

**STAKEHOLDERS LEVEL OF PREPAREDNESS ON USE OF ALTERNATIVE  
ASSISTIVE TECHNOLOGY AMONG LEARNERS WITH VISUAL IMPAIRMENT  
IN INCLUSIVE PRIMARY SCHOOLS IN TURKANA COUNTY, KENYA**

**BY**

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## DECLARATION

### Declaration by the Candidate

This research thesis is my original work and has not been presented for a Degree in this University or any other University.

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## **DEDICATION**

To the Almighty God for making everything possible, my family, friends and the University department that made this study a success.

## ABSTRACT

Braille has been used as the main assistive technology by Learners with Visual Impairment (LVI) for the last 200 years. However, the use of this technology has limited opportunities for learners to access the curriculum and general information. With the emergence of new devices that are based on audio, electronic and multimedia technologies such as audio tapes, talking books, Optacon, note taker, computer with speech output, Optical Character Reader (OCR) scanner, refreshable braille display machine and live readers LVI have enjoyed enriched classroom engagement, greater independence in completing curriculum tasks and more flexible learning experiences. Consequently, the use of AAT devices has become a Special Needs Education (SNE) global and national policy recommendation in Kenya yet the preparedness expected of the stakeholders remains unexplored. In 2014, Turkana reported the lowest level of access to audio and electronic devices at 1.8% from the national average of 33% and, Turkana was the worst-hit area in terms of, persons with disability with no access to education at 69.06% as compared to Samburus' 66%, Marsabits' 60%, Baringos' 42% and West Pokots' 50%. The purpose of the study was to establish the stakeholders' level of preparedness on use of AATs among learners with visual impairments in Inclusive primary schools in Turkana County. Objectives were to; establish the availability of AAT devices, establish stakeholders' level of awareness in respect to use of AAT and, determine stakeholders' attitude towards the use of AAT in Inclusive primary schools in Turkana County. The study was guided by a conceptual framework showing the different levels of preparedness required for the use of AAT devices. The study adopted a descriptive survey design. The population consisted of 102 LVI, 65 teachers, 6 Educational Assessment and Resource Centre (EARC) officials and, 40 parents. The study sample was; 92 LVI, 58 teachers, 5 EARC officials and 36 parents selected by saturated sampling after using 10% of the population for pilot study. Questionnaires, interview schedule and observation guides were used for data collection. A pilot study was conducted on 10% of the population to determine the reliability of instruments and the results of the two tests correlated. The first test produced coefficients of; 0.72 for learners' questionnaires, 0.74 for teachers' questionnaires and 0.82 for EARC officials' questionnaires. The Pearson correlation test coefficient in the retest was; 0.74 for learners' questionnaires, 0.75 for teachers' questionnaires and, 0.85 for EARC officials. Content validity of the instruments was ascertained by expert judgment. Quantitative data were analysed by the use of frequencies and percentages. Qualitative data was summarized in categories and reported in themes and sub-themes as they emerged. The study established that; there was limited availability of AAT devices since the 38 AATs available were unevenly distributed across the schools and, where they were available they were unused. Stakeholders' level of awareness of some AAT devices was as low as 5.8%. Stakeholders' expressed mixed attitudes towards factors surrounding AAT use as shown by the overall mean score of 3.7. To improve the preparedness levels of stakeholders, the study recommended that the government should; increase the supply AAT devices to schools to make them available, sensitize all the stakeholders on the use of AAT devices and, strengthen implementation of strategies that promote a positive attitude towards AAT use in Inclusive schools. The finding of the study may be used by the providers of education to LVI to; avail AAT devices, sensitize stakeholders on AAT use and contribute towards attitude change.

