Level and Nature of ICT Use in Teaching and Learning in the Special Primary Schools of Learners with Visual Impairments

Julia Jelagat Keitany[1], Jessina Muthee[2], Samsom Rosina Ondigi[3]

[1]PhD candidate at Kenyatta University.

[2]Lecture at the Department of Early Childhood and Special Needs Education, Kenyatta University.

[3] Executive Dean School of Education, Kenyatta University.

ABSTRACT: Information communication Technology (ICT)has become the most suitable tool for learners with different learning demands exercise their rights to education. Information Communication Technology literacy has enhanced teaching and learning through its dynamics, interactive and engaging content and opportunities for individualized instruction. However, given the role that ICT plays in instruction, the level and nature of ICT use by learners with visual challenges in Kenya should be looked into. The findings are significant for it would help the policymakers as they will be able to come up with effective policies that will aid in the provision, planning and use of ICTs in schools of learners with visual impairment. The objective of the study was to determine the level and nature of ICT use in teaching and learning in the special primary schools of learners with visual impairments in Kenya. The survey adopted descriptive survey research design. The study targeted seven public special schools for visually impaired learners and 1667 learners. The study sampled three schools situated in different counties in the country; Kiambu county, Meru county and Mombasa county. Judgemental sampling technique, stratified random sampling and simple random sampling were used to draw samples. The sample consisted of three primary schools for learners with visual impairments, 168 learners and 18 class teachers. Data collection instrument was observation schedule. Content validity was determined by seeking expert review. The instruments were submitted to experts iteratively for consideration and their suggestions in different items were used to refine them increase validity. The Cronbach Alpha formula was employed to compute the reliability of the instruments. A reliability coefficient of 0.72 was used to judge the reliability of the instruments. Qualitative data was analysed using descriptive statistics. The study found that ICT enjoyed full support from learners with visual impairments and teachers in class. It was seen as an essential tool for teaching and learning in special schools for the learners with visual impairment. However, the use of ICT in teaching and learning was not effective. Both the teachers and learners' ICT skills were low and the schools were not well equipped with quality ICT resources. The study recommended that schools be equipped with modern technologies and teachers be trained on the use of ICT in teaching learners with visual challenges.

KEYWORDS: ICT levels; ICT utilization; teaching; learning; visual impairment; special schools.

I. INTRODUCTION

The rapid development and adoption of technology has fundamentally changed almost every aspect of life. Research world over has proved that one of the greatest remedies to the problem of access to quality education for learners with VI is the use of ICT in pedagogy. UNESCO (2006) construes that ICT has become the most suitable tool which can help people with different learning challenges exercise their right to education, employment, social life, leisure, access to information and democratic channels. Information communication and Technology literacy has enhanced teaching and learning through its dynamic, interactive and engaging content and has provided real opportunities for individualized instruction. Despite the availability of a growing number of technology and sophisticated assistive devices that provide alternative formats to support the learning of learners with VI, there are numerous challenges in when to use ICT tools in special schools for learners with VI in Kenya.

Studies by Shiue (2007), in Taiwan found out that teachers' ICT integration in the teaching-learning process was largely determined by teachers' skills in using technology. Buabeng (2012) in Ghana revealed that effective adoption and integration of ICT into teaching in schools depends mainly on the availability and accessibility of ICT infrastructures and resources such as hardware and software. Study by Ngwu (2014) in Nigeria found that there were enough ICT resources but the use of it in teaching and learning was below expectation. Research by Namibia Training Authority (2006) in Namibia indicated that there are barriers to the integration of ICT in inclusive settings. These barriers included attitudinal, administrative, architectural, programmatic and training

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of facilitators.

East African region also suffer from ineffective use of ICT forlearners with disabilities. A study by Sabomana (2017) in Rwanda revealed that the level of integration of ICT in teachingand learning science in lower public primary schools was low.It was found that the minimal use of ICT was influenced by inadequate ICT abilities among the majority of science teachersand inadequate resources in most primary schools. A study carried out in Kenya by Makanda (2015) on the use of ICT in teaching found that teachers though had a positive attitude towards the use of ICT, barriers such as inadequate skills to integrate the technology in their teaching were a problem. Alma (2014) in his study construed that ICT integration in classroom instruction in Kenya is constrained due to lack of adequate training and refresher courses for teachers, inadequate resources and inadequate support from technicians andadministration. Biwot (2012) cited determinants of ICT accessin schools as the capability of the implementers that is teachers,head teachers and education officers; availability of materials and resources, positive attitudes of teachers and learners, existing school set up and supportive management.

