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## Performance of Learners with Visual Impairment in Summative Evaluation in Special Schools in Kenya

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**Abstract-** Vision is the most crucial sense among the five senses. Almost 80 percent of all learning is achieved through the visual channel. Good vision is therefore paramount for learners to reach their academic potential. Lack of it can negatively affect how a learner performs in examinations. Available studies have looked at the performance of learners with visual impairment in specific subjects. The aim of the study was therefore to explore the general performance of learners with visual impairment in summative evaluation in special schools in Kenya. A survey design with qualitative research method was adopted. Examination results from four special schools for learners with visual impairment were analyzed and in addition, a questionnaire was used to solicit more information from teachers who taught the classes under study. Descriptive statistics were used to analyze data and findings were presented in tables and percentages. Findings indicated that; learners with visual impairment generally performed poorly in examinations. Mathematics and sciences were the worst done at secondary school level where as Kiswahili and Social studies were the two worst performed at primary school level.

**Keywords:** *visual impairment, summative evaluation, braille, KICD, KCPE, KCSE, KNEC, NACOSTI.*

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## 1. INTRODUCTION

Education is accepted all over the world as the core of national development and a major factor in the utilization of human resources to the fullest. Education is important in that it does not only help people to improve their lives but also makes them self-independent, in addition to acting as a platform to prove the equity by defeating all barriers, including those imposed by disability. Education is the best investment for the people because well educated people have more opportunities to get a job which gives them satisfaction. Egunyomi (2006) observed that Education is universally recognized as the main key to sustainable development and helps in improving human welfare. Through education, individuals, including those with disability, gain strength of mind and opportunity to be

independent, so education is not a preserve of individuals without disabilities alone. Thus, education would enable a person with disability to transform from life of complete isolation and social neglect to emerge as self-supporting, economically independent and useful member of the society.

All learning takes place through the five sensory channels. Among the sense organs, the eye is considered a very important sensory organ which accounts for a large fraction of total information available. Vision and learning are very closely related. Experts agree that about 80% of what children learn in school is information presented through vision. Therefore, good vision is paramount for learners to reach their full academic potential. Loss of vision is likely to impact negatively on a student's educational achievement. Owing to this, intervention becomes very handy to ensure that learners with loss of vision are not disadvantaged in their education. Early intervention is the first step towards making it possible for children with visual impairment to have equal opportunities with their sighted peers. Failure to give early intervention services to these children may lead to their developmental vulnerabilities in motor, cognitive, language, social and also attention domains including the risk of developmental setback. One of the intervention strategies is availing the relevant communication medium to these students which in this case is Braille. Braille is a tactile system of reading and writing used by persons with visual impairment. Braille entails use of raised dots as shown in figure 1. The dots are used to form different combinations which represent words and other signs which are read through touch by persons with visual impairment or through sight by those with vision.

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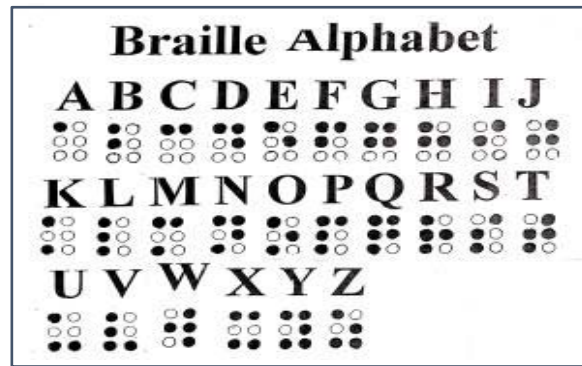


Figure 1: English Braille Alphabets

It is through Braille that learners with visual impairment interact with their academic work including sitting for their examinations. Most children with visual impairment require extra support in order for them to succeed in school. This is in an attempt to establish a level ground with their peers who have vision. Despite the overwhelming evidence about the importance of early intervention for learners with visual impairment, such services are not available in African countries; instead, children with visual impairment are admitted to school with no additional support or service. This is likely to cause some limitations in their learning and yet they are later subjected to the same examinations with their sighted counterparts.

In Botswana, a study by Habulezi and Kefilwe (2017) found that students with visual impairment in senior secondary schools performed dismally in science subjects. Out of the 8 students with visual impairment who sat the examination in the year 2014, in the school under study, only 2 (25%) passed. The remaining 6 (75%) failed. In the following year, 2015, 11 students with visual impairment sat the examination and out of the 11, only 1 (9%) passed. The remaining (91%) failed. In the year 2016, out of the 9 students with visual impairment who sat the examination, none passed in science subjects. All the 9 (100%) failed.

In the Kenyan context, a study by Bisi (2013) indicated that performance of students with visual impairment in Kiswahili in the three colleges that offer Primary Teacher Education and admit students with visual impairment (Asumbi, Machakos and Mosoriot Teachers colleges) was very low. Out of the 17 students with visual impairment who sat the PTE Examination in the three colleges in 2009, 7 (41%) failed, in 2010, 13 (44%) out of the 26 students failed and in 2011, 13 (44%) students out of the 29 who sat Kiswahili that year failed (KNEC, 2012). No study is available to show the performance of these students in the other subjects offered in the Primary Teacher Education or their general performance at primary and secondary school levels of education and yet their mode of learning and sitting examinations is quite different from that of their sighted peers.

Summative evaluations in education in this case are assessments that are used to evaluate students' learning at the conclusion of a defined instructional period. Students' learning is compared against some benchmark or standard with an aim of assessing what they have learned. The evaluation focuses on the outcome of a programme. These evaluations are generally evaluative rather than diagnostic (Abbott, 2014). Saima and Qadir (2011) further observed that examinations are useful as they measure a student's progress towards predetermined objectives. Learners are subjected to evaluation through examinations at various stages of their learning.

In Kenya, learners are subjected to summative evaluation after eight years of primary education and four years secondary education and also at tertiary level. The Kenya National Examination Council (KNEC) is the main examining body in Kenya. KNEC controls examinations, ensuring their validity and reliability, and also ensuring conformity to Kenya's goals and changes in Government policy relating to the curriculum and examinations (KNEC, 2013). The two main examinations controlled by KNEC are the Kenya Certificate of Primary Education (KCPE) and the Kenya Certificate of Secondary Education (KCSE).