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## LIST OF ACRONYMS

<b>AAT</b>	-	Alternative assistive technology
<b>ASAL</b>	-	Arid and Semi-Arid Lands
<b>EARCs</b>	-	Educational Assessment and Resource Centre
<b>ECDE</b>	-	Early Childhood Development and Education
<b>EFA</b>	-	Education for All
<b>IEP</b>	-	Integrated Educational Program
<b>KICD</b>	-	Kenya Institution Curriculum Development
<b>LVI</b>	-	Learners with Visual impairments
<b>MoE</b>	-	Ministry of Education
<b>SEN</b>	-	Special Education Needs
<b>SNE</b>	-	Special Needs Education
<b>VI</b>	-	Visually Impaired

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# CHAPTER ONE

## INTRODUCTION

### **1.1 Background of the Study**

Traditional Braille technology generated by devices such as Perkins Brailier, slate, and stylus that produced hard copy Braille were the key to independent reading and academic success for learners with visual impairment (LVI) since the 1820s when it was invented by Louis Braille (Roth & Fee, 2011). However, continuous changes in educational practices and further technological advancement altered the format in which LVI access educational materials and the curriculum in general hence the need to shift from the use of traditional Braille to Alternative Assistive Technology (AAT) devices (D' Andrea, 2015). For instance, the technology of the current age such as E-text speech synthesiser, voice note, and handy tech has enabled students who read Braille to; access the Internet, use electronic and digital audio books, convert text on a computer screen to audible speech and, produce refreshable Braille. These technologies are currently as AAT devices such as; audio tapes, talking books, optacon, note taker, computer with speech output, OCR scanner, refreshable braille display machine and live readers all of which was not possible before (Withrow, 2004).

The global situational conditions and changes in the educational environment in Kenya as a nation provided further justification to warrant the paradigm shift from the traditional Braille-based assistive technologies to the modern audio, electronic and multimedia-based AAT devices (KICD, 2014). Ministry of Education (MoE) through the Kenya Institute of Curriculum Development (KICD) recently piloted new audio, electronic and multimedia-based learning devices in selected primary school throughout Kenya in readiness to introduce digital education in schools yet Braille is not computer-based (GoK, 2014). The current technology of information storage is e-based making it difficult to access it using Braille. The job market is becoming computer oriented where uptake of paperless services are more

favoured than using Braille and, the prevailing laws demand that all persons are entitled to be included in all processes, yet Braille is not inclusive in the same manner that the emerging audio, electronic and multimedia-based technologies are since Braille cannot be used by learners with additional disabilities. (D'Andrea, 2010). Modern education system is driven under the global call of inclusivity hence the call for adoption of inclusive education in all primary schools where learners with disabilities can learn alongside normal learners(Mwangi, 2013)

Additional pieces of evidence as to the decline in the number of Braille readers in favour of audio and multimedia technology have been attributed to; dispute on the utility of Braille codes (Thurlow, 1988), the decline in teachers' knowledge of Braille due to reduced enthusiasm among teacher trainees in mastering methods of teaching it (Schroeder, 1989), negative attitudes towards Braille (Hoolbrook & Koenig, 1992) and the greater reliance on speech output and print magnification devices (Paul, 1993). Indeed, using AAT devices of the current age as compared to the use of traditional Braille producing devices in educating LVI has also been shown to benefit LVI by; providing them with more flexible learning experiences, enriched classroom engagement and, greater independence in completing curriculum activities and assignments ( KICD, Sider & Maich, 2014).

The need for and benefit of modern AAT devices for LVI has therefore been well-documented throughout literature with very strong justifications on LVI' entitlement to enjoy the efficiency afforded by the new technologies but, with no studies exploring the current preparedness for the recommended introduction and use of AATS (Strangman & Dalton 2001). In Kenya for example, Ouma et al (2014) has raised an argument that 'whereas the 2006 ICT policy encourages the integration of new technologies both as learning aids and teaching tools in all educational institutions, some level of stakeholders' readiness is required

to successfully integrate and realize the benefits of the technologies yet very little research has been done in this area.

While education is regarded as the way out of further impoverishment, access to modern AAT devices for which LVI are constitutionally entitled to new technologies is generally poor in Kenya and needs to be enhanced (Ngeno & Susanne, 2014 and Mwangi, 2013). Smith & Kelly (2002) advised that the benefits of the modern AAT devices will only be realized if the availability of the devices to the LVI is guaranteed. Nations throughout the world observed the advice and, in the United States, for instance, the devices provision framework and entitlement to access of the same were rooted in federal legislation and harmonized by the Individuals with Disabilities Education Act of 1999 (Bryant & Bryant, 2003). In Asia, the Equal Opportunity Commission (EOC) in Hong Kong issued the Disability Discrimination Ordinance law (DDOL) to ensure compliance (EOC, 2010). Support for the same provision and entitlement in Kenya was recommended by the Kochung Taskforce of 2003 (SNE policy, 2009). However, Kelly (2008), D'Andrea, (2009) and Mwangi, (2013) pointed out that policies fell short of recommending specific devices for learners with disabilities hence very little research regarding the implementation of the entitlement policy throughout the world as well as in Kenya with the possible implication that supply and availability of AAT devices for which LVI are entitled to by law has not been determined, relevance of stakeholders' awareness and knowledge of AAT use environment has not been explored, and stakeholders' psychological readiness has not been judged hence the need for further research to source for this data.