There are a number of causes for lack of access to technologyaccording to several research reports. According to Rasheed etal (2020) study, he found out that teachers grumble about howchallenging it was to always have access to computers inschool. The authors cited factors such as the fact that computershad to be reserved in advance and the teachers would forget todo so, or they could reserve them for multiple periods in a rowwhen they wished to work on several projects with the learners.Eligi and Mwatinwa (2017) construed that ICT resources are not always inaccessible because the school does not have the necessary hardware, software or other ICT materials it could also be the result of several other factors including lack of personal access for teachers, inadequate resources organization, low quality hardware, improper software or defective hardware (Becta 2004).

The difficulties of making new technology accessible to teachers are numerous and vary from nation to nation. According to Almanthari et al (2020), there are infrastructure constrains in schools, such as the lack of broadband connectivity. The findings indicate that only one-third of European schools have access to broadband internet. Accordingto Gharifekr et al. 2016, there are several factors that prevent the successful adoption of ICT in Turkish schools, including the lack of computers, outdated or slow ICT systems and lack of educational software. Studies by Renukadevi et al (2018) onthe factors influencing the effective use of ICT in education andlearning, found that poor connectivity; self-enthusiasm; required extra time, incentive to integrate ICT tools in teachingcertain ICT software is difficult to learn and use are the most significant factors.

Kisanga and Kisanga (2021) findings on the availability of assistive technology for students with visual impairment at higher education institutions in Tanzania revealed that theavailability of assistive technology (AT) and the user's technical proficiency are key factors in a students use of it. Mugo (2013) points out that by nature blindness presents obstacles that might greatly affect access to quality education for instances understanding of information and application of the lessons derived from the information require a fully derivedcognitive ability unfortunately most learners with visual impairments are faced by major cognitive problems.

II. STATEMENT OF THE PROBLEM)

The access and use of ICT in pedagogy is currently high. The impact of ICT use in education sector world over is positive. Kenya has made considerable effort to make schools accessibleto all groups of learners including those with visual challenges.To ensure quality education for all, the government has given support and put emphasis in the use of ICT in all schools at alllevels including special schools. Moreover, legislations such asthe Kenya constitution (2010), Persons with Disabilities Act (2003) and the Special Needs Education Policy (2009) has resolved in improving the quality of education for learners withdisability. However, research has shown that these learners stilllag behind their sighted peers in education and this has generated numerous questions with respect what could be doneto help the learners compete equally with their peers. Basing onthe fact that ICT plays a great role in the education of these learners, access of ICT in the schools could play a vital role inhelping the learners to acquire quality education. In view of this gap, it was thought worthwhile to undertake this study with theview to determine the access and use of ICT in schools of learners with VI.

III. METHODOLOGY

The study aimed to determine the level and nature of use of ICTs in teaching and learning in special primary schools for learners with visual impairments. The study adopted descriptive survey design. A descriptive survey research designwas appropriate for the study since it describes systematically the facts and characteristics of a given population or area of interest, factually and accurately. According to Mugenda and Mugenda (1999), descriptive study is probably the best methodfor social scientists and educators who are interested in collecting original data for describing a population. The surveyapproach was used to assess thought, feelings and opinions of the respondents concerning the access and use of ICT in the instruction of learners with visual challenges. The study targeted seven special primary schools, of learners with visual impairment; 1667 learners with visual

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impairment; 7 computerteachers; seven head teachers and 7 Ministry of education officers. These schools were targeted because they had population enough for the study and also had established computer laboratories which offer the learners with visual impairment with ICTs facilities and other assistive technologies. The target population in this study was the learners with visual impairment, class teachers, computer teachers, head teachers and ministry of education officers. The learners with visual impairment were the key respondents of thestudy. This was to gain deeper insights on the level and natureof usage of ICTs facilities. Computer teachers are special teachers who are trained to assist learners with visual impairment on to use the adapted computers. Three public schools for the visually challenged constituted the sample population for the study. Judgmental sampling technique whichis a non-probability technique, was used to select the schools. Three schools situated in different counties in the country, Kiambu County, Meru county and Mombasa county were sampled. This constituted 43% of the target population. Out of 1667 targeted population of 168 (10%) of the learners were selected as participants in the study. 18 teachers out of 161 (11%), 3 head teachers out of 7 schools which made (43%), acted as study respondents. Three computer teachers from the three selected schools (43%) were selected for the study Finally, the three Ministry of education representatives (43%) one from each area the selected schools were geographically situated were picked as respondents for the study.