The Kenya National Examination Council is mandated to prepare the examination papers for candidates who are blind in Braille. In order for learners with special needs in education to benefit from the education system in Kenya, KNEC has found various ways and means in which assessment for these learners can be made more adaptable to their needs through differentiation, adaptation and modification of its examination and examination management. The examinations are norm referenced. The Kenya National Examination Council develops or adapts examinations using the adapted curriculum by the Kenya Institute of Curriculum Development (KICD). Where such curriculum does not exist, the learners are left to fit within the regular curriculum. Candidates with visual impairments take the regular examinations but in Braille for those who are blind and large print for those with low vision. Differentiation is made in adaptations which are made in

certain questions that require sight e.g., in Mathematics, Biology, Geography and Home science. Certification requirements are also waived for candidates who are blind by exempting them from taking a second science subject which is a requirement for other candidates. On time allocation, an extra thirty minutes is given in all subjects.

In Kenya Certificate of Secondary Education Examination, map reading and diagrams used in Geography use symbols with texture which is felt by touch to enable the learners with visual impairment arrive at correct interpretation (KNEC, 2013). The council has a grading system that it uses in measuring the performance in KCPE and KCSE examinations by candidates. In KCSE, the grading is as follows (grades are from A –E in a strength scale of 12 down to 1 point respectively). A (80% and above), A-(75 -79), B+(70-74), B (65-69), B-(60-64), C+(55-59), C (50-54), C-(45-49), D+(40-44), D (35-39), D-(30-34) and E (0-29). The grading applies both for the subjects' performance and the learners' mean grade (KNEC, 2013). Examinations offered by KNEC are terminal, summative and their main purpose is for selection, placement and certification.

## II. PERFORMANCE OF LEARNERS WITH VISUAL IMPAIRMENT IN MATHEMATICS AND SCIENCE SUBJECTS

Fraser and Maguvhe (2008) observed that conceptual development and abstract thinking for learners with visual impairment may be delayed due to the absence of graphical stimulus or imageries. Therefore, since greater parts of science representations are visual, learners with visual impairment frequently face educational challenges. This is likely to be due to the fact that some teachers lack appropriate teaching and learning strategies for learners with visual impairment. Kapperman and Sticken (2004) observed that many people with visual impairment encounter challenges in performing mathematical operations in real-life situations mostly due to the visual nature of

mathematics. In addition, delay in development of concepts which are needed in understanding mathematics and also lack of the required knowledge by teachers to be able to teach learners with visual impairment contributed to poor performance in mathematics. According to Clamp (2003), learners with visual impairment are usually slower in acquiring knowledge in mathematics than their sighted colleagues. This could be due to lack of visual stimulation in natural mathematics and also the limiting effects of visual impairment on cognitive function, in addition to the underdevelopment of specific mathematical concepts.

In support of this, Kalra, Lauwers, Dewey, Stepleton & Dias, (2009) and Maguvhe (2005) observed that science and mathematics education was less accessible to learners with visual impairment as compared to those with vision. They attributed this to the fact that many concepts in science and mathematics were presented graphically and there were also a number of concepts which could not be explored through touch thus disadvantaging the learners who used touch. Habulezi, Kefilwe, Batsalelwang and Malatsi, (2017) carried out a study on factors influencing the poor academic performance of learners with visual impairment in Science subjects in a senior secondary school in Botswana. The study embraced qualitative research design and used purposeful sampling. They sampled 14 learners and 5 teachers for the study and used interviews, observation and document analysis for data collection. They explored results of students with visual impairment in science from the year 2010 through 2016. They found that the performance of learners with visual impairment in science subjects was far below average. Not a single year recorded 50% pass. The best performance was recorded in 2010 and 2013 where percentage pass was at 33%. The other years ranged from 25% down to 0% pass recorded in the year 2016 where all the 9 students who sat the examination failed in science as presented in table 1.

*Table 1:* Performance of learners who used Braille in Science Subjects

Year	No of learners who sat Examination	No passed	No failed	Pass %	Fail %
2016	9	0	9	0	100
2015	11	1	10	9	91
2014	8	2	6	25	75
2013	6	2	4	33	67
2012	5	1	4	17	83
2011	4	1	3	25	75
2010	3	1	2	33	67

Source: Special Education Dept, 2017 in Habulezi, Kefilwe & Malatsi (2017)

Habulezi et al. concluded that performance of learners with visual impairment in science was influenced by deficient pedagogical practices, insufficient teaching and learning materials and also

shortage of specialized teachers of science. In partial support of these findings, (Beck-Winchatz & Riccobona, 2008; Moreland, 2015) noted that majority of teachers face difficulties when teaching learners with visual

impairment because they have little experience. In addition, these teachers usually have rigid views regarding the abilities of the learners.

These teachers give their students the impression that science subjects are inaccessible due to their absence of vision Maguvhe (2013), while the actual problem is that teachers themselves lacked adequate direct experience in teaching learners with visual impairment (Sahin & Yorek, 2009). Some teachers doubt whether their learners have the capacity to do well in science. However, Kumar, Ramasamy, and Stefanich (2001) asserted that learners with visual impairment have the same cognitive ability just like their sighted counterparts. In order for them to perform on the same level, learners with visual impairment only need appropriate accommodations. In addition, there is availability of necessary technologies that can be utilized to support learners with visual impairment in their science and mathematics education (Sahin & Yorek, 2009). On pedagogical practices, Mwakyeya (2013) also noted that when teachers fail to use teaching methods properly and lack the skills and abilities to work with learners with visual impairment, the learners are disadvantaged as they face numerous challenges in acquisition of education. It was further observed that teachers of learners with visual impairment were not well trained in the use of Braille materials and also in the preparation of tactile diagrams and maps. There also seemed to be a large gap between teachers' perspectives on what learners with visual impairment could do and the availability of resources to support them achieve their full potential.

Still on the teaching of science and mathematics, Maguvhe (2013) carried out a study aimed at exploring the role of the teacher in promoting the participation of learners with visual impairment in mathematics and science subjects in South Africa. He embraced a case – focused – study of an individual respondent who had unique characteristics of interest to the researcher. The individual was a technician with visual impairment who drew from his own experiences. A semi structured face – to – face interview was used for data collection. The participant felt that teachers were the primary resource in teaching mathematics and science subjects and therefore they should be well equipped with knowledge, skills, attitudes and values to make them inspire and stimulate learners' interest in sciences. Sahin and Yorek (2009) felt that learners with visual impairment regarded science as a challenging subject due to its abstract concepts and yet the subject depended mostly on visual instruction. The researchers over emphasized the fact that learners with visual impairment needed to rely on their other senses such as touch and auditory in their learning process. Maguvhe (2013) further noted that teachers lacked motivation and mentorship in mathematics and science in addition to deficiency in methodologies and abilities to use tools in order to empower their learners. Generally, teachers

lacked the necessary skills in special education to support learners in realizing their potential in mathematics and science.