Education of children with disabilities is a global policy priority. Even though legislations and policies underscore the necessity of assistive technology devices to equalize access to education for all persons with disabilities, Kenya draft education policy (2012), Kenya national ICT policy (2006) and Digital learning program report for SNE (2017) failed to

recommend specific assistive devices to be used by LVIs in inclusive schools but highlighted the commitment of the government and parents to encourage the use of all forms of assistive technology that will be appropriate for learners (Bii & Taylor 2013).

One purpose of policy is to level the playing field. When policy fails to provide the standards then one is allowed to reasonably suggest the devices on the basis of their appropriateness to the education of learners intended. To this extend, the significance of the study by D'Andrea &Siu (2015) that suggested the range of devices acceptable to learners with visual impairment on the basis of visual, auditory and tactile mode of access is paramount. D'Andrea's study suggested magnifiers, interactive whiteboard, copiers, electronic book readers, talking book, digital voice recorder, audiotapes, live readers, optacon, note takers, computer with speech, OCR scanner and refreshable braille display machine.

There has been an acute shortage and apparent absence of empirical data in Kenya concerning special education in general and conditions under which learners with visual impairment are provided with alternative assistive devices for curriculum access. The Government of Kenya (2009) in the Special Needs Education Policy book confirms the need to carry out a Special Needs Education (SNE) national survey as it was recommended by the Kochung taskforce of 2003 in order to determine; the population of SNE children in all forms of schools in Kenya against an inventory of assistive devices and equipment available for them. In view of responding to Kochungs' taskforce recommendations, Mwangi (2013), conducted research aimed at exploring Government policy and teachers' understanding with respect to Special Needs Education (SNE) in Kenya. However, Mwangis' research only managed to establish the population of LVI in selected primary schools of urban areas hence leaving the gap of inventory of the assistive devices available for those LVI hence the need for more research in this area to respond to the gap.

Research conducted by Prensky (2001) argued that while stakeholders unequivocally recognized the benefits of AAT devices, there was a significant gap and disconnection in awareness of knowledge expected in supporting the shift from using Braille to the application of AAT devices. Research contribution on the debate of awareness and knowledge expected of stakeholders to meaningfully support AAT use include awareness of; psychosocial and pathological implications of shifting from Braille in favour of AAT devices (Cohen and Wong,2003), the differential characteristics of individual learners (Cohen and Wong,2003), instructional methods and means of evaluating learners using AAT devices (NCIP, 2014), and, the required adaptations and accommodations needed to facilitate integration of AAT devices (Corn & Wall, 2002). This research study shall seek to establish whether or not the stakeholders in the education of LVI do possess awareness required of them as mentioned above as the necessary pre-condition for supporting the smooth transition from Braille to its alternatives.

Other than availability and awareness factors aforementioned, the attitude has been noted as a critical factor affecting the implementation of all school programs (Abner, 2002). In relation to the introduction and use of assistive technology, Anstey & Bull (2006) surveyed teachers in America who instructed students who used computer-based assistive technology in instructing LVI. The American learning environment is decidedly different from the local learning environments which are resource strained (Butler et al. 2002). In the collection of data, Anstey & Bull relied on questionnaires only as the survey tool which Bullman (2004) criticizes as unable to effectively inform the researcher about attitude unless supplemented by observation and interview schedule that makes it possible for the researcher to view attitude traits through behavioural reactions as was done in the current research.



The Socio-Economic Atlas of Kenya launched on November 10th 2014 by the Ministry of Devolution and Planning and published by the Kenya Bureau of statistics shows that Turkana had the highest negative deviation from the national average in respect to access to the seven most important indicators of modern services and conveniences with the possible implication that its schools are the least supplied with basic amenities such as electricity which is necessary pre-condition for the use of some AATs like the computer as shown in table 1.1.

