necessary ICT literacy skills for my work.	2.32	1.06	2.00	1.91	1.21	2.00
The number of ICT devices in the school are adequate for use in teaching and learning.	3.25	1.29	4.00	3.67	1.43	4.00
Digital learning content for my subjects/ learning areas is available in the school.	3.02	1.28	3.00	2.69	1.12	2.50
The school has assistive technologies for teaching and learning in my subjects/ learning areas.	3.18	1.24	3.00	3.06	1.22	3.00
I would like to learn as much as I can about ICT integration in teaching and learning.	1.72	1.39	1.00	1.91	1.61	1.00
I would integrate ICT in teaching if I were required to.	1.83	1.35	1.00	1.94	1.58	1.00
I integrate ICT in teaching because I am passionate about it.	2.01	1.30	2.00	1.94	1.37	1.00
I would like my school to nominate me for an ICT integration course.	1.79	1.42	1.00	1.84	1.63	1.00
ICT can make learning interesting.	1.70	1.44	1.00	1.85	1.60	1.00
I can design teaching and learning activities for my learners using ICT.	2.22	1.25	2.00	1.94	1.41	1.00
ICT can enhance Special Needs Education.	1.83	1.42	1.00	1.85	1.60	1.00

ICT can improve my teaching.	1.77	1.43	1.00	1.82	1.57	1.00
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Because of the imbalance between group sizes (Primary $n = 197$; Secondary $n = 33$), it is not appropriate to perform inferential statistical comparisons between-groups. When comparing mean and median data, subjectively, there are very few differences between the attitudes and perceptions of Primary and Secondary School Teachers. Certainly, in terms of these central tendencies falling on the side of Agree or Disagree (relative to Neutral), there is complete consistency across groups.

There is strong agreement among teachers that:

- *I would like to learn as much as I can about ICT integration in teaching and learning.*
- *I would integrate ICT in teaching if I were required to.*
- *I integrate ICT in teaching because I am passionate about it.*
- *I would like my school to nominate me for an ICT integration course.*
- *ICT can make learning interesting.*
- *I can design teaching and learning activities for my learners using ICT.*
- *ICT can enhance Special Needs Education.*
- *ICT can improve my teaching.*

There is weak agreement to neutrality among teachers that:

- *I get ICT technical support in my school*
- *Learners have the necessary ICT literacy skills.*
- *Training opportunities on ICT are available for teachers.*
- *I have the necessary ICT literacy skills for my work.*
- *The number of ICT devices in the school are adequate for use in teaching and learning.*
- *Digital learning content for my subjects/ learning areas is available in the school.*
- *The school has assistive technologies for teaching and learning in my subjects/ learning areas.*

There is disagreement that:

- *The number of ICT devices in the school are adequate for use in teaching and learning.*

Teacher Training and Training Needs

Teachers were asked if they had taken part in pre-service or in-service ICT integration training. 73% of Primary Teachers reported that they had undergone such training, compared with only 55% of Secondary Teachers.

A breakdown of which training programmes have been accessed by teachers surveyed is provided in **Table 27**.

Table 27. Teachers' engagement with training programmes

Primary			Secondary		
Yes	No	Blank	Yes	No	Blank

Economic Stimulus Programme (ESP)	2%	66%	32%	0%	42%	58%
Digital Literacy Programme (Laptops Project)	44%	24%	32%	27%	15%	58%
ICT Champion Training Programme	26%	42%	32%	18%	24%	28%
Kenya ICT Competency Framework for Teachers	6%	62%	32%	3%	39%	58%
KISE ICT integration course	8%	60%	32%	0%	42%	58%
Elimika ICT integration course	1%	67%	32%	3%	39%	58%

The Digital Literacy Programme (Laptops Project) was the most popular among both groups, with 44% of Primary Teachers having completed this course, and 27% of Secondary Teachers. The CIT Champion Training Programme was next most popular, with 26% of Primary Teachers and 18% of Secondary Teachers having completed this programme.

Teachers were asked to suggest what were their most pressing ICT training needs. This data is summarised in **Table 28**.

