

Myth or Reality: Digital Literacy Programme Implementation in Primary Special Schools in Nairobi, Kenya

Charles Magwari Omboto

PhD Cand. The Catholic University of Eastern Africa

Anne Kanga

PhD, Senior Lecturer | Faculty of Education,
The Catholic University of Eastern Africa

Ann Rita K. Njageh

PhD, Senior Research Fellow | Faculty of Education,
The Catholic University of Eastern Africa

Abstract

Information Communication Technology (ICT) enhances accessibility, efficiency, and quality of education. This study aimed to examine the status of ICT resources in teaching and learning in public primary special schools in Nairobi County, Kenya. Questionnaires, interviews, observation schedules, and manuals for document analysis were used to collect data from respondents. Research shows that most special schools have regular ICT resources provided by digital literacy programs (DLP), such as laptops and tablets. However, there is limited investment in specialized ICT resources to support the teaching and learning of children with disabilities and special educational needs. Research also shows that ICT resources are limited because most of the devices are kept by school administrators or teachers who do not know how to use them. The study concludes that limited investment in assistive and/or adaptive digital technologies and devices will harm the attainment of ICT skills as a fundamental skill by children with disabilities in special schools and special needs units. The study recommends the establishment of a technical committee on design innovation and equipment technology. This will complement DLP's efforts in providing resources for special schools to make better use of ICT for students with disabilities and special educational needs.

Keywords: Special Needs Education, ICT Resources, Assistive Devices, Assistive Technology

Introduction

Information and Communication Technology (ICT) resources refer to hardware such as computers, scanners, copiers, mobile phones, printers, projectors, and broadcast technologies including radio and television as well as essential software that enhances teaching and learning. Information and Communication Technology resources need to be connected via computer networks and internet connections to enable sharing and distribution of data and information between teachers and learners. A networked school is not just a school with a physical network, but where there is an advantage, the use of sources outside the school network may be applied (Rodríguez et al., 2019). Like ICT curricula, ICT resources directly affect the outcomes and outputs of ICT use in teaching and learning. Information and communication technology (ICT) resources play a central role in transforming teaching, learning, and assessment practices for teachers and learners with special educational needs (Hersh, Leporini & Buzzi, 2020; Masih, 2018). Globally, it is recognized that teachers and schools are constantly committed to improving their pedagogy, the way their learners learn, and the way learning is assessed. With the increasing use of ICTs in today's contemporary society, it is essential to integrate ICTs into education systems at all levels (Lowder & Regmi, 2020).

Information and communication technologies are pervasive in society and continue to change the way we live our daily lives. Integration of ICT in teaching /learning has the potential to support the transformation of teaching, learning, and assessment practices in special schools, and it can link education policy with economic and social development (Rana & Rana, 2020). Likewise, there is growing evidence that digital technology is changing how learners learn, how teachers teach, and where and when learning takes place (Rana & Rana, 2020; Masih, 2018). Skills in ICT have been recognized as an essential skill in all the educational reforms taking place around the world (UNESCO, 2018). This statement is the real proof of education reform in developing countries like Kenya since 2011 and developed economies like Czech Republic as ICT resources in schools have been emphasized.

Learners with disabilities and special educational needs also need more open learning experiences to develop their higher levels, such as reflection, creativity, independence, cooperation, and mastery (Medina et al., 2021). When ICT resources are used effectively, it can provide all teachers, learners, and parents/guardians with the opportunity to develop these key skills (Hersh et al., 2020). Integrating ICT into the teaching, learning, and assessment of learners with disabilities is a complex undertaking and the mere presence of ICT in schools does not equate to its effective use (Enrique, 2018).

With the advent of ICT resources in developed countries, trends referenced include redesigning the way schools operate and the transition from learners as consumers to creators. (Passey et al., 2018). Obstacles noted include redesigning the role of teachers and scaling up educational innovations. Developed countries like Japan,

Britain, France, and Germany have unanimously confirmed the potential role of the ICT resources in helping to transform teaching, learning, and assessment practices in a very positive way in the long term (Enrique, 2018). In the long run, such a transformation will help improve student learning and prepare the young people to live, study and work in modern globalized societies (Akkari & Maleq, 2019).