**Table 1.1 Deviation from national average of modern services accessible in Turkana**

Indicator/factor	National Average	Turkana	deviation
Electricity	22.7%	2.7%	-20%
TV access	28%	3.2%	-24.8%
Mobile ownership	63%	15.9%	-47%
Poverty index	45.2%	87.5%	-42.3%(above)
P/School enrolment	77%	56.04%	-21.96%
Radio access	84%	17.5%	-66.5%
Multi media/internet	64%	1.8%	-62.20%

Source; GoK report on socio-economic atlas of Kenya 2014

Further statistical evidences by the KNBS (2009) points out that 86.7% of the adult population living with disabilities were illiterate and 69.06% prevalence of persons with disabilities with no access to educational services has been reported in Turkana. On comparison with four other counties generally classified as marginalized and/or arid and semi-arid lands, Turkana had the worst score as shown in table 1.2.

**Table 1.2 Comparison between Turkana and other ASAL counties.**

Theme/ county	illiteracy	PwDs no access to education
Turkana	86.7	69.06
Marsabit	80	60
Samburu	76	66
West Pokot	61	50
Baringo	50	42

Source: Kenya National Bureau of statistics 2010

This data leaves open the possibility of recommending for studies to be conducted on how best to integrate AAT use for the purpose of attaining other beneficial goals of education for LVI's in respect to the following; improved the Inclusivity of class attendance, meaningful adaptation of the school curriculum, lower levels of school drop-out, enhanced rate of

transition through different levels of educational and, reduced class repetition as part of stakeholders preparedness in implementing the use of AATs.

### **1.2 Statement of the Problem**

The problem addressed by the study was; there is so much information available which Learners with Visual impairments cannot access through the traditional Braille technology. The need for and benefit of AATs devices for LVI is further reinforced by; the Government of Kenya is on its way to introduce digital learning yet Braille is not computer-based, the current technology of information storage E-based making it impossible to access it using Braille, the job market is becoming computer oriented where uptake of paperless service are more favoured than using Braille and, the prevailing laws demand that all persons are entitled to be included in all processes, yet Braille is not inclusive in the same manner that media for reading such as audio, electronic and multimedia are. And, Braille cannot be used by learners with additional disabilities in the same manner as AATs can be used. It is for these reasons the shift from Braille to AATs is nationally and internationally recommended by policies while the supply of AATs to the LVI is an entitlement. However, preparedness of stakeholders for supporting this change in terms of device availability, gaps in awareness expected of the stakeholders in supporting the introduction and use of AATs and, attitude readiness for ensuring that LVI benefit from this desirable shift remains unexplored hence limiting the potential of the LVI to become more independent as it is desired of them.

### **1.3 Purpose of the Study**

The purpose of the study was to assess stakeholders' level of preparedness on use of AATs among learners with visual impairments in Inclusive primary schools in Turkana County.

#### **1.4 Objectives of the Study**

- 1) Establish the availability of AAT devices for use among LVI in Inclusive primary schools of Turkana County
- 2) Establish stakeholders' level of awareness on the use of AAT devices among LVI in Inclusive primary schools of Turkana County
- 3) Determine attitudes of stakeholders towards use of AAT devices among LVI in Inclusive primary schools of Turkana County

#### **1.5 Research Questions**

The study was guided by the following questions;

- 1) What alternative assistive technology devices are available in Inclusive primary schools of Turkana County?
- 2) What are stakeholders' levels of awareness on the use of alternative assistive technology devices for LVI in Inclusive primary schools of Turkana County?
- 3) What is the attitude of stakeholder towards the use of alternative assistive technology devices among LVI in Inclusive primary schools of Turkana County?