Table below shows the sample frame

Table 1: Sample Frame

Category of Respondents	Target population(N)	mple(n)	entage(%)
Special schools	7	3	43
Learners with VI	1,667	168	10
Class teachers	161	18	11
Computer teachers	7	3	43
Head teachers	7	3	43
Ministry of Education officers	7	3	43
Total	**1,849**	**195**	**10.5**

IV. ANALYSIS AND DISCUSSION

The objective of this research was to determine the extent of access and use of ICT by learners with visual impairment in special schools. To achieve this objective, it was important forthe researcher to find out the demographic information about the learners and the teachers, the resources available in the schools and the use or how teachers utilize ICT in the classrooms

A. Demographic Data of the Learners

Learners with visual problems could be divided into two majorgroups; those who are blind and those with visual impairmentsor challenges. These two categories apparently access ICT differently (Mugo) 2013). This research hence first categorizedthe learners in gender and went further to establish the extent towhich the learners were affected in terms of vision. The following Table presents the categories of the leaners in terms of gender and category of vision.

Table 2: Demographic Information of the Learners

Category of Learners	Male	Female	Total
Blind	40 (24%)	73 (43%)	113 (67%)
Low Vision	34 (20 %)	21 (13 %)	55 (33%)
Total	**74 (44%)**	**94 (56%)**	**168 (100%)**

Table 4 shows that more than half of the learners in the study were females. Most of the learners are blind and almost half ofthe blind learners in the sample were females. Slightly more than half of the learners in the sample were in the category of low vision. Most of the low vision learners are males. It was Imperative to consider gender issue in this research demographic data since this influence the way in which research recommendation and suggestion implementation strategy works. In essence, it makes it clear the implementationfor whom, under what circumstances and why (EIGE, 2019).

B. Demographic Information of the Teachers

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Table 3: Demographic Information of the Teachers (N=18)

Demographic Information		F	%
Gender	Male	8	44
	Female	10	56
Ages (Years)	20-30	1	6
	31-40	2	11
	41-50	7	39
	51-60	6	33
	Beyond 60	1	6
	Non commital	1	6
Experience in teaching VI	1-5 yrs	-	00.0
	6-10 yrs	3	17
	11-15 yrs	6	33
	16-20 yrs	4	22
	20 yrs & Over	5	28
Highest academic qualification	KCSE/ KCE	11	61
	B. Ed	5	28
	Post graduate	1	6
	Noncommittal	1	6
hest professionalqualification	P1	3	17
	Diploma	8	44

	B.Ed	5	28
	Masters	1	6
	Noncommittal	1	6

Slightly more than a quarter were between 51 and 60 years of age. Those who were between 31 and 40 were less than a quarter. One teacher fell below 30 years and another one was 60 beyond years. The teachers had different experiences in teaching learner with visual challenges. Majority of the teachers had taught for 11 to 15 years, more than a quarter hadtaught for over 20 years while about a quarter had taught for between 16 to 20 years. All the teachers had taught for more than five years. The Table further reveals that majority of the teachers had diploma and slightly less than a quarter had bachelor degree in education. This shows that apart from the teaching experience, these teachers had good academic qualification. Indeed, those who had done diploma had perusedit at the Kenya Institute of Special Education (KISE). This clearly tell that the teachers were trained and had substantial experience in teaching the leaners who are visually challengedand hence could make concrete contribution to this study.

Table 4: ICT resources Available in the Schools for VI

Type of AT	Number of items		atio of functional items to number of leaners
	Functional	Non functional	
Ipods and ipads	6	-	6:1667
Computers with voice output software	52	-	52:1667
Enhanced Vision Systems Cameras	2	-	2:1667
Talking calculators	32	-	32:1667
Embossers	3	-	3:1667
Scanners	3	-	3:1667
Braille sense	1	-	1:1667
CCTVs	6	-	6:1667
Smartphones	68	-	68:1667
Tablets	30	-	30:1667
JAWS (Screen reader software)	6	-	6:1667
NVDA (screen reader software)	Free online	-	1667
Audio recorders	6		6:1667

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Electronic books	36	36:1667
Compacts Discs	8	8:1667