Under normal circumstance, science and mathematics education is easily accessed by learners with sight while those with visual impairment experience a myriad of challenges in accessing the subjects owing to the fact that most of the concepts are presented in graphics. In addition, there are many concepts which are difficult to explore by touch and are therefore presented through visual observation (Kalra et al., 2009). Sahin and Yorek (2009) observed that in situations where resources have been modified for learners with visual impairment, and the relevant information put across in formats that these learners are able to access, then they perform competitively with their sighted peers. They therefore concluded that learners with visual impairment performed minimally in science due to lack of appropriate access to technologies as opposed to their psychological incapacity. However, Maguvhe (2013) was of a different opinion where he asserted that teachers lacked the proper training to enable them teach learners with visual impairment. This finding is supported by Sahin and Yorek (2009) who asserted that many teachers lack experience in teaching learners with visual impairment in addition to scarcity of resources. Further, Catholic Education Office Canberra (2011) observed that most teachers lack confidence in understanding assessment procedures of learners with visual impairment.

Malik, Ngban and Ibu (2009) described mathematics as a subject that affects all facets of human life in many ways. However, that notwithstanding, students' performance in mathematics has not ameliorated significantly despite its importance, not even with the introduction and use of technology. In developing countries, the situation might be quite different. For instance, in Nigeria, mathematics has not shown any significant improvement even after the government confirming its importance and making it a core and compulsory subject both at junior and senior secondary levels (Federal Republic of Nigeria, 2004). In developed countries, unlike the developing, schooling resources which may include reduced class sizes, higher teacher salaries, modern equipment and other structures are associated with better student outcomes. On several accounts, mathematics teachers have been judged as the central determinant in the way students perform in mathematics. According to Idowu (2015) teachers are very crucial to the good performance of their students since they are expected to possess the required knowledge important for teaching. In addition, teachers ought to have the ability to impart the knowledge in a way that it results to learning. Soer (2009) added that teachers of mathematics should be in position of communicating the required knowledge in unambiguous, informative and accurate manner to their

students. Unfortunately, this is not being done by the teachers for mathematics according to Okafor and Anaduaka (2013) who argued that most teachers are not ready to do anything extra in their teaching.

Olalekan (2016) conducted a study in Nigeria on performance of high school students in mathematics. The study embraced use of descriptive survey with a designed questionnaire for data collection. A sample of 287 students was randomly selected from two rural secondary schools and subjected to the questionnaire. The findings indicated that overpopulated schools with large classes, unqualified teachers and undesirable spending by the government were the main factors contributing to the poor performance. Partly supporting these findings was Avong (2013) whose study concluded that lack of qualified mathematics teachers was the single most cause of poor performance in mathematics.

In their study Osunde and Izerbigie (2006) cited teachers' attitude as another aspect contributing to students' poor performance in mathematics. Overcrowded schools with large classes of student - teacher ratio of up to 100:1 is likely to compromise the teaching and learning of mathematics (Umameh, 2011). Sahin and Yorek (2009) in their Turkey study further asserted that it was difficult for teachers who are not specialists to impart the subject matter effectively to learners with visual impairment; it was difficult to achieve maximum participation. Fraser and Maguvhe (2008) argued that learners with visual impairment found it difficult to pursue mathematics and science due to the unavailability of resources in addition to teachers who had problems in imparting the subject matter to their students. So, it is paramount for teachers to have enough knowledge on how their students learn mathematics and the best ways of teaching it (Ruth, Linda, Alethea, Nikole, and Stelios, (2009).

A study by Miheso (2012) in Nairobi County, Kenya examined factors affecting mathematics performance among secondary school students. The study involved a sample of 570 form two students from ten randomly selected secondary schools. Through use of questionnaires, checklists, achievement tests and interviews, the study found that variation in performance in mathematics was significantly influenced by the type of teaching method embraced. There seemed to exist a direct relationship between the learning environment and poor performance. Text book-student ratio was also another factor that affected performance. However, there was no significant difference in performance when the ratio of text books to learners was 1:2 and below. A ratio of 1:3 and beyond seemed to have a negative impact on performance (Miheso, 2012). Another study by Mwangi (2014) on pedagogical challenges which faced teachers of learners with visual impairment at Thika Primary School for the blind established that learners with visual impairment performed minimally in

mathematics in Kenya. The study used descriptive survey design to collect data from both the teachers and the learners. In this study, teachers agreed that mathematics topics were the most difficult to teach to learners with visual impairment. Topics such as measurement, geometry, multiplication and division were identified as the most challenging. On time, about 74% of the teachers felt that the time allocated for both teaching and assessment of learners with visual impairment was not adequate. The study further established that learners with visual impairment were slow in acquiring computational skills and some had challenges in using resources such as the abacus in mathematical computations (Mwangi, 2014).

### III. PERFORMANCE OF LEARNERS WITH VISUAL IMPAIRMENT IN LANGUAGES

The sense of vision is very important in providing information on non-verbal communication in addition to providing meaning to language. The role played by language in learning is very crucial. Being handicapped in the language of instruction for any learner would most probably mean no learning takes place since there won't be any communication between the teacher and the learner (Malekela, 2003). To help learners with visual impairment to improve on their use of language, it is important that they are provided with many hands - on experiences with real objects together with auditory labels paired with descriptions and a rich literacy environment (Carmen, 2019). Kapoli (2001) asserted that learning materials help the learner to make exploration of the language used in day-to-day life which is related to their interests and needs. Still on the issue of teaching/learning materials, Nyamubi (2003) postulated that materials make learning more gratifying to the learner by stimulating their imagination and making learning more real. Tangible foundation for abstract thought is extended by learning materials giving more meaning to word responses.