#### **1.6 Scope of the Study**

The general area of concern of this study was the education of LVI whose sight loss cannot allow them to access the curriculum except by Braille and alternatives assistive technology devices based on audio, electronic and multimedia technologies in the nine (9) Inclusive primary schools Turkana County. The range of AATs available include magnifiers, interactive whiteboard, copiers, electronic book readers, talking tools, digital voice recorder, audiotapes, live readers, optacon, note takers, computer with speech, OCR scanner and refreshable braille display machine. The study shall limit itself to the analysis of AATs such as audiotapes, talking books, live readers, optacon, note takers, computer with speech output, OCR scanner and refreshable braille display. Specifically, the study aimed at; establishing the

availability of the AAT devices, establishing awareness of stakeholder on the use of AAT devices and, determining attitude(s) of stakeholder towards the use of AAT devices in Inclusive primary schools of Turkana County. The Stakeholders was limited to; LVI schooling in the identified Inclusive primary schools, their teachers, parents and, EARC officials in the County.

### **1.7 Assumptions of the Study**

The study was guided by the following assumptions:

1. That the Inclusive primary schools had and used AAT devices.
2. LVI were present and they were taught using AAT devices.
3. That the existing curriculum in all the Inclusive primary schools under investigation was the KICD based curriculum and recommended the use of AAT devices.
4. That all the Inclusive primary school had similar resources and infrastructure

### **1.8 Significance of the Study**

Preparedness of stakeholders is quite pivotal in supporting the use of AAT devices in the education of LVI in Inclusive primary schools. Since the rate at which technology changes is fast and may leave the stakeholders feeling unprepared, it is hoped that, the outcome of this research may present information that might assist the Ministry of education in addressing availability, awareness and attitude gaps that hinder the readiness of stakeholders in respect to introduction and use of AAT devices among learners with visual impairments in Inclusive primary schools of Turkana County.

### **1.9 Limitations of the Study**

The limitations of the study were;

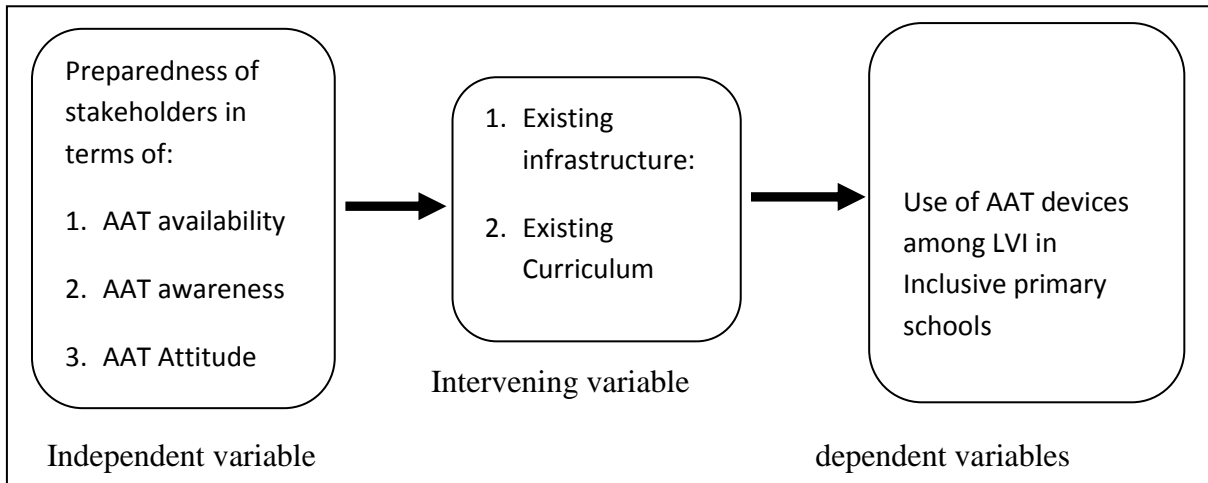
1. The targeted respondents except teachers and the EARC officials had difficulties in reading questionnaire with the possible implication that return rate would have been

compromised. In order to overcome the problem above, the researcher administered the questionnaire as interview schedules and increased the time of contact with the respondents to achieve 100% return rate.

2. Inclusive schools with LVI were far apart and the researcher would not have been able to control how questionnaires were filled. The researcher made use of two research assistants and school head-teachers to co-ordinate implementation and collection of data on rotational basis where data is collected from one centre at a time.