Table 28. Teachers' disclosures about their priority ICT needs (yes / no)

	Primary			Secondary		
	Yes	No	Blank	Yes	No	Blank
Basic Computer Literacy	30%	64%	6%	9%	91%	0%
Word Processing	32%	62%	6%	9%	91%	0%
Presentations	50%	45%	6%	21%	79%	0%
Data Processing	53%	42%	6%	33%	67%	0%
Internet	36%	59%	6%	21%	79%	0%
Multimedia Production	47%	48%	6%	73%	27%	0%
Assistive Technologies	53%	42%	6%	55%	45%	0%
Adapting Digital Content	63%	31%	6%	67%	33%	0%
Networking Applications	42%	53%	6%	67%	33%	0%
Troubleshooting	29%	65%	6%	36%	64%	0%
None	0%	94%	6%	0%	100%	0%

Primary School Teachers identified the following areas as greater training need priorities:

- Basic Computer Literacy
- Word Processing
- Presentations
- Data Processing
- Internet

Secondary School Teachers identified the following areas as greater training need priorities:

- Multimedia Production
- Networking Applications

There was similarity between both groups as to the priority of needs around:

- Assistive Technologies
- Adapting Digital Content
- Troubleshooting

No single teacher suggested that they had no ICT training needs.

Focus Group Discussions

Methodology

A series of in-person Focus Group Discussions (FGDs) were conducted by members of MoE and eKitabu as part of a larger mixed-methods study to evaluate the current "e-readiness" of Kenyan schools that include learners with disabilities (see Haga et al., 2023).

Between June and August 2023, thirty-four FGDs were held, involving 336 learners (147 girls and 189 boys). Each focus group, typically comprising 10 learners, took place in schools. Fifteen FGDs were conducted in English ($n = 140$ learners), fifteen FGDs in Swahili ($n = 150$ learners), and four FGDs in Kenyan Sign Language ($n = 40$ learners).

However, some discussions were excluded during transcription for not meeting the minimum criteria (e.g., data were not rich enough for Thematic Analysis). Consequently, the transcribed FGDs were reduced to nine in English, eight in Swahili, and one in Kenyan Sign Language (See **Table 29**).

Table 29. *Coded FGDs*

Language	Primary	Secondary
English	5	4
Kiswahili	7	1
Kenya Sign Language	1	0
Total Schools	13	5

FGD Data collection

With an introduction letter from MOE, the data collection team consisting of MOE and eKitabu officers visited selected schools. In each county, teams made a courtesy call to the County Directors of Education (CDE) to be cleared to visit schools.

Qualitative data was collected in the form of FGDs by trained research assistants from both MOE and eKitabu. FGDs were recorded using voice recorders and notebooks, downloaded, and transcribed. FGDs took place in schools. They typically consisted of 7-10 learners, non-strategically sampled to form a group. FGDs were managed by a moderator (MOE) and an assistant moderator (eKitabu). Additionally, one teacher was present. Participants were seated in one semi-circle / two smaller groups facing each other. This helped foster a comfortable environment and encourage face-to-face interaction. Moderators managed conversations by directly engaging respondents while assistant moderators took detailed notes, managed time, and resolved any challenges.

FGDs began with moderators making brief introductions and sharing the reason for their visits. Each FGD lasted between 5 and 22 minutes (average time of 10 minutes). Schools for learners with intellectual disabilities typically had shorter FGDs; schools for learners with VI or hearing impairment (HI) were typically longer. See [Appendix 2](#) for the full FGD Tool.

FGD Data Analysis

Raw FGD data were standardized into written English and analysed via Reflexive Thematic Analysis (Braun & Clarke, 2021). Two members of the eKitabu team carried out joint coding and met to agree codes before conducting full analysis of the transcripts. Direct quotations were highlighted to maintain the authenticity of respondents' voices.

FGD Findings and Discussion

The data from learners with VIs was 'richest' – that is, this was the only data suitable for formal Thematic Analysis. However, the responses of learners who take part in alternative FGDs aligned closely with those of the learners with VIs.