The early years are typically the time when language develops greatly since this is the time when children begin connecting verbal labels and identifying objects. Unfortunately, for children with visual impairment, this opportunity of casually observing and making connections with gestures and materials in their environment is not there. This can only be achieved if the learner with visual impairment is intentionally taught through direct experiences accompanied with language. If this is not done, language development in learners with visual impairment will be undoubtedly delayed. Carmen (2019) cited a number of language problems likely to be found among learners with visual impairment. These are, verbalism; this is where a learner talks about people, objects and events without understanding the concepts at all. This is mostly due to the fact that they have heard people talking about the

topics but had no experiences related to the topics themselves. Unless learners with visual impairment are provided with various hands – on experiences then they will definitely experience difficulties understanding the concepts and will have no foundation to build upon. Ramakrishnan (2013) asserted that excessive dependence on verbal learning impacts negatively on both academic learning and also personality development. Ramakrishnan further noted that the absence of vision not only influences but also delays the process of language acquisition. Without vision, the child with visual impairment relies more on auditory and tactual exploration unlike a child with vision who integrates all the senses including vision. Another problem is echolalia; this is where a learner with visual impairment learns to talk by copying words, phrases or sentences from others without attaching any meaning to them (Carmen, 2019). If such problems are not addressed in the early years, it is likely that their effects will be felt later in life and this might determine how such a learner performs in language examinations.

The language of instruction in the upper primary and in other post primary institutions of learning in Kenya is English. It is the expectation of everybody that by the time students are through with secondary education, they will have acquired and also developed both spoken and written skills of the language to enable them cope with its demands at higher educational levels and also in the world of work. However, despite the important role that is played by English language, empirical studies have indicated that learners have not been performing well in English language examinations. One such study was carried out by Moshia (2014) in Zanzibar. The study aimed at investigating the factors affecting students' performance in English language subject in secondary schools in Zanzibar. It adopted both qualitative and quantitative approaches and used questionnaires, interviews, classroom observation and documentary review for data collection. The population for the study was made up of both students and their English teachers. The results indicated that students were inspired to learn English language because they recognized its importance in local and international communication and also for employment prospects.

However, even with such motivation, students continued performing poorly in the language as indicated in the findings. For instance, in the year 2001, 197 students out of a total of 296 (67%) failed in the subject. In the following year, 2002, the situation was not very different because out of 292 students who sat the English examination, 181 (62%) failed. In the year 2003, 68% of the students failed, and in 2004, the situation got worse with up to 72% failure. The worst was the year 2005 where 78% of the students failed. The trend indicates that the situation was worsening as students continued performing poorer (Moshia, 2014). The findings pointed to a number of factors that continued

affecting the performance of the high school students in English language. First, there was a deficit of English teachers and the teaching and learning resources were scarce (Moshia, 2014). The study further found that students were taught by teachers who were not qualified, some other teachers were trained but still they were not competent. In some instance, such teachers resulted to skipping some difficult topics in the syllabus.

Other contributing factors to the poor performance of English according to Moshia (2014) included large class sizes and unfavourable teaching and learning environments. Moshia's findings partly corroborated with those of Msanjila (2005) whose study in Tanzanian secondary schools found that learners' poor performance in English examinations was because of the inappropriate methods used by the teachers, inadequate text books and the fact that some teachers were unqualified. Therefore, this would mean that qualities of teachers are among the factors that lead to student' poor performance (Harmer, 2003; Moshia, 2004). In their study Fakeye and Ogusini (2009) posited that proficiency in English language impacted very significantly on the students' overall academic performance. Moreover, there was a positive notable relationship between proficiency in English language and the general academic achievement. Despite its great impact on the students' general performance, research has indicated that most students perform poorly in it (Nyamubi, 2003; Yohana, 2012).

Students' success in school to a large extent relies on their proficiency in the language of instruction (Fakeye & Ogusini, 2009). Harb and El-Shaarawi (2006) postulated that competence in English is a pre-requisite factor that has some positive effect on the student's performance. Moreover, a study by Nara, Eunjin, and Reubenson (2015) found that use of language as a medium of instruction limited the students' academic performance. These researchers used an ex-post facto, non-experimental approach to examine the impact of proficiency in English language on academic performance of international students in a university in the United States of America. The population of the study was university students in their junior and senior year of college. The study found that students who were excellently proficient in English had the highest mean GPA of 3.57. Further, the group of students who had indicated that English was their second language scored the lowest mean GPA of 2.68. The conclusion of the study was that self-perceived English proficiency correlated with the students' academic performance. Thus, it was crucial to offer support services to the international students most of which was to be in form of English language courses (Andrande, 2006).

A similar study was carried out by Olanipekun, Garuba, Mohammed and Ohiemi (2014) in Nigeria. The aim of their study was to investigate the influence of English language on students' performance in

vocational education, majoring on Agriculture, Science and Economics and it adopted a descriptive survey method. The population was derived from graduating students. The results of the study indicated that competency in English considerably determines the students' academic performance. This showed that good mastery of English language is paramount in students' performance in intelligence tests (Olanipekun et al., 2014). Lack of proficiency in English could be among the factors likely to lower the students' performance. Students who experienced difficulties in communication skills in English were likely to underperform not only in English language, but also in other areas of study. In Olanipekun et al. (2014) study, it was evident that students' academic performance in vocational education was influenced by English language. Therefore, the importance of English language as the medium of instruction can never be over emphasized.

Among the languages examined in the Kenyan Education system are Kiswahili and English, in the lower grades and foreign languages like German and French in high school. Kiswahili and English are compulsory in both Kenya Certificate of Primary Education (KCPE) and the Kenya Certificate of Secondary Education (KCSE) examinations. Kiswahili is looked at as a key subject in career development (Bisi, 2013). It affects the career choices of students, for example for one to join primary teachers' training colleges one has to score a minimum of grade C in either Kiswahili or English. Okombo (2002) asserted that governments' policies on schooling, national language and mass media of communication all in a way affect the people's career prospects and also their cultural life. That is to say, whatever is done in the classroom has some consequences in life after school. According to Maina (2003) children are introduced to Kiswahili early enough and they learn it with ease. Once they are exposed to the language early, they learn it with no problem and they become bilingual. However, in Kipipiri division of Nyandarua county Maina (2003) found that learners consistently performed poorly in Kiswahili. The researcher looked at the performance of secondary school students in Kiswahili in their KCSE examination for five consistent years starting in 1998 through 2002. The study used descriptive survey and targeted form four students and their Kiswahili teachers.