The use of ICT resources for persons with disabilities is an important initiative that enables education systems worldwide to meet the challenges of inclusion (Hersh et al., 2020). Developed countries such as China, Germany, the US, and Japan have reform programs that include people with disabilities at all levels of education (Cha, Park & Seo, 2020). The implementation of the ICT strategy aims to enhance the continuous application and improvement of education. Similarly, in the recent past, many reforms in education have led to consideration of the key role that ICTs can play in transforming education systems so that learners are equipped with the knowledge and skills needed to meet the challenges posed by rapid growth. The world is changing (Barakabitze et al., 2019).

In Africa, the use of ICT assets in unique training remains in its preliminary degrees and most of the international locations threat being left at the back of technological development because of the gradual tempo at which they may be integrating ICT into their training system (Lloyd, 2020). Unfortunately, maximum growing international locations along with Sub-Saharan Africa, for example, Uganda, Ghana, Liberia Kenya, Zambia, and Sudan have restrained utility and use of ICT in Education, notwithstanding complicated ICT rules in Education being in place. Their rules are not conscious of the precise desires of the training zone with an emphasis on the usage of ICT for financial returns in outdoor schools (Achimugu, Oluwagbemi, & Oluwaranti, 2010).

In Kenya, the ICT policy was introduced in 2006 (CA, 2006). The policy's mission is to be a "prosperous ICT-based society of Kenya" with ICT at the heart of national development (Kashorda & Waema, 2014). This policy is intended to encourage the use of ICT resources and to promote the growth and development of e-learning at all levels of education with the objective of promoting teaching and learning (Pavel, Fruth & Neacsu, 2015). From the policy, relevant data on the use of ICT resources in teaching and learning in special schools are not provided. Therefore, the policy of providing ICT resources has not been based on the needs of special schools. This calls for research into ICT resources and their use in teaching and learning in special schools in Nairobi County. According to Kenya's vision 2030, if schools provide access to ICT, the quality of education will improve, and productivity will be enhanced (MOEST, 2003). The status of information and communication technology (ICT) resources in public primary special school schools in Kenya has not been adequately examined. Existing assessment reports come mainly from NGOs. This follows the Kenya Government's robust Digital Literacy Program (DLP). With the current implementation of the Competency-Based Curriculum (CBC), which recognizes ICT as

a core competency, a comprehensive assessment of the state of ICT resources in these schools becomes necessary to support policy and program implementation advocacy. For learners with disabilities and special educational needs, appropriate ICT resources not only improve access but also maintain the quality and relevance of education.

Purpose of the Study

The main aim of this study was to establish the status of ICT resources for the implementation of a digital literacy programme in public primary special schools in Nairobi County, Kenya. The status of these resources is examined in three aspects: availability, functionality, and adequacy. This will assist to find out whether DLP implementation in special schools in Nairobi County is a myth or a reality.

Literature Review

Lack of ICT resources can be a serious impediment to the use of ICTs in teaching and learning in schools, especially in developing countries like Kenya. Without ICT resources, Kenya may not integrate ICT in schools to the extent expected or required. Therefore, resource planning and investment in ICT are necessary if Kenya is to realize its huge economic and development potential. The availability of ICT equipment in schools in Kenya is still very low. In investigating internet availability and accessibility, Kenyan schools found that email is still not recognized as a tool for collaboration between learners and teachers (Makokha & Mutisya, 2016). The authors further reiterated that internet access was very limited and when available it was used for administrative purposes only. Research shows that almost 40% of these schools have less than 10 computers and are therefore not suitable for teaching and learning. More than 20% have less than 5 computers, indicating that these computers are mainly for administrative purposes.

For some special schools, facilitating resources such as electricity will not qualify even with an ICT donation opportunity. Typically, the criteria for placing computers and ICT equipment in schools are security, power supply, and the availability of ICT-savvy teachers, among other factors (Rodríguez et al. al., 2019). Due to a lack of electricity connections, some schools use generators to power computers (Gayapersad et al., 2019). Such energy sources are inconvenient because they are often used at night. As a result, few teachers can use technology, resulting in a low frequency of ICT use. However, a program to improve teachers' access to computers has been launched.