From Table 2 it is evident that the schools have a variety of modern ICT resources, which could be helpful in accessing quality education for the learners. For instance, IPods and ipads (6) have many built in functions that help improve productivities and academic performance for these leaners. Leibs (1999) observed that the learners using these devices could also browse the web, chart, send and receive emails and so on. Braille sense though it was only one in the three schoolsthat were sampled for the study offers the ability to perform various tasks simultaneously. This device provides all the functionality of a laptop computer, including WiFi, MSN chat,and document processing, and so on. Braille embosser technology (3) enhances the production of braille in terms of production of many copies of braille documents. It was observed that the embossers were used to create tactile graphicsand also to make copies of braille texts in the schools. (Johnson,2004). In a relative study, Zaid (2018) supports this finding when he identified Computer, Video Conferencing, Internet, and World Wide Web as the top ICT facilities that are helpful in learning for the visually impaired. Also crucial is the use of various AT tools for visually challenged pupils, including screen readers, Braille translation software, Braille writinginstruments, closed-circuit television (CCTV), Braille embossers, and scanners.

Print enlarging technology including the enhanced vision system camera (2) enables magnification of very small print for easy reading. In addition, available was CCTV (6) enables the students to read print text easily. The screen readers which included the Jaws (6), and the NVDA allows the challenged users to interact independently and efficiently with the computer. Some of this software for example the Jaws and the NVDA have features that enable enlargement of print text on the computer screen for easy reading. The special scanner (1) is used to scan texts with small font and change the image to digital form which can be enlarged and even converted into braille (Mugo, 2013). According to Simui et al. (2017) assistive technologies can help visually impaired students all over the world learn by facilitating information access and retrieval, contacting friends, and knowledge sharing just like sighted individuals do. ICT is essential for promoting the participation of the blind, especiallyin educational activities. In fact, ICTs can aid in exceptional ways to reduce and even eliminate the feeling of prejudice andopen access to knowledge. ICT is typically utilized as a tool toenhance efficacy and efficiency in several socio-economic spheres, including education, hence raising quality of life.

Further, Table 2 presents the rations, which indicates whether ICT available in the schools met the demand of the users. Looking at the ratios, one would tell that only those technologies that were multi users for instance audio recorders (6:1667) would efficiently serve the three schools. However, it was noted that one of the schools had only one while another had three. The NVDA software was free online and hence the schools could access it with ease. The scanners (3) and the embossers (3) would also be used to serve many users at the same time. Smartphones from the ratios appears to be many but these belonged to individual teachers and therefore the learners would only access them when their teachers used them in the classroom. According to Kisanga and Kisanga (2020), assistive technologies benefit people with visual impairment by making electronic resourcesand tests more accessible, improving the reliability of students'work, expanding employment options, and decreasing overdependence. Additionally, assistive technology including audio recorders help people with vision impairment manage their academic and social obligations as well as direct their career paths. In the field of education, scanners (3) and the embossers provides instructors with cutting-edge resources to assist students with VI and other special needs in overcoming obstacles to their teaching and learning (Tom et al., 2018).

From the ratios presented in Table 2, it was clear that the resources were not enough in the schools. Scarcity of ICT resources in schools is a common thing especially in the developing countries. ETD (2012) postulates that a very small number of leaners with disabilities get access to adaptivetechnology in the developing countries. This problem is not unique in the developing countries. Studies in the developed countries including USA have also shown that these learners suffer from the same problem (ACAMPESD, 2011: Mugo 2013). The cost especially for special ICT is intimidating. According to Hasselbring (2000), the special Technology ranges between 700 to 2000 US dollars. This means that the ICT resources are not easily affordable especially by the students and even the schools in the developing countries. Scarcity of the of ICT resource possess a serious challenge to the access of quality education for the learners living with visual impairment. Accessing the ICT resources in the schools of learners with VI is crucial because it will inform the researcher on how to approach other objectives. The availability of resources in the schools means that learners and teachers are expected to use them during teaching and learning and if not the research is to find out why they are not utilized.