The study revealed that performance in Kiswahili during the five years under study was quite low. Most schools under study recorded a mean score of C's- over the years under study. In 1998 and 2001, the mean grade was C-, in 1999 and 2000 the mean grade was D+ and the best performed year was 2002 where the mean grade was a steady C (Maina, 2003). The findings indicated that learners lacked resources and in some cases the resources available were inadequate. Areas highlighted as the most challenging to learners thus contributing to poor performance were,

poetry, Kiswahili grammar, composition, vocabulary and literature in Kiswahili. The finding supported Kinyanjui (2006) who stated that poetry in Kiswahili was found to be the most difficult part of literature to understand and quite a number of students do not like studying it. Some students felt that 'mashairi' (Poetry) was a foreign aspect of literature and had no direct relationship to their day-to-day lives. Cole and Chan (2000) further argued that most teachers held negative attitude towards Kiswahili and unfortunately this attitude is passed on to their learners.

According to Curran and Rosen (2006) attitude affects achievement. This would then mean that once students have negative attitude towards Kiswahili, their preparation in it would be poor, thus, yielding poor results. This being the case then, teachers are supposed to be good mediators and portray a positive attitude towards the subject so that students can have similar attitude and achieve their full potential. Learners with visual impairment would need more support of modified school practices and services to assist them develop their full potential and perform as well as their sighted counterparts. As AFB (2007) asserts, instruction for learners with visual impairment should be provided by teachers who are well qualified and prepared to impart knowledge and skills in the best way possible. If this is not done, then it is highly likely that performance of learners with visual impairment in Kiswahili will continue being poor. Unfortunately, no study has been done to establish performance of learners with visual impairment in humanities like history and geography.

#### IV. RESEARCH METHODOLOGY

The study adopted a qualitative study design to explore performance of learners with visual impairment in summative evaluation. Four special schools for learners with visual impairment in Kenya were used for the study. Results for the Kenya certificate of secondary education and Kenya certificate of primary education for the year 2017 were analysed. Further, results for the year 2013 through 2016 were also explored. To supplement data collected through document analysis, a questionnaire was used to collect more data from the teachers. The questionnaire sought to find out whether there were topics that teachers felt were challenging to teach learners with visual impairment. It also focussed on soliciting information on challenges emanating from the whole examination process.

Consent to carry out the study was obtained from the National Commission for Science, Technology and Innovation (NACOSTI) through graduate school, Kenyatta University. The four schools under study were visited and after getting permission from the head teachers, the questionnaires were administered to the teachers who taught class eight and form four. Results for the years under study were also acquired.



### V. DATA ANALYSIS

The collected data was edited, coded, categorized and classified according to its origin. The classified data was then put in tabular form. The examination results were analysed and presented through frequencies and percentage distributions. The tabulation helped to give a comprehensive picture of what the data looked like. Explanations were also given in relation to reviewed literature.

### VI. FINDINGS AND DISCUSSIONS

a) *Student's performance in 2017 KCPE in the schools*

In their KCPE performance, the learners' mean marks obtained in English, Kiswahili, Mathematics,

Science and Social Studies were established in the two schools (St. Francis and Kibos Primary schools for learners with visual impairment). Performance in Thika High school and St. Lucy's secondary schools for learners with visual impairment in KCSE was equally evaluated.

Table 2: Learners' performance in the subjects in 2017 KCPE (Mean scores)

Primary schools (KCPE)		
	School 1	School 2
English	31.00	35.67
Kiswahili	33.50	30.50
Math	35.33	32.50
Science	34.67	29.92
S/Studies	33.00	29.58

Source: KNEC, 2018

Analysis of the learners' mean performance in KCPE per subject in the two primary schools indicated that the learners performed minimally in all the subjects. It can be observed that not a single subject attained the average mean score of 50 and above. The highest mean score achieved in subjects was 35.67 in English in school 2 and 35.33 in Mathematics in school 1, a deviation of 14.33 and 14.67. The two lowest mean scores were 31.00 and 29.58 from the two schools respectively. Total mean scores posted for the five

subjects from the two schools were 167.5 from school 1 and 158.17 from school 2. This indicates that the performance in the two schools was indeed low. Results for the years preceding 2017, that is 2013 through 2016 indicated some improvement in the performance as observed in Figure 2. However, the improvement was not very significant though because it was only school 1 which managed an above average mean score in the year 2016. Both schools posted below average scores for the other three years 2013, 2014 and 2015.

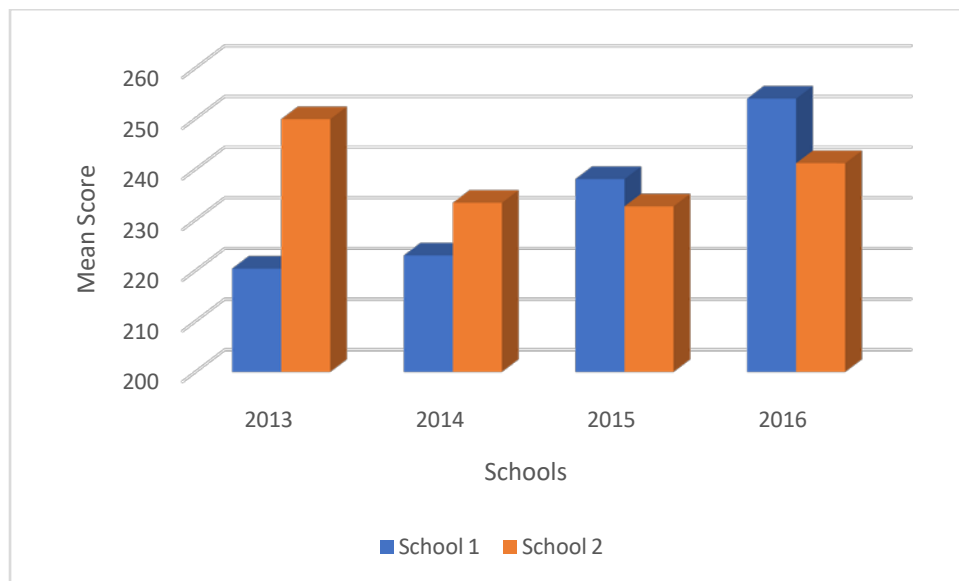


Figure 2: Performance of learners in KCPE in the same schools for the years 2013 - 2016



b) *Students' performance in 2017 KCSE in the two secondary schools*

Performance in the two high schools in the individual subjects were analyzed using a descriptive

analysis of the mode (highest occurrence) based on the number of the learners.