### **1.10 Conceptual Framework**

The study was conceptualized from three sets of variables, two of which interact through a cause and effect relationship to give outcomes that eventually result in an enhanced educational achievement for the learners with visual impairments. The postulated framework, therefore, shows that; the cause variable was the independent variable of preparedness of the stakeholders in respect to AAT availability, awareness of AAT use and attitude towards AAT use. The effect variable was the dependent variable called the use of AATs. The study had three sets of intervening variable that were controlled as follows: AAT uses infrastructure in which the schools used were of the same status regarding infrastructure and facilities. The curriculum in which all the schools used implemented the KICD curriculum under the 8.4.4 system approved by the government of Kenya. School attendance by learners being a marginalized and hardship area, many children may have problems of Inclusive attendance. To address these confounding variables the learners who had 80% attendance score in the last two terms were selected as the study participant. The relationship between the three sets of variables is as represented in figure 1.1;



**Fig 1.1: Conceptual Framework on preparedness of stakeholders on the use of AATs among LVI in Inclusive primary schools of Turkana County**

Studies have shown that, in an environment in which learners with visual impairments are educated alongside their sighted peers, the positive outcome of the causal interaction between the two sets of variables discussed above promotes preparedness for the introduction and use of modern AAT as a shift or break away from the traditional mode of Braille and also account for beneficial outcomes in the education of LVI such as; ease of storing educational materials of the LVI in a paperless format (D’Andrea 2010), improved computer literacy and ability to access the internet (sider &Maich 2014), more flexible teaching and learning experiences and environment (Ouma 2014), enriched classroom engagement (KICD, 2014), greater independence in completing curriculum activities and educational assignment (Strangmann and Dalton 2001), and, continuously updated information and skills base in the field of AAT use (D’Andrea 2010). Further research has shown that the other benefits will be; improved Inclusivity of class attendance by the LVI, lower levels of school drop-out, and, a higher rate of transition through different levels of education and, reduced class repetition thus enhanced academic achievement for the LVI educated in Inclusive schools (UNESCO 2005).

The conceptual framework employed in this study, therefore, shows the cause relationship between the different levels of stakeholders’ preparedness affects the use of AAT devices.

### **1.11 Operational Definition of Terms**

Key terms are defined as used in this research as follows:

**Alternative assistive technology devices-** They referred to audio, electronic and multimedia technologies such as audio tapes, talking books, live reader, optacon, note taker, computer with speech output, OCR scanner and refreshable braille display machine used by LVI without relying on traditional Braille.

**Attitude:** - it is an aspect of preparedness that was measured in the study by the analysis of the existing levels of stakeholders' perception against pre-identified set of opinions.

**Availability:** - it is an aspect of preparedness that was measured in the study by the; count of AAT devices available, distribution of the devices across the schools, usage of the devices, supply of the devices and, perceived level adequacy of AAT device.

**Awareness:** - it is an aspect of preparedness that was measured in the study by analysis of; stakeholders knowledge of the devices, stakeholders knowledge of the uses to which the devices could be used for, stakeholders awareness of factors affecting AAT use and, sources from which stakeholders gained awareness of using AAT devices.

**Learner with visual impairment:** - These were the low vision, partially blind and totally blind children enrolled as learners in the inclusive primary school targeted by the study.

**Preparedness:** - It referred to readiness expected of stakeholders in terms of; availability of AAT devices, knowledge and awareness and use of AAT devices and attitude towards AAT use. All of which have been derived from objectives of the study.

**Inclusive primary schools:** - Refers to primary school where children with visual impairments learn with their sighted peers in ordinary classrooms.

**Inclusive education;**-Refers to a strategy adopted by schools to contribute towards the ultimate goal of promoting inclusion of learners with visual impairments in ordinary classrooms



**Stakeholders;** - They were identified as LVI in the targeted Inclusive primary schools, their teachers and parents as well as EARC officials.

**Use:** - it referred to the practical application of AAT devices in day to day learning activities.

## CHAPTER TWO

### LITERATURE REVIEW

#### 2.1 Availability of Alternative Assistive Technological devices for Education of the LVI

Research on the provision of educational services to children with learning disabilities has variously justified with very convincing reasons that special education is equipment/device driven and that the assistive devices play a significant role in facilitating engagement and involvement of the learners living with disabilities in learning tasks that ordinarily would not be possible for them (Omede 2013). However, there exists conflicting information from various scholars of the subject in respect to what has been said about the provision, availability, preference, accessibility, and ease of use, cost, and usage of individual AATs (Moodley, 2014). Concerns have also emerged on the preparedness of the AAT implementation environment concerning electricity/power, resource rooms, and stakeholders' training opportunities for enhancing their capacity and, the budget for meeting AAT related expenses (Corn & Wall, 2002). This section reviews the existing literature audio and electronic alternatives of Braille as a basis of questioning the relevance of the raised concerns to Kenya specific to the education of LVI in Inclusive primary schools in Turkana County.