C. Class Observation

Classroom observation was to ascertain the level of use and access of ICT in class during pedagogy. The information gathered by

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the research included, how often the teachers used these resources and the degree of preference, comfort and ability in teaching using the ICT tools. In this context, this research established how the learning with ICT took place in the classrooms. The head of the departments who included head of mathematics, head of sciences head of languages and head of humanities (4 teachers) from each school were followed in the classroom for at least three times each. This made a total observation of 36 lessons. The connotation here is that in order to benefit from the impact of the role played by ICT in education, one's ability and style to navigate and explore through ICT is critical. The word access here could hence be viewed in two perspectives; one the right or opportunity to have; that is acquisition of these tools and two the ability and approach to use.

Classroom observation was done based on the instructional strategies and what the strategies supported to enable the learners' long-life learning and that which influence acquisition of skills and values that would help the learners fit in the current dynamic trends of life and education of the 21st century.

Table 5: Use of ICT in the Classroom of Learners with Special Needs

Strategy	Support	Lessons observed	Percentages
Student motivation	Principles, attitude etc.	2	6%
Developing creativity	Brain sketching, concept mapping, roleplay, case studies etc.	1	3%
Evoking prior knowledge	Concept mapping, charts, graphics organizing, anticipatory guiding etc.	3	8%
Development of different skills	Problem solving, research, communication etc.	7	19%
Supporting Process	Interpreting, organizing, logical thinking, reasoning, etc.	3	8%
Total		16	44%

According to findings in Table 5, it is clear that ICT was used in supporting learning in very few lessons (16) out of the 36 lessons that were observed. It was in only two lessons that the teachers used ICT to motivate learners. It was in only one lesson where the teacher endeavoured to develop creativity in the learners. Making learners creative is one of the core aspects of the 21st century and ICT plays a great role in enhancing this. It was in three lessons out of the 36 observed that the teachers tried to capture the leaner's previous knowledge with ICT. Prior knowledge helps the learner in understanding the new concepts and in constructing new knowledge (Hoque, 2016). Development of different skills in the learners with special need is a vital thing in their education. However, from the 36 lessons observed it was only in seven that the teachers endeavoured to develop various skills in the learners. It was in only three lessons ICT tools were used to develop process for instance interpreting, logical thinking, reasoning and so on. According to Mugo (2013), in such a situation where there is scarcity of ICT resources and lack of relevant and effective training, creativity is a priority on the part of the user. Botelho(2012) construed that what can really help in such a situation is the ICT strategy not devices. In consideration of this, and based on the data in Table 2, one would construe that the ICT was not well employed to ensure access to quality education for the learners with special needs. According to the statistics of the World Health Organization, just persons with impairments, especially students, have limited access to ICT (WHO, 2016). In most of the classes, it was observed that the teachers orally systematically explained the lesson concepts and then dictated notes to the learners. In other words, the teachers put little effort to actively involve the learners in the lessons where the learners could get the opportunity to learn with the ICT in an enabling learning environment.

Normally, the special ICT should be used to support learning in all academic areas (Mugo 2013; Wiazowski, 2009). Accordingly, the use of ICT with special needs learners should influence their psychological, intellectual, social and cultural conditions exposed to them. In the 21st century what matters most is what a learner can do with the knowledge he or she has acquired not how much of the knowledge the learner has accumulated (Botelbo, 2012). It means the leaners did not effectively access the ICT resources and therefore did not have access to quality education. This is contrary to the developed countries where the ICT has helped the leaners to access quality education.

According to Hassellbring and Glaser (2000) ICT especially in developed countries has enhanced the visually challenged leaners participation in teaching and learning and has helped them to become independent and competitive learners. Further, findings by UNESCO (2006), attest to the fact that ICT offers a potential support to lifelong learning for all groups of students, including those who have special educational needs and had made learners develop greater pride in their work and tasks are completed on time. Also, Fu, (2013), construed that ICT offers more opportunities in developing critical higher- order thinking skills in the learners. ICT

also offered diversity in the teaching methods applied by teachers encompassing all learners.

V. CONCLUSION

The study found out that ICT was used in supporting learning in very few lessons. 16 out of 36 lessons that were observed. The study therefore concluded that the teachers put little effortto actively involving the learners in the lessons where the learners could get the opportunity to learn with ICT in the enabling environment. Despite the fact that the resources werelimited, the few available were not utilized by the teachers in class during lessons.

VI. RECOMMENDATION

The study recommends that a vigorous training on the use of ICT resources and other assistive technologies should be conducted early enough for the learners with visual impairmentin order for them to reap full benefit of these technologies in their education. The government through the ministry of education should ensure that these are available, adequate and In functional status. ICT and other assistive technologies for thevisually impaired in the schools.

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