A thorough rationale is needed before starting to use ICT resources in schools and classrooms. In general, with the increasing availability of computer equipment, teachers should not focus on machines but should focus on their primary role as educators. Teachers need to expand their imagination with the realization that as computer technology develops, they will be able to achieve more goals (Kashorda & Waema, 2014).

The use of ICT in Education

The education sector has been influenced by ICT, which has certainly influenced teaching, learning, and research (Achimugu et al., 2010). ICT resources have the potential to accelerate, enrich and deepen skills, motivate, and engage learners, help connect school experiences with work practices and create economic viability for students as future workers, as well as enhance education and help schools change (Pannen, 2015). In a rapidly changing world, basic education is essential for an individual to access and apply information technology.

Teaching has always been emphasizing content and for many years course work has been revolving around textbooks. Teachers have taught through lectures and presentations interspersed with tutorials and getting-to-know activities designed to consolidate and rehearse the content. Contemporary settings are now favoring a curriculum that promotes competency and performance. Curriculums have started emphasizing capabilities and are concerned more with how the information will be used than with what the information is. Contemporary ICT can provide strong support for all these requirements and there are now many outstanding examples of world-class settings for competency and performance-based curriculum that makes sound use of the affordances of these technologies (Sharma, 2015). The integration of information and communication technologies could help revitalize teachers and learners in special schools. This can help to improve and develop the quality of education by providing curricular support in difficult subject areas. To achieve these objectives, teachers need to be involved in collaborative projects and the development of intervention change strategies which should include teaching partnerships with ICT tools. Further, there are three conditions necessary for teachers to introduce ICT and use it in their classrooms: teachers should believe in the effectiveness of technology, should believe that the use of the technology will not cause any disturbances in learners learning, and finally in their control over the new technology (Cheung & Slavin, 2012). However, research studies have shown that most teachers do not make use of the potential of ICT to contribute to the quality of learning environments despite the value they attach to the technology (Butler, Hallissy, & Hurley, 2018).

The benefits of the use of ICT technology are realized only when confident teachers are willing to explore new opportunities for changing their classroom practices by using ICT (Jamieson-Proctor, Burnett, Finger, & Watson, 2006). Consequently, the use of ICT does not only enhance learning but also prepares the next generation for future lives and careers (Wondemtegegn, 2018). The changed pool of teachers will come with changed responsibilities and set of skills for future teaching involving high levels of ICT and the need for more facilitative than didactic teaching roles (Dart et al., 2017).

The flexibility in time-space accounted for by the integration of the ICT resources into teaching and learning processes contributes to increasing interaction and reception of information in education (Baskin & Williams, 2006). Such possibilities suggest

changes in communication models and in the teaching and learning methods used by teachers by giving way to new scenarios that favor both individual and collaborative learning in schools. The use of the ICT resources in an educational setting by itself acts as a catalyst for change in the domain. ICT tools encourage and support independent learning in schools'

The influence of technology on supporting learners' abilities will continue increasing. In the past, the conventional process of teaching has revolved around teachers planning and leading-learners through a series of instructional sequences to achieve the desired learning outcome. Typically, these forms of teaching have revolved around the planned transmission of a body of knowledge followed by some forms of interaction with the content to consolidate the knowledge acquisition. Learning approaches using contemporary ICT provide many opportunities for constructivist learning through their provision and support for resource-based, student-centered settings and by enabling learning to be related to context and practice (Damşa & De Lange, 2019).

The use of ICT resources in learning settings supports various aspects of knowledge construction and as more and more learners use ICT in their learning processes, the more pronounced their impact becomes. Teachers generate meaningful and engaging learning experiences for their learners strategically using ICT to enhance learning. Learners enjoy studying, and the independent inquiry that innovative and appropriate use of ICT helps to foster. The study established that very few schools were using ICT mostly for computer classes and office work.

Methodology

Study Design

This study used the Mixed Method Research (MMR) Design in which both quantitative and qualitative datasets are collected and analyzed concurrently and triangulated in reporting the results.

Sampling

The study adopted a multi-stage sampling technique in identifying teachers who participated in the study. The first stage involved purposive sampling of Special schools in Nairobi County to ensure representative of as many disability categories as possible. The second stage involved random sampling of individual teachers based on the individual school's staff register. Systematic random sampling was used to select teachers from the list of staff register which was the basic sampling frame in this study. Further, purposive sampling was used to identify key informants from the Ministry of Education (MOE).