Key themes and sub-themes are summarised in **Table 30**. The themes and sub-themes encompass the availability, types, and impact of ICT devices.

Table 30. *Themes and sub-themes*

Themes	Sub-Themes
ICT devices	Types of ICTs (e.g., computers, laptops, smartphones, tablets) AvailabilityAccessibility
Assistive Technology	Types of devicesAdaptations
Use of ICT	EffectivenessFrequencyConfidenceAttitude / Beliefs
Infrastructure	ICT Room – availabilityICT Room – adequacy of spacePower outagesInternet connectivityRepairs / Maintenance
Security and Safety	Online risks (e.g., pornography, viruses, cyberbullying)

The types of ICTs are essential for diverse learning needs. The use of ICT covers how effectively and frequently these tools are employed, along with the confidence and attitudes of users. Assistive technology focuses on the specific devices and adaptations required for learners with special needs.

The ICT room's availability and spaciousness are crucial for creating conducive learning environments. Security and safety address the risks associated with online activities, emphasizing the need for protective measures. Government support is identified as a key factor in providing necessary resources. The challenges encountered illustrate the technical, cultural, and infrastructural barriers that can impede effective ICT integration, including issues like power outages and internet connectivity. Lastly, the aspect of repairs underlines the importance of having skilled technicians and adequate budgets to maintain ICT resources.

Availability of ICT Resources

FGDs suggested that there were generally inadequate ICT specific devices in schools with learners with VIs.

Availability of ICT rooms in their schools depended on level (primary, secondary). In most primary schools visited, learners reported that they didn't have an ICT room – ICT devices were kept in the Head Teacher's office. Learners mentioned using ICT devices in the classroom rather than specifically in the ICT room:

"Yes, we have one ICT room, but it was changed into a classroom as there were few classrooms around, so we used the ICT devices in classes"

Secondary school learners reported having ICT rooms, but challenges related to space:

"I would like as in, they should add another room, because here we are of different disabilities. So for example, those who are on wheelchairs, in that room it is small so they are suffocating. It needs round one, round two. So, there should be another room added, it could be better for them because they will be there all of them together. Also, those desktops or laptops should be repaired and also more laptops should be added because most of them are for teachers, they are private, there aren't any that we can use when we need to. Also, there should be a timetable and frequency to access the room".

ICT Specific Assistive Technologies

Some learners reflected that they did not have access to absence assistive devices such as hearing aids and braille machines. Other learners reported that there were no assistive devices for learners with physical impairment:

"They bring assistive devices because here we are of different disabilities. So they will help those who have other disabilities like; blind, hearing impaired, etc."

There was confirmation from most learners in visited schools that there were no assistive devices available for physically impaired learners.

Purpose of ICT usage

Learners stated having limited use of ICT devices in teaching and learning. However, a majority of learners reported lessons are enjoyable and interesting *when* teachers use ICTs. FGDs concerned how teachers incorporate ICT into their teaching. Learners from VI & HI secondary schools had been the clearest beneficiaries. They gave examples of how ICTs are used in teaching subjects like biology, geography, history, and agriculture. Learners prefer learning with ICT devices, finding it more engaging than traditional methods. Other learners highlighted the benefits of using ICT devices for learning, such as enhanced retention through visual aids like videos and images, saving time besides making learning easier, more interactive, and enjoyable.

Learners believe that the use of ICT devices by teachers makes learning more engaging:

"We use the projector in KSL time, It is easier as the projector enlarges content being taught and we enjoy learning very well".

Learners expressed a preference for learning with ICT devices, finding it more engaging than traditional methods. They highlighted benefits such as enhanced retention through visual aids, time savings, and making learning easier, more interactive, and enjoyable:

"We use the projector in KSL time. It is easier as the projector enlarges the content being taught."

The frequency of access to ICT devices

Learners' access to ICT devices varied. Some reported using ICT devices one to five days a week, while others mentioned infrequent use, often depending on the subject and teacher. For instance, a primary student said:

"We only use ICT devices 'once in a while' or 'once or twice' in a term, and that is during computer lessons. Mostly we use textbooks rather than devices."