*Table 3:* Learners' performance in 2017 KCSE in High school 1

SUBJECT	A	A-	B+	B	B-	C+	C	C-	D+	D	D-	E	F
ENG	0	0	1	0	1	4	2	6	4	16	10	0	0
KIS	0	0	2	1	2	2	6	7	4	11	8	1	0
MATHS	0	0	0	1	0	0	0	0	0	4	6	33	0
BIO	0	0	0	0	1	0	1	0	1	7	16	16	2
HIST	2	2	2	4	4	2	6	5	2	8	5	2	0
C.R. E	0	2	4	6	6	1	3	5	1	13	3	0	0
GEO	0	0	0	3	2	3	1	2	2	4	3	0	0
H/SCI	0	0	0	4	3	6	3	4	0	6	2	0	0
AGR	0	0	0	0	0	0	1	2	2	3	3	0	0
FRENCH	0	0	0	0	0	0	0	0	1	0	0	0	0
MUSIC	0	0	0	0	1	1	1	0	0	3	1	0	0
B/ST	0	0	0	0	1	0	0	1	0	3	1	1	0

*Table 4:* Learners' performance in 2017 KCSE in High school 2

Subject	A	A-	B+	B	B-	C+	C	C-	D+	D	D-	E	F
ENG	0	0	0	0	0	0	1	1	0	2	2	3	0
KIS	0	0	0	0	0	0	0	1	2	2	3	1	0
MATHS	0	0	0	0	0	0	0	0	0	0	0	9	0
BIO	0	0	0	0	0	0	0	0	0	0	5	4	0
HIST	0	0	0	0	0	1	1	4	0	1	1	1	0
C.R. E	0	0	0	0	0	1	1	2	0	3	1	1	0
GEO	-	-	-	-	-	-	-	-	-	-	-	-	-
H/SCI	0	0	2	0	0	1	0	1	1	3	1	0	0
AGR	0	0	0	0	0	0	0	0	0	0	1	2	0
FRENCH	-	-	-	-	-	-	-	-	-	-	-	-	-
MUSIC	0	0	0	0	0	0	0	0	0	0	1	1	0
B/ST	0	0	0	0	0	0	0	0	0	0	4	0	0

Source: KNEC (2018)

The tables indicate that the performance across subjects was rather low. Home science had the highest grade of C+. Performance in English, Kiswahili, CRE, History, Agriculture and Business Studies was the same where the mode posted by all the six subjects was a D while Biology had a D-. Mathematics had the lowest mode which was Grade E. The tables also indicate that the best grades posted by individual students were in history and CRE. Majority of the students in high school 1 managed to score Grade C and above in history where two students scored grade A and a further 2 scored grade A-. Two students managed a B+ and another 4 students got grade B. 4 students scored a B-, 2 got a

C+ and 6 got grade C. Interestingly, the situation was completely different in high school 2 where the best score in the same subject was a C+ posted by one student only and another 1 student posting grade C, all the other students in this school scored grade C- and below in history. In C.R.E two students in school 1 managed to score grade A-. Another 4 scored a B+, six scored B and the same number got a B-. One had a C+ and another 3 posted a C. Just like in history, the situation was different in high school 2 where the best score was a C+ posted by a single student and another one scored grade C. All the other seven in this school scored C- and below. In English, 8 students managed to

score grade C and above in school 1 while in school 2 only one student scored grade C. All the others had grade C- and below.

Kiswahili was not very different since 13 students scored grade C and above in school 1 and just like in English, school 2 had a single student scoring grade C while all the others scored grade C- and below. French was done by a single student in school 1 who scored a D+.

Mathematics was the worst performed subject where in school 1 a single student managed to score grade B and all the others scored grade D- and below,

with the majority scoring grade E. Interestingly all the students in school 2 scored grade E in mathematics.

c) *KCSE points obtained in the two schools in respective subjects*

In KCSE grading A – E (points A =12, A- =11, B+ =10, B =9, B- =8, C+ =7, C =6, C- =5, D+ =4, D = 3, D- =2 and E = 1), the points obtained in each of the subjects were added up to establish which of the subjects learners with visual impairment scored the highest points in the two high schools in that year.

Table 5: High School total points obtained in the subjects

SUBJECT	SCHOOL 1			SCHOOL 2			Av. Points
	Total	No of learners	Ave.	Total	No of learners	Av.	
ENG	172	44	3.91	24	9	2.67	98
KIS	196	44	4.45	26	9	2.89	111
MATHS	66	44	1.50	9	9	1.00	37.5
BIO	87	44	1.98	14	9	1.56	50.5
HIST	253	44	5.75	39	9	4.33	146
C.R.E	263	44	5.98	35	9	3.89	149
GEO	106	20	5.3	-	-	-	106
H/SCI	162	28	5.79	47	9	5.22	104.5
AGR	39	11	3.55	4	3	1.33	21.5
FRENCH	4	1	4.00	-	-	-	4
MUSIC	32	7	4.57	3	2	1.50	17.5
B/ST	25	7	3.57	8	4	2.00	16.5

In the first school, the best performance was therefore recorded in C.R.E where the school had a total of 263 points. Similarly, in the second school; the best performance was in C.R.E where the learners scored a total of 149 points. Using descriptive statistics, mean performance, the learners performed well in C.R.E (mean points 149). Considering the number of learners who attempted the various subjects, in school 1, the

best subject, C.R.E scored a mean point of 5.98 while in school 2 the best performance was in Home science which had a mean of 5.22 points. In both the schools 1 and 2, the lowest points were recorded in Mathematics (1.50 and 1.00 respectively, and an average of 1.25).

The average performance of the two schools was therefore established as shown in table 6.

Table 6: Average points for the two high schools obtained in the subjects

Subject	Eng	Kis	Math	Bio	Hist.	C.R. E	Geo.	H/Sci	Agri	Fren	Mus	B/St
Ave. Points	3.29	3.67	1.25	1.77	5.04	4.94	5.30	5.51	2.44	4.00	3.04	2.79

The table indicates that the mean for the two schools for the particular year was 3.528. Home science was the best performed (mean point 5.51) followed by geography (mean point 5.30). On the other hand, mathematics was the worst performed subject with mean point of 1.25, followed by biology (mean point 1.7). The performance in all the schools was generally below average.

The teachers were asked to explain whether there were some topics that proved difficult to teach those learners with visual impairment. Most of them agreed that they faced a number of challenges in teaching a number of concepts particularly in math and sciences.