Instruments and Data Collection

Data was collected through the Computer Assisted Personal Interview (CAPI). In this approach, respondents were contacted through mobile contact and given a detailed

explanation of the background and motivation of the study, and requested to participate in the research. The email containing the link to the online self-administered tool was sent only to those respondents who gave consent and were willing to participate in the study. Responses were received in MS Excel file for analysis. However, observations were conducted by the researchers in individual schools. Table 1 below presents a summary of the sampling matrix showing key participants and their demographics.

Table 1

Demographic Characteristic of Respondents

Demographics of teachers	Frequency	Percent
Sex		
Female	72	72.7
Male	27	27.3
Age bracket		
40 – 49	47	47.5
50 – 59	43	43.4
30 – 39	8	8.1
Below 30	1	1
Teaching Experience		
More than 10	50	50.5
4 – 7	23	23.2
8 – 10	14	14.1
1 – 3	12	12.1
Highest Qualification		
Bachelor’s Degree	48	48.5
Master’s Degree	27	27.3
Diploma	19	19.2
PhD	5	5.1
Total	99	100

Data Analysis: Statistical and thematic techniques were used in the analysis quantitative and qualitative datasets respectively. Statistical methods used in this study were mainly descriptive and bivariate forms of analyses including frequencies, percentages, and cross-tabulations. Thematic analysis technique used in this study was adopted from the six-phase model proposed by Braun and Clarke (2006) as follows: (1) Familiarizing with your data, (2) Generating initial codes (3) Searching for themes, (4) Reviewing themes, (5) Defining and naming themes and (6) Producing the report. Triangulation of quantitative and qualitative evidence was done continuously, and a final research report was produced.

Ethical Considerations: In conducting this study, relevant authorizations were sought. First, ethical clearance was sought and obtained from the University. The data collection permit was given by the National Commission for Science, Technology, and Innovation (NACOSTI). Background and motivation of the study were provided to all target respondents and data was collected from those who had given informed consent to participate in the study.

Results and Discussions

Teachers were provided with a list of 16 ICT resources and required to indicate whether the said resources were available or not available. For those that were available, teachers were then required to indicate whether they were adequate or inadequate. Table 1 presents frequency distribution sorted by the availability of ICT resources.

Table 1

Summary Statistics of Availability of ICT Resources in Schools

ICT Resources	Rank	Available (%)		Adequate (%)		
		Yes	No	Yes	No	Not sure
Electricity	1	93%	7%	24%	2%	74%
	2			27%	14%	
Space for storage of laptops	2	89%	11%			59%
	3			24%	16%	
Television Set	3	83%	17%			60%
	4			30%	26%	
Laptops	4	74%	26%			44%

Printer and Scanner	5	67%	33%	30%	17%	53%
Teacher Digital Device	6	64%	36%	%	%	22%
Desktop Computers	7	63%	37%	%	%	52%
LCD Projector	8	63%	37%	24%	18%	58%
Radio	9	62%	38%	30%	15%	56%
Video Decks	10	54%	46%	26%	30%	43%
DVD/VCDs	11	54%	46%	42%	32%	26%
Desktop Computers with JAWS	12	27%	73%	22%	37%	41%
Internet connectivity	13	27%	73%	33%	19%	48%
Adapted computers	14	23%	77%	17%	30%	52%
Standing generators or UPS	15	9%	91%	44%	33%	22%
Mobile phones provided by the school	16	7%	93%	43%	14%	43%

The results show that in terms of availability, electricity, storage space, and television sets were reported to be available by more than 75% of teachers. In terms of adequacy, 24% of teachers reported that electricity is adequate, 27% reported that storage space is adequate and 24% reported that television sets were adequate. The stability of electricity supply throughout the week was considered a measure of the adequacy of electricity. It was curious to note that a significant majority of teachers, 59% and above did not comment on the adequacy of electricity, storage space, or television set. The probable reasons were that either they did not want to commit themselves or they chose to ignore the response.