Audiotapes are the foremost and simplest audio media (Moodley, 2014). In respect to their availability and use, due to their convenience, suitability, and portability, LVI make extensive use of audiocassette recorders for a variety of reading and recording tasks for retrieval at a later stage. Caton (1991) and Arter (1997) further observed that usage of these AAT devices has tremendously increased as demonstrated by an increase in membership to libraries that stock and lend audio taped books. While the foregoing arguments about the audiotape is true, the device steady supply and availability is limited to the resource sufficient countries throughout the world but without mention of how the situation is like in resource-strained countries hence the need for research in Kenya to determine the extent to which government

libraries like the Kenya National Library Service stock and lend out audio taped books to LVI in Inclusive primary schools of Turkana County.

Despite the huge preference of the media due to bulkiness of Braille and the prohibitive cost of other possible alternatives like the screen access devices, it was argued that, while it is possible to record, index, store, and retrieve personal notes and messages through the use of tape recorders and dictating equipment, learners with VI who have tried to record notes from a lecture or reference book will attest to just how tedious and cumbersome that particular technique. It was further suggested that individuals who relied heavily on the audio taped media to meet their reading needs found out that they had to use additional mode such as Braille to accomplish some tasks (Turtle, 1996). This conflicting report on audiotape opens the possibility that some alternatives compete with audiotapes for preference hence the need for research to establish relative strength of audiotapes in comparison to other media as they are used among LVI in Turkana County.

Talking book is the more advanced version of the audiotape which LVI may prefer to Braille (Ohnstad, 1942). Pepin (2000) argued that, instead of pushing a finger laboriously over miles and miles of dots, all one had to do was to sit back and listen. Unlike audiotapes, which are limited to tone indexing to locate chapters, the digital talking book provides greater access to the recorded information. According to Lowenfield (1981), the talking book would be ideal for persons who lost their sight in later life and had difficulty in developing their sense of touch. Lowenfield, however, adds that the Talking Book has become a widely used reading medium, not only for those who became blind later in life but also as a supplementary reading source for the sighted. The greatest advantages of the talking book are that it does not require any learning of a special code and that it permits a faster reading rate than can easily be achieved by most Braille readers. While the advantages of talking books are outstanding hence making it ideal for both the LVI and the sighted schooling together in Inclusive

primary school, there is a need for research to establish their availability and accessibility in Turkana County.

Learners with VI rely either totally or partly rely on live readers and/or scribes for some or their entire curriculum needs. Researchers have argued that choice of a live reader or scribe may depend on several factors, including the following: The material may not be available in an alternate format (Moodley, 2014). The nature of the material may be such that independent access is not possible, for example, reading diagrams, maps, charts, graphs, and hand-written material (Koenig, 1989). They may not be conversant with the other media, and their reading rates may be too slow to cope with the demand for a particular task (McBroom, 1997). Other than the cited reasons, preference for a live reader to the other media may be because of the opportunities it affords for social interaction, especially in the Inclusive school setting.

From the study of 102 college learners with VI undertaken in the United States of America by McBroom (1997), it was evident that hiring a live reader was a necessary ingredient for the success in higher education. In their advice to learners with VI wishing to pursue their studies in higher education, the participants emphasised the following: "hire your readers, so you can get what you want" (McBroom 1997). Whereas this study foregrounded the significant contribution of a live reader as an alternative mode of accessing the curriculum, the study was not centred on the primary school level for which this research shall investigate and, the study failed to investigate the role of the stakeholders in identification and recruitment of live readers as recommended for by the SNE policy.

In a review of the functionality and structure of the OCR scanner, the researcher explained that the device worked through converting printed text into an electronic format that can be accessed tactually and through sound. The scanner is further expertly made to allow for editing and reviewing materials by manipulating the Braille or print texts (Espinola & Croft

1992). However, other than functionality and structure, the review failed to investigate the end Braille product of the device and whether the product was more preferred by the LVI than the ordinary Braille produced on hard copy paper.