Poor performance by learners with visual impairments in mathematics has been confirmed by a number of researchers. The worst scenario in the current study was the results posted by school 2 in 2017 KNEC examination where all the learners scored grade E. Grade E in the KNEC examination is considered the lowest grade a learner can score in a subject or in their overall performance. This finding supports Schleppebach (1997) who reported that mathematics was a field considered inaccessible to learners with visual impairment because of the presentation of its concepts and information. Schleppebach (1997) further noted that only a few educators are prepared adequately to teach mathematics to learners with visual impairment, thus the poor performance.

The fact that mathematics is usually taught using the 'chalk and talk' method which basically focuses on what the teacher is saying and the examples worked out on the board, makes it quite a challenge to learners who are not able to see and follow the demonstrations, and the subsequent development of the concepts on the board. This finding on poor performance in mathematics by learners with visual impairment also supports Cliffe (2009) who reported that taking in a lot of information, and trying to conceptualize huge amounts of spoken mathematics without reference to what is being developed on the board or written notes could place high demands on memory. Such a situation could be made worse by the ambiguity of spoken words particularly when teachers of mathematics use gestures and phrases like 'this equation' or 'this plus this' which the learner with visual impairment cannot see (Rowlett & Rowlett, 2012; Cliffe, 2009).

The issue of time could also be a contributing factor to poor performance in mathematics. Time was reported as an issue by majority of the teachers in the current study who observed that mathematics papers should be given more time since the current time was not adequate, even with the additional thirty minutes. They attributed this to the many activities and long processes that candidates with visual impairment involved themselves in before arriving at the answers. This included reading the questions, arranging the calculation tools (cubes and cubarithms) and getting back to the Braille writer to arrange the process on paper. This finding supports Gross (1995) who noted that computation by learners with visual impairment usually took a lot of time as compared to the way learners who use sight work out the same mathematical questions.

Lack of proper accommodations could also be another reason why learners with visual impairment in the current study posted a minimal performance in mathematics. It was reported that diagrams adapted by KNEC were quite difficult to interpret. The teachers also noted that mathematics papers were full of diagrams and learners with visual impairment took a lot of time trying to read and interpret the diagrams tactually. However, the finding on minimal performance in mathematics contrasted with Lynn (2012) who found a consistent high percent of learners with visual impairment getting high scores in mathematics across grade levels and years in her study. This good mathematics performance by learners with visual impairment as confirmed by Lynn (2012) countered a theory and misconception by Ferrel, Buertel, Sebald and Pearson (2006) and Kapperman and Sticken (2004) that performance in mathematics by learners with visual impairment had always been poor as a result of the visual-spatial and abstract nature of mathematics concepts and teachers who were not well prepared to teach advanced concepts.

However, an interesting point to note was the difference in the performance of mathematics in the two primary schools as compared to the performance of the secondary schools. In primary school 1, mathematics had a mean of 35.33 and it was the best done among the five subjects. In primary school 2, mathematics was the second best done with a mean of 32.5. This was a complete opposite of the findings from the secondary schools where mathematics was the worst done. Findings on better results in mathematics at primary school level supported a number of researchers (Chapman & Stone, 1988; Corrigan, 1977) The explanation these researchers gave was that mathematics during the primary years was practical and related to everyday activities but as concepts become established the nature of work in numeracy becomes more representational, possibly because learners rely on their memories and have little or no reinforcement from visual promptings, thus learners with visual impairment excel in mental arithmetic. Another explanation that could support better results for mathematics at the lower classes was indicated by Aldrich and Sheppard (2001) who found that many young learners were keen on tactile graphics as they found them quite interesting and derived lots of fun from them, on the other hand, older learners found them more difficult maybe due to the content under study, sometimes calculations can be too long or too complicated to be handled mentally.

The second worst done subject in the two secondary schools was biology. This could be attributed to similar factors that affect performance in mathematics. Such are time factor and also the way the examinations were adapted for learners with visual impairment. Sahin and Yorek (2009) observed that learners with visual impairment merely needed proper accommodations to enable them to perform as well as their sighted peers in science. More researchers, (Gardner, Stewart, Francioni & Smith, 2002) agreed that Science, Technology, Engineering and Mathematics (STEM) subjects are known for the huge number of visual resources used which included diagrams, graphs and charts. It is a long-held belief that, technical subjects can be quite challenging to learners with visual impairment. Concepts in STEM subjects could be difficult for grasping by learners with visual impairment because they rely quite heavily on visual representation as in diagrams, graphs and charts (Agarwal, Jeeawoody & Yamane, 2014).

Another factor which might have contributed to low performance in biology could be challenges in teaching some of the topics as indicated by the teachers. Jones, Minogue, Oppewal, Cook, Michelle, Broadwell and Bethany (2006) advanced a similar idea that in Science Education, learners with visual impairment reported challenges in learning about topics that they are not able to experience directly. McCarthy

(2005) concurs with these researchers that there was evidence that learners with disabilities were often not given the same opportunities to experience science like their non-disabled counterparts, furthermore McCarthy (2005) reported that teachers in special needs education often lacked knowledge about the science

curriculum, content involved in science, together with the science pedagogy.

Performance in KCSE for the years 2013 - 2016 were also explored and the results presented in Figure 3.

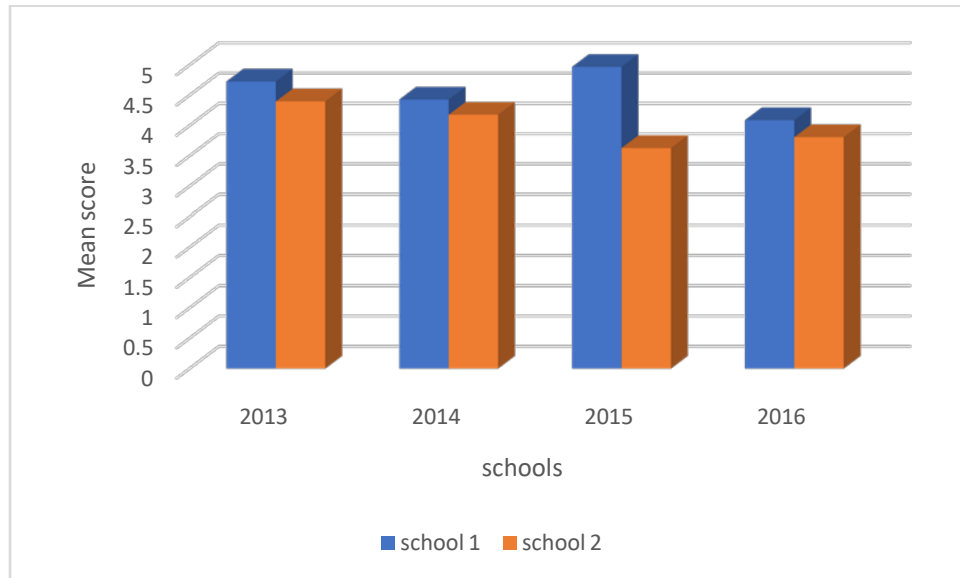


Figure 3: Performance of learners in KCSE in the same schools for the years 2013 – 2016