Laptops were reported to be available in schools by 74% of teachers out of which only 30% of teachers indicated that the available laptops were adequate, 26% reported

that they were not adequate and 44% of teachers could not comment on the adequacy of laptops in their schools. Printers and scanners were reported to be available by 67% of teachers out of which only 30% indicated that the available printers were adequate, 17% said they were not adequate while 53% of teachers could not comment on the adequacy of the available printers and scanners.

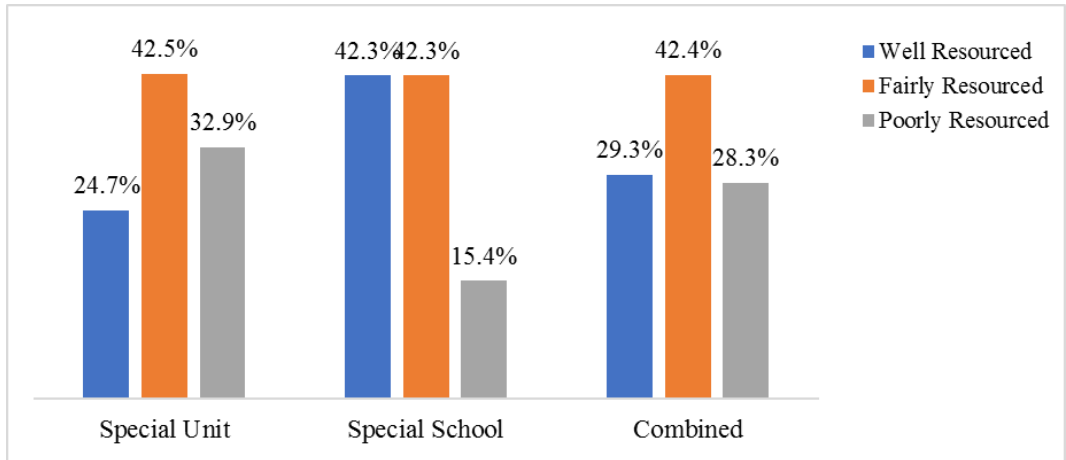
The resources that were reported to be available in schools by between 55% and 64% of teachers include teacher digital devices (64%), desktop computers (63%), LCD projectors (63%), and radio (62%). In terms of adequacy, 32% of teachers reported that teacher digital devices are adequate, 46% said they are not adequate while 22% could not comment on the same; 29% of teachers said the desktop computers were adequate, 19% said they were not adequate while 52% could not comment on the adequacy of desktop computers; 24% said LCD projectors were adequate, 18% said they were not adequate while 58% could not comment about the adequacy of the available LCD projectors; finally it was found that only 30% of teachers reported that available radios were adequate, 15% said they were not adequate while 56% could not comment about the adequacy of available radios.

The resources that were reported to be available in schools by between 45% and 54% of teachers include; video decks (54%) and DVD/VCDs (54%). In terms of adequacy, 26% of teachers said the available video decks are adequate, 30% said they are not adequate while 43% could not comment on the adequacy of the available video decks. Similarly, 42% of teachers indicated that the available DVD/VCDs are adequate, 32% said they are not adequate while 26% could not comment on the adequacy of the available DVD/VCDs.

The resources that were reported to be available in schools by less than 30% of teachers include desktop computers with JAWS (27%), internet connectivity (27%), adapted computers (23%), standing generators or uninterrupted power supply [UPS] (9%) and mobile phones provided by the school (7%). Similar trends regarding adequacy were observed where a significant majority (between 22% and 52%) of teachers are not able to comment on the adequacy of the available resources. Similar studies in different contexts also mirror the trend of ICT resources lacking in schools. For instance, in Greece, Nikolopoulou and Gialamas, (2016) found that many schools did not have internet connections, and many lacked adequate equipment for the successful integration of ICT for classroom teaching.

The scores on the availability and adequacy of the 16 pre-determined ICT resources were used to create three-point categorical classes 'Well resourced', 'Fairly resourced', and 'Poorly resourced'. The results show that 29.3% of teachers reported that their schools are well resourced, 42.4% resourced while 28.3% of teachers reported that their schools are poorly resourced. Figure 1 presents a comparative summary of the availability of ICT resources between special units and special schools.