General Discussion

What ICT resources are available in public schools?

The current datasets provide a comprehensive insight into the availability of ICT resources within Kenyan public schools. There are clear positives; for example, almost half of Primary Schools and almost two-thirds of Secondary School had dedicated ICT Rooms. However, there were some concerns raised about how 'available' these were (e.g., students had infrequent or low-frequency access).

The presence of desktop computers in Secondary Schools (83% of sites) and laptops in Primary Schools (84% of sites) are also positive findings. The presence of Projectors at each level was clear (approximately 80% overall). 87% of Primary Teachers and 91% of Secondary Teacher surveyed indicated that they currently have regular access to ICT devices for teaching and learning in their school.

Only 14% of Primary School and 17% of Head Teachers reported that their ICT devices had Assistive Technologies. This is a major concern, particularly given that approximately 95% of schools were supporting learners with at least one type of additional need / disability.

ICT devices are vulnerable due to lack of up-to-date anti-virus protection. Only 22% of Primary School Head Teachers reported that their facility had up-to-date anti-virus software installed on devices; this figure rose to 60% of Secondary School Head Teachers. This aligns with Head Teacher data that shows that 68% of Primary and 88% of Secondary Head Teachers have flagged Computer Viruses and Malware as an issue that has been escalated to them.

40% of Primary School and 68% of Secondary Head Teachers reported that their facility had internet connectivity. Internet connectivity is "Highly Reliable" only in a small proportion of school sites; the vast majority have only "Fairly Reliable" or "Not Reliable" connectivity. In an increasingly Cloud-based computing environment, this will pose serious challenges, in terms of access to relevant platforms and Apps and other web-based content. There are also issues around storage and retrieval on Cloud-based platforms if connectivity is not robust.

What is the level of teachers' ICT skills?

The current study has provided useful insights into the ICT-specific training undertaken by Head Teachers and Classroom Teachers; however, it was beyond the scope of the current evaluation to undertake a fine-grained exploration of, for example, educators' self-efficacy in relation to ICT in education, or to undertake peer-observation / classroom observation of ICT usage in education.

Overall, there is clear evidence that a substantial proportion of school leaders have received ICT training. Typically, training had been provided in partnership with the MoE and / or KISE.

82% of Primary School Head Teachers indicated that they had been trained in ICT integration in education; of those who had been trained, 15% were at Certificate level, 2% at

Diploma level, and 83% had participated in ICT in Education workshops. 77% of Secondary School Head Teachers indicated that they had been trained in ICT integration in education; of those who had been trained, 17% were at Certificate level, 4% at Diploma level, and 78% had participated in ICT in Education workshops.

Teachers were asked if they had taken part in pre-service or in-service ICT integration training. 73% of Primary Teachers reported that they had undergone such training, compared with only 55% of Secondary Teachers. The Digital Literacy Programme (Laptops Project) was the most popular among both groups, with 44% of Primary Teachers having completed this course, and 27% of Secondary Teachers. The CIT Champion Training Programme was next most popular, with 26% of Primary Teachers and 18% of Secondary Teachers having completed this programme.

Where there is perhaps scope for improvement is in the cascade or broadening of training and capacity among classroom teachers. Only 49% of Primary School Head Teachers indicated that their school provides training for its teachers on ICT. Within those schools that offered training, 57% responded that this took place Termly, 12% Twice Yearly, and 31% Yearly. Within those Primary schools that offered training, 44% responded that this was offered to All Teachers, 32% to Some Teachers (apart from the ICT teacher), and 24% Only the ICT Teacher. Only 39% of Secondary School Head Teachers indicated that their school provides training for its teachers on ICT. Within those schools that offered training, 50% responded that this took place Termly, 33% Twice Yearly, and 17% Yearly. Within those Secondary schools that offered training, 13% responded that this was offered to All Teachers, 63% to Some Teachers (apart from the ICT teacher), and 25% Only the ICT Teacher.