The average score for the four years was 4.404 with school 1 scoring 4.554 whereas school 2's mean score was 4.255, a deviation of 0.299. Therefore, the difference in performance between the two schools was not very significant and the general performance was rather low just as it was found out in the analyzed 2017 results. It is possible that the numerous factors raised by the three categories of respondents indeed impacted negatively on the performance of learners with visual impairment.

d) Challenges faced by learners with visual impairment during examinations

The teachers were asked to identify some challenges emanating from the whole examination process that their learners usually complained about. They came up with nine different issues as indicated in Table 7.

Table 7: Teachers' responses on challenges faced by learners with visual impairments during examinations

Impediments	Frequency (N = 16)	Percent	Rating (1- 9)
Poor adaptation of questions and diagrams	12	75.0	9
Inadequate time	11	68.75	8
Inadequate facilities	11	68.75	8
New Braille signs in examinations	10	62.50	7
Breaking down of machines	10	62.50	7
New materials in examinations	8	50.0	6
Long passage in languages	5	31.25	5
Panic and anxiety	3	18.75	4
Unfriendly supervisors & invigilators	2	12.50	1

Note: 1-least impediment, 9 – biggest impediment

Majority of the teachers, 12 (75.0%) reported that their learners complained of questions and diagrams that were poorly adapted. Diagrams that are not well adapted are likely to cause confusion and even mislead the learners leading to wrong responses.

Examination adaptation for learners with visual impairment was also highlighted as quite a challenging area in a study by Graeme et.al. (2009) where data gathered from ten countries indicated that the challenges were experienced in all the countries. Allman

(2009) observed that test bias should be eliminated from examinations for learners with visual impairment by paying attention to item construct. It is important that in adaptation of examinations, individual learners' needs are considered as opposed to blanket adaptation. This was observed by Schmidt and Cagran (2008) who concluded that student's age, type of class setting ought to be considered in determining the kind of adaptation for learners with visual impairment. Eleven more teachers (68.75%) reported that the learners usually said that the time allocated for the examination was inadequate for most subjects.

Studies done on time modification found that extra time was available in all the countries under study, but contrary to the Kenyan situation, some countries like Netherlands and Czech Republic considered giving learners with visual impairment 100% extra time. Ireland and France reported a 33% extra time, (Ghulam et al., 2014), though lower than the Netherlands and Czech Republic, this was still higher than what the Kenyan learners are added. In Kenya learners are added thirty minutes both at primary and secondary school. This translates to 16% extra time in a 3 hours paper and a 25% addition in a two hours paper. This was the lowest extra time added compared to all the countries reviewed.

The thirty minutes added is also uniform in all the subjects and yet the teachers reported that some subject would need more time than others. Still in agreement with the need to add learners with visual impairment more time during examinations, the AFB (2016) observed that extended time during examinations was very essential since some learners may be slow in writing and also because some tools that these learners used may pose some challenges. This finding supports Mitchell (2008) who found out that sometimes tools used to assess learners with visual impairment were rigid and not adapted.

The same percentage (68.75%) further observed that facilities were inadequate. Braille machines that learners used to write examinations were just enough. In some extreme cases, the learners had to wait for the machines to be repaired as reported by 10 (62.50%) of the teachers. This is in case they broke down during examination period. Such inconveniences are likely to cause untold anxiety to the learners which might in turn affect their performance. It is advisable for schools to have some spare machines to ensure that learners do not get stressed in case they break down during examination time. A further 10 (62.50%) reported that learners pointed out that they usually came across new Braille signs that they had not earlier learnt. A further eight teachers (50.0%) reported that learners complained of strange materials that KNEC usually used in its adaptation of the examination. New materials during examination can easily bring confusion and anxiety to the candidates.

A few teachers; 5 (31.25%) said that the learners complained of very long passages in languages. Reading and responding to such long passages could cause fatigue to the learners. Three teachers, (18.75%) reported a possibility of learners experiencing some form of anxiety during examinations. Presence of unfriendly supervisors and invigilators during examinations was reported by 2 (12.50%) of the teachers. The two teachers reported that some learners with visual impairment often complained of unfriendly examination supervisors and invigilators who never made any attempt to create some rapport with them during examinations. A new strange voice to a learner who is not able to see the person who is speaking can easily make them uneasy. This can be countered if the supervisors and invigilators took time to build some rapport with the learners before they start the examination.

Though among the least rated, there is broad agreement in literature that test anxiety is responsible for lower academic performance. Hill and Wigfield (1984) reported that test anxiety has affected about 25% American learners at both primary and secondary levels.

In support of this was Seipp, (1991) who meta-analyzed 126 American and European studies and found negative correlation between academic performance and anxiety. So, it is no wonder that some teachers (18.75%) in this study brought it up as one of the issues that their learners complained about.

## VII. CONCLUSIONS AND RECOMMENDATIONS

A number of conclusions were drawn from the findings of the study. First, the findings indicated that performance of learners with visual impairment in summative evaluation was below average. Mathematics and Science were the worst done subjects at secondary level whereas Social Studies and Kiswahili were the two worst done at the primary level. The teachers pointed out a number of issues that most likely affected the performance.

### a) Recommendations

The following recommendations were proposed in line with the findings.

To ensure that learners with VI are not disadvantaged when it comes to sitting examinations, the Kenya National Examination Council should;

- (i) Improve on making diagrams more tactually clear,
- (ii) Adjust the extra time added according to the demands of different subjects,
- (iii) Consider presenting examinations through other media e.g. auditory and use of scribes since some learners are not proficient in Braille, On the other hand, Learners with visual impairment should be provided with relevant and adequate equipment so

as to close the gap between them and their sighted peers,

- (iv) There should be capacity building for teachers for learners with visual impairment in order to make them more competent.

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