Figure 1



Availability of ICT in Special Schools and Special Units

Information about the availability of ICT resources in special schools and units was obtained from teachers. The results show that 24.7% of special unit teachers and 42.3% of special education teachers reported that their schools had sufficient resources to implement DLP. Another 42.5% of special unit teachers and 42.3% of special education teachers showed that their schools had the resources to implement DLP. Meanwhile, 32.9% of special unit teachers and 15.4% of special education teachers reported that schools were not equipped to implement digital literacy programme.

Using the observation checklist and with the support of school authorities, researchers examined several school records to determine the availability of ICT devices in special schools and units. The results are shown in Table 2. It has been shown that most ICT devices such as desktop computers, laptops, tablets, and projectors are available in most institutions. Special equipment such as embossers, scanners, large prints, photocopies, communication devices for the hearing impaired (TDD), talking clocks/clocks, JAWS / NVDA, dolphin pens, communication devices for the hearing impaired (TDD), speech recorders, sound recorders, etc. However digital devices and software were still very limited. Other common devices such as LCD projectors, tablets, and laptops were available to teachers but were blocked by the head of the institution. The results of this study show that ICT devices are available and are in line with the government's commitment to providing laptops to all children, regardless of disability.

Table 2

Frequency Tabulation of Availability of ICT Devices (Sample Size n=41)

S/N	ICT devices	Number	Percent
i)	Desktop computers	33	80%
ii)	Laptops	27	66%
iii)	Tablets	27	66%
iv)	Projector	22	54%
v)	CCTVs: Potable CCTV system,	14	34%
vi)	Handheld magnifying cameras	12	29%
vii)	Embossers, scanners, large print, photocopier	3	7%
viii)	ICT textbooks	3	7%
ix)	Internet connectivity	3	7%
x)	Ipads, iPhones, iPod	3	7%
xi)	Telecommunication Device for the Deaf (TDD)	2	5%
xii)	Calculators: Low Vision, Scientific,	2	5%
xiii)	Talking watch/clocks	2	5%
xiv)	JAWS	1	2%
xv)	Dolphin pen, NVDA Kurzweil, 1000,	1	2%
xvii)	Telecommunication, Device for the Deaf (TDD)	1	2%
xviii)	Voice recorders: Tape recorder, Smartpen,	1	2%
xix)	Notetakers: Book Sense, Braille sense,	1	2%
xx)	Storage room	1	2%

These findings can be used to infer that other than the availability of resources, there could be a problem with the utilization of the same resources since most teachers cannot tell whether the available resources are enough. Further, it can be inferred that special schools have been equipped in the same way regular schools are equipped since assistive technologies such as JAWS and adapted computers are available in less than 30% of schools. This could be an indicator of a potential challenge in the implementation of DLP for children with disabilities who required adapted technologies to learn. These findings are supported by studies done by Wahome (2011) and Wanjala (2013) who found the ICT tools available in most schools where

computers and printers were used in teaching and learning and publishing examinations. Additionally, this is in line with the Ministry of ICT Policy which postulates that ICT is expected to be integrated seamlessly into teaching and learning across all levels of education in Kenya (Ministry of ICT, 2016). An interview with the key informants revealed that although the MoE had supplied ICT devices to special schools and units in Nairobi County, not most devices were supplied. On supply of DLP devices to special schools, one KI reported that:

Devices have been supplied adequately. However highly specialized devices are not yet supplied, from what we get from reports only 75 percent were done but no concrete evidence in addition devices is not necessarily adapted, and some were for specific disabilities. Delayed procurement no proper consultation, so specifications are not the correct ones and devices, arrived late and work was not evidence-based we skipped baseline hoping that now in phase 2 we will do better (Interview MOEF2, October 2020).

Similarly, these findings are supported by the sector policy for learners and trained with disabilities that state that most of the learning materials in the market are not adapted, becoming a challenge in accessing appropriate and specialized teaching and learning materials for learners and trainees with disabilities. Further, this limits the teacher in employing a variety of content in teaching and learning activities for effective curriculum delivery. For an institution to fully integrate information and communication technology in its learning, there should be resources that fully support the integration. The researcher used an observation checklist to ascertain if the schools have ICT resources.