Head Teachers were asked if their teachers received any training on assistive devices and technologies to support learners with different categories of disabilities. Only 27% of Primary School Head Teachers and 32% of Secondary School Head Teachers responded "Yes". This is despite approximately 95% of all schools indicating that they support learners with disabilities within the enrolments. Even within the Schools where the Head Teachers had responded that staff had received some specialist training in Assistive Technologies, this was very limited. When extrapolated to the entire population of teachers working with learners with disabilities, these proportions are tiny fractions. At both Primary and Secondary School levels, there was better evidence of training in Assistive Technology to support Audiology and Sign Language Interpretation; however, all other domains were very limited.

Primary School Teachers identified the following areas as greater training need priorities:

- Basic Computer Literacy
- Word Processing
- Presentations
- Data Processing
- Internet

Secondary School Teachers identified the following areas as greater training need priorities:

- Multimedia Production
- Networking Applications

There was similarity between both groups as to the priority of needs around:

- Assistive Technologies
- Adapting Digital Content
- Troubleshooting

No single teacher suggested that they had no ICT training needs.

What is the extent of ICT utilization in schools?

There is a mixed picture when it comes to the issue of ICT utilization in schools.

For example, it is positive that 75% of Primary School Head Teachers reported that their school taught basic computer skills. However, of that 75%, only 45% reported that these classes were available to All Learners. 39% of Primary Head Teachers indicated that there was a timetable for allocating usage of ICT facilities. 63% of Secondary School Head Teachers reported that their school taught basic computer skills. Only 21% reported that these classes were available to All Learners. 50% of Secondary Head Teachers indicated that there was a timetable for allocating usage of ICT facilities. Only 40% of Secondary Head Teachers indicated that Computer Studies was an examinable subject at their school. Thus, it is clear that there is scope of enhanced provision of computer skills teaching, with a view on widening access and participating

Asides from lesson delivery, there is room for development of ICT usage for lesson preparation and for tracking learner development. At primary school-level, 60% of Head Teachers report using ICT for lesson preparation, 91% for lesson delivery, 71% for analysing assessment results, but 0% of tracking learners' progress. At secondary school-level, 80% of Head Teachers report using ICT for lesson preparation, 87% for lesson delivery, 87% for analysing assessment results, but 0% of tracking learners' progress.

In schools where ICT is used for Administration, there is over 96% utilisation at both Primary and Secondary levels for Student Records. However, there is less utilisation for School Finance Management, School Inventory, Security, or Human Resource Management. It is particularly noteworthy that only 32% of Secondary School Head Teachers indicated that ICTs were used for Security, and only 5% of Primary School Head Teachers.

The lack of implementation of formal ICT Guidelines is a focal concern. This has issues for infrastructure security, device safety and lifespan, as well as user safety and wellbeing. Nearly half (44%) and more than half (59%) of secondary school Head Teachers indicated that no formal ICT Guidelines were implemented.

What do Learners' Voices tell us about their experiences of ICT in schools?

The integration of FGD data with large-scale survey data from both Head Teachers and classroom teachers provides a comprehensive understanding of the status of ICT in schools. This triangulation strengthens the validity of the findings, allowing for cross-verification and a more robust analysis of the educational environment and its impact on learners.

Data from Learner FGDs aligns very closely with the results of both Head Teacher and Classroom Teacher surveys. Most students explicitly mentioned the absence of assistive technologies. Students mentioned limited use of ICT devices in teaching and learning. However, most learners reported lessons are enjoyable and interesting when teachers use ICTs. Students from VI & hearing impaired (HI) secondary schools were the clearest beneficiaries, particularly in relation to subjects like biology, geography, history, and agriculture. Students prefer learning with ICT devices, finding it more engaging than traditional methods.

One highly illustrative quote extracted was:

"I would like as in, they should add another room, because here we are of different disabilities. So for example, those who are on wheelchairs, in that room it is small so they are suffocating... So, there should be another room added, it could be better for them because they will be there all of them together. Also, those desktops or laptops should be repaired and also more laptops should be added because most of them are for teachers, they are private, there aren't any that we can use when we need to. Also, there should be a timetable and frequency to access the room".