The refreshable Braille display device qualify to be categorized as a tactile mode of accessing the curriculum for the following reasons; they must be used in conjunction with computers, they provide paperless Braille, they produce refreshable as opposed to permanent Braille, they produce only a few lines of the Braille text at a time all of which can only be accessed through the sense of touch. The device also produces a sound much the same way as a speech synthesizer (Espinola and croft 1992). Scholarly analysis of the device confirms that the thematic perspective associated with the device is in respect to its cost. Despite their usefulness, refreshable Braille displays are way beyond the financial reach of most persons with visual impairment .while the ideal situation would be to have a multi-line Braille display, the cost of manufacturing such displays would be prohibitive. In respect to these difficulties, the availability and use of the media is thoroughly limited. This study shall seek to investigate the extent to which stakeholders in the education of LVI in Turkana County are financially prepared to purchase/acquire the device and whether or not schools receive grants from donor to purchase the device.

Whereas the portable electronic note taker is a multipurpose device which not only takes notes but also; serve as a reading and writing media, gives access to the internet, records short telephone numbers and messages for later retrieval, executes ordinary and scientific calculations, keeps track of time and appointments and, facilitates composition and printing of essays, it has the disadvantages of being too costly with a limited capacity which cannot be upgraded until a new device is bought hence limiting the level to which it can be preferred in comparison to its alternatives (D'Andrea, 2009, Chong 2003 & Moodley 2014). Scholars argue that, even when all the limitations of the device are mediated, a learner may still fail to

use it as an AAT when a replacement is unavailable during the time it is damaged (Edward and Lewis, 1999). Owing to its recentness in the market, institutions, and schools there is an acute absence of research data on its application as an AAT hence the need for this study to determine the extent to which schools are endowed with trained personnel and suitable technicians to support its use.

Computers are the most complex AATs with the undisputed ability to perform all functions performed by other AATs combined. They are evaluated in respect of hardware and software components (Rodgers, 2003). While hardware refers to the physical component software is the information aspect of the technology (Aydn & Tasci, 2005). In the education of learners with Visual Impairment, speech output gadgets are the key software which allows the LVI to; navigate the screen, generate information, read documents, surf the internet and receive a verbal verification of what is being inputted in the keyboard (Chong, 2000). In Kenya, the computer-based education for all students is a policy entitlement spearheaded by the Government through agencies such as; the KICD which is responsible for the development of content and guidelines for the use of computers (the laptop program), the Ministry of Education and the Ministry of Information and Communication Technology (Ouma 2015).

While the educational success promised by a computer are enviable, research has revealed that preparedness for the application of computers and their relevant software as AATs poses enormous challenges regarding infrastructure, human resource and operational logistics yet very little research has been conducted in this area (Wiawzski, 2005). For instance, schools will require; electricity or alternative power supply, computer room, resource centre and a wide range of accessories for use with the computer but the absence of research as to the presence of these infrastructural requirements in schools of Turkana County and Kenya in general justifies the need for this study so as to generate evidence-based information on the status of the existing infrastructure and the interventions required for upgrading them.

In a survey conducted by Shraim & Khlaif (2010), the human input required for the successful implementation of computer-based learning in educational institutions revealed that; the main stakeholders are the learners, teachers, parents, and administrators not only in their capacities as human beings but as experts for the implementation of the computer-based programs. The implication thereof is that studies must be conducted to respond to the gap as to whether or not the teachers have had the necessary training, skills, and knowledge of AAT use. Ntukidem and Ashi (2009) pointed out that a majority of teachers of special needs children are not computer literate: How can they teach what they do not know? In the same vein, D' Andrea (2009) admits that “some teachers have never had the opportunity of touching or using some of the assistive technology, how can they teach or talk of about it to students?” This study is therefore timely for the need of determining the presence and distribution of teachers with training/expertise in computer-based AATs for the benefit of the LVI in the Inclusive primary schools of Turkana. The study will also investigate the existence of training opportunities available for the targeted stakeholders.

Discourse on computer-based AATs in the literature of recent times has raised concerns in regard to; the digital knowledge divide and strategies of bridging among teacher and learners in school setting, the cost of computers against the ability of the stakeholders