Consequently, lack of adequate ICT resources in schools can be explained by the insufficiency of funds and low levels of ICT training among the teachers. The findings concur with a study by Kibuku, Ochieng and Wausi (2020) that established that some of the major barriers in developing maturity when it comes to utilization of technology in learning include teachers' attitude, lack of access, lack of training on the utilization of the ICT resources as well as inadequate ICT skills in general. More precisely, when it comes to trainees' attitudes there is an indication of lack of independence in learning and devoid of commitment to take responsibility for self-learning.

Other challenges noted include lack of a standard course curriculum, learning materials as well as inadequate learning resources that integrate the utilization of ICTs. Additionally, there is also the barrier of phobia towards technology among teachers and teacher trainees this deems their confidence and readiness to utilize ICT support in the teaching and learning process. This is further aggravated by the lack of qualified professionals in ICT to support teachers in the incorporation of ICTs in schools and particularly in the learning and teaching process. This can be attributed to the high levels of 'brain drain' whereby professionals in these areas opt to look for better-paying jobs in other countries where they are well compensated commensurate to their services.

Conclusions

The researcher sought to establish the current state of availability of ICT resources for implementing DLP in public special schools. The study found that items such as electricity, storage space, television sets, laptops, printers and scanners, teacher digital devices, desktop computers, LCD projectors, and radio were available in schools. In terms of adequacy, 30% of teachers reported that they were adequate, 26% reported that they were not adequate and the majority 44% of teachers could not comment on the adequacy of these items in their schools. The study also revealed that Desktop Computers with JAWS, internet connectivity, adapted computers, standing generators or uninterrupted power supply [UPS] and mobile phones provided by the school were available though in small supply. Similarly, regarding adequacy, a significant majority of teachers could not be able to comment on the adequacy of the available resources. Finally, the study showed that special schools were resourced while special units were poorly resourced in terms of ICT devices to implement DLP. To improve the implementation of ICT in teaching and learning in public primary schools in Nairobi County, there is a need to handle challenges related to the availability, adequacy, and utilization of ICT devices in those special schools.

Recommendations

The study recommends the establishment of collaborative partnerships among government agencies to ensure adequate ICT (hardware and software) and infrastructure are made available for all categories of learners with special needs and disabilities. Such partnerships could be the ministry of education (through the School Equipment Production Unit (SEPU) and Kenya Institute of Special Education (KISE)) in collaboration with the Ministry of ICT to consider the establishment of a technical working committee on innovation for the design of assistive devices and technologies. Further, the study recommends the institutionalisation of Public-Private Partnerships (PPP) between the government, non-governmental organizations (NGOs), Faith-Based Organisation (FBOs), Community-Based Organizations (CBOs), and other development partners with the aim of formulating sustainable ICT infrastructure programs. Assistive devices for CWDs can be very expensive and this calls for concerted effort and determination from all stakeholders to make it certain. If this is not done and well addressed the DLP implementation in primary special schools in Nairobi and by extension will be a myth and not a reality.

References

- [1] Achimugu, P., Oluwagbemi, O., & Oluwaranti, A. (2010). An evaluation of the impact of ICT diffusion in Nigeria's higher educational institutions. *Journal of information technology impact*, 10(1), 25-34.
- [2] Kibuku, R. N., Ochieng, D. O., & Wausi, A. N. (2020). e-Learning Challenges Faced by Universities in Kenya: A Literature Review. *Electronic Journal of e-Learning*, 18(2), pp150-161.