This single quote encapsulated many of the issues raised by learners:

- Physical infrastructure – room sizes, dedicated ICT rooms; availability & access to ICT rooms
- Hardware – device availability, device maintenance
- Curriculum – embedding timetabled ICT sessions / ICT access into learners' schedules

Furthermore, the FGD data allows the voices of learners to be heard in an authentic way. Incorporating the perspectives of the learners themselves ensures that their experiences and needs are directly addressed. This emphasizes the importance of including the voices of those directly affected in the decision-making process (i.e., *"nothing about us without us"*). This leads to more relevant and effective reflections on ICT resource implementations.

However, within the FGDs, only a relatively limited amount of 'linguistic' material was generated. This is common when working with young children / young learners. The data collected was somewhat impoverished due to the need for greater support and different questioning styles to empower learners to provide more comprehensive responses. This limitation affected the depth and breadth of the data, making it challenging to extrapolate broader themes and insights. Enhancing the methods of data collection to encourage fuller participation from learners is essential. To address this in future work, researchers should consider alternative approaches - such as one-to-one interviews with learners, or more extensive rapport-building between (adult) facilitators and (younger) participants. Indeed, the importance of role / authority is important, and future researchers should consider having only 'independent' facilitators engaged in data collection (i.e., not school officials, school staff, MoE representatives). For example, Honours-level or Masters-level student research assistants. This may also help to reduce bias and / or social desirability in responses.

Critical Reflection and Recommendations

Major strengths of the e-readiness study were the inclusion of multiple beneficiaries (e.g., school leaders, classroom teachers, individual learners) and the use of multiple methods (e.g., surveys, FGDs). The scale of the data collection – and the recruitment of beneficiaries from such a diverse set of geographies – is also a positive; the datasets can be interrogated further, depending on the specific issues to be explored (e.g., sub-analyses of datasets from particular regions; datasets from particular teacher demographics / biographics; datasets related to schools who support a certain profile of learners with additional support needs for learning).

There are several recommendations to consider if future research of this type is to be undertaken. First and foremost, at the point of identifying research funding, recruit an independent evaluation team (through tender, if necessary). The evaluation team can contribute to the design of the data collection methodologies and materials and can ensure that rigorous ethical procedures are implemented. This becomes especially important when thinking about eventual research dissemination – increasingly, Editors / publishers are asking for proof of institutional ethical approval as part of the publication process. Without formal ethical approval of study design, materials and procedures, and planned data analyses, it may not be possible to publish in certain high-profile arenas. Typically, the gold-standard for such ethical review would be through a university Ethics Committee (either at Department, School, College, or institutional level, as determined by the sensitivity of the research).

“Baking in” the evaluation team at the outset can help to ensure that research funding is used most effectively; that is; streamlining data collection instruments, developing standard operating protocols for field researchers, developing procedures that encourage ‘richness’ in data (especially qualitative data), and sharing out the workload associated with executing such large-scale research projects.

It was beyond the scope of the current study and its evaluation to consider associations between e-readiness and individual learner outcomes. However, future research – particularly longitudinal research – could aim to relate aspects of school infrastructure, teacher readiness, learning environment, and individual differences with learner outcomes (e.g., local and national assessments). Furthermore, given the multi-faceted and complex relationship between individual demographic and biographic characteristics, such a longitudinal exploration would benefit from including measures of psycho-social development and health and wellbeing (especially mental health and wellbeing) as part of understanding how to promote healthy and successful learners and school leavers. The social, cultural, and economic benefits of promoting health and education are well-established.

It would be interesting to explore the same issues around e-readiness and inclusive education within the Further and Higher Education spaces – that is, speaking to academics involved in research, teaching and learning, and assessment spaces, as well as professional services staff, and students themselves (both disabled and non-disabled students). What is working well in terms of facilitating transitions from one level of the education system to the next, what is working well in terms of promoting access and engagement, and what are the challenges and opportunities for enabling successful graduate outcomes.

A stakeholder group that was not included in the current study was employers. Having a clear understanding of what attributes employers seek – in particular, in relation to ICT – is important to ensure that those leaving formal education and entering the workforce have been adequately skilled to meet the expectations and needs of potential employers.

With a view to fostering equality, diversity and inclusion, it is also important to understand employers' readiness to support workers with additional support needs. This could be in terms of physical infrastructure readiness, broader accessibility in terms of ICT / Assistive Technology / systems, or social readiness (that is training for employers and staff around implicit biases, inclusive language, anti-discrimination initiatives).

Conclusion

This report summarises and synthesises data from a large-scale evaluation of ICT and e-readiness within the Kenyan public school system. Importantly, there is consistency in datasets gathered from different stakeholder groups (school leaders, classroom teachers, individual learners) via multiple methods (surveys, FGDs).

There is cause for optimism, particularly given the appetites of educators to embrace additional training specific to ICT, Assistive Technology, and Special Needs Education / Inclusive Education.

Investment to support learners throughout their educational journey (from early years to Further and Higher Education) is critical; in particular, embedding ICT and Assistive Technology to effectively promote an inclusive learning environment for all. An adequate supply of well-maintained devices, that are accessible to learners, supported by a well-trained staff is vital to ensuring Kenya's progress towards a future as a "Silicon Savannah".

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Appendix 1 – Links to Data Collection Instruments

[Inventory checklist](#)

[Head of Institution-Primary](#)

[Head of Institution-Secondary](#)

[Teacher's Questionnaire](#)

[Head Teacher Interview Guide](#)

[Focus Group Discussion \(FGD\)](#)

Appendix 2 – Focus Group Discussion Tool

Listen carefully to the children's voices / observe their signing

Utilise existing friendship groups for choosing children to participate in FGD / organise FGDs

Specificity of FGDs – e.g., distinct groups for children with low vision / blindness, low hearing / deafness, multiple / complex disabilities

Record the session – video, audio, and supplement these recordings with facilitator notes taken during FGD

Background Information	
Date of Interview:	
Name of School	
Type of School: (Private/Public)	
Level: (Primary/Secondary)	
Disability Category	
Name of County	
Name of Sub-County	
Name of Enumerator	
No. of participants	# of males _____ # of females _____

FGD Introduction

Good morning / afternoon, my /our name(s) is / are_____.

We work for the MOE / eKitabu. Do you know the MOE / eKitabu? *[If no, explain]*

We are here today to discuss how you learn using ICT devices in your school

The information provided will be used by the MOE / eKitabu to improve your learning by use of ICT.

Participation in this discussion is free and there is no obligation to respond, you can stop at any point.

No personal data will be shared with others, and the information provided will be analysed anonymously and used confidentially.

Your views are valuable and important and will contribute to ensuring our services and the information we share meets your needs.

Your interview will be recorded.

Do you have any questions before we proceed?

RQ1: What ICT resources are available in public schools where learners with disabilities are located?

Can you tell me about the ICT room in your school?

What devices does your school have?

Can you move freely in space? Are there cables lying around that affect your movement?

Has the school adapted the devices/teaching methods, so ALL learners can use them?

Are there assistive devices in your school?

- -How do you use them?
- -How often?
- Status of the devices, functioning

RQ2: What is the level of teachers' ICT skills in this school?

Do your teachers use ICT devices in teaching? (*Probe for specific subjects, teaching learners with SNE*)

In your opinion, when your teachers use ICT devices does it make learning easier? How? In what ways? Why not?

RQ3: What is the extent of ICT utilisation in these schools?

How often do you use ICT devices for learning (*When? Where? Who uses them?*)

Does your school have a schedule or timetable for utilisation of ICT facilities/devices?

How often do you go to the ICT room?

Can you use all the materials/devices? (*adaptations for SEND learners?*)

How confident do you feel using ICT devices? Could you rate your skills using ICT devices? (*High, medium, low*)

What threats have you encountered while using ICT facilities/devices? Probe on some threats (Virus, Obscene content, cyberbullying) Are you aware of any safety measures while using ICT facilities? (Are some webpages blocked for safety reasons?)

Is there anything else you would like to add?