- [3] Medina-García, M., Higuera-Rodríguez, L., García-Vita, M., & Doña-Toledo, L. (2021). ICT, Disability, and Motivation: Validation of a Measurement Scale and Consequence Model for Inclusive Digital Knowledge. *International Journal of Environmental Research and Public Health*, 18(13), 6770.
- [4] Akkari, A., & Maleq, K. (2019). Global citizenship: Buzzword or new instrument for educational Change? *Europe's Journal of Psychology*, 15(2), 176.
- [5] Barakabitze, A. A., William-Andey Lazaro, A., Ainea, N., Mkwizu, M. H., Maziku, H., Matofali, A. X., ... & Sanga, C. (2019). Transforming African education systems in science, technology, engineering, and mathematics (STEM) using ICTs: Challenges and opportunities. *Education Research International*, 2019.
- [6] Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative research in psychology*, 3(2), 77-101.
- [7] Butler, D., Hallissy, M., & Hurley, J. (2018, March). The digital learning framework: What digital learning can look like in practice, an Irish perspective. In *Society for Information Technology & Teacher Education International Conference* (pp. 1339-1346). Association for the Advancement of Computing in Education (AACE).
- [8] Cha, H., Park, T., & Seo, J. (2020). What should be considered when developing ICT-integrated classroom models for a developing country? *Sustainability*, 12(7), 2967.
- [9] Damşa, C., & de Lange, T. (2019). Student-centered learning environments in higher education: From conceptualization to design. *Uniped*, 42(1), 9-26.
- [10] Dart, E. H., Radley, K. C., Furlow, C. M., & Murphy, A. N. (2017). Using behavioral skills training to teach high school students to implement discrete trial training. *Behavior Analysis: Research and Practice*, 17(3), 237.
- [11] Enrique Hinostraza, J. (2018). New challenges for ICT in education policies in developing countries: The need to account for the widespread use of ICT for teaching and learning outside the school. In *ICT-Supported innovations in small countries and developing regions* (pp. 99-119). Springer, Cham.
- [12] Gayapersad, A., Ombok, C., Kamanda, A., Tarus, C., Ayuku, D., & Braitstein, P. (2019, December). The production and reproduction of kinship in charitable Children's institutions in Uasin Gishu County, Kenya. In *Child & Youth Care Forum* (Vol. 48, No. 6, pp. 797-828). Springer US.
- [13] Hersh, M., Leporini, B., & Buzzi, M. (2020, September). ICT to support inclusive education. In *International Conference on Computers Helping People with Special Needs* (pp. 123-128). Springer, Cham
- [14] Kashorda, M., & Waema, T. (2014). E-Readiness survey of Kenyan Universities (2013) report. Nairobi: Kenya Education Network.
- [15] Lloyd, I. (2020). *Information technology law*. Oxford University Press.

- [16] Lowder, S. K., & Regmi, A. (2020). Assessment of outcomes based on the use of PIM-supported foresight modeling work, 2012-2018. *Intl Food Policy Res Inst*
- [17] Makokha, G. L., & Mutisya, D. N. (2016). Status of e-learning in public universities in Kenya. *International review of research in open and distributed learning*, 17(3), 341-359.
- [18] Masih, A. (2018). Effective use of ICT in teacher education for an inclusive environment in the classroom. *Educational Quest*, 9(3), 247-251.
- [19] Nikolopoulou, K., & Gialamas, V. (2016). Barriers to ICT use in high schools: Greek teachers' perceptions. *Journal of Computers in Education*, 3(1), 59-75.
- [20] Pannen, P. (2015). Integrating technology in teaching and learning mathematics. *Southeast Asian Mathematics Education Journal*, 5(1), 31-48.
- [21] Passey, D., Shonfeld, M., Appleby, L., Judge, M., Saito, T., & Smits, A. (2018). Digital Agency: Empowering equity in and through education. *Technology, Knowledge, and Learning*, 23(3), 425-439.
- [22] Rana, K., & Rana, K. (2020). ICT Integration in Teaching and Learning Activities in Higher Education: A Case Study of Nepal's Teacher Education. *Malaysian Online Journal of Educational Technology*, 8(1), 36-47.
- [23] Rodríguez-Rodríguez, I., Rodríguez, J. V., Elizondo-Moreno, A., Heras-González, P., & Gentili, M. (2019). Towards a holistic ICT platform for protecting intimate partner violence survivors based on the IoT paradigm. *Symmetry*, 12(1), 37.
- [24] Sharma, H. K. (2015). Role of ICT in Improving the Excellence of Education. *International Journal on Computer Science and Engineering*, 7(8), 78.
- [25] UNESCO. (2018). ICT Competency Framework for Teachers. Retrieved from <https://en.unesco.org/themes/ict-education/competency-framework-teachers>
- [26] Wondemtegegn, S. A. (2018). University Students Perception and Utilization of Technology for Learning: The Case of Haramaya University. *Online Journal of Communication and Media Technologies*, 8(1), 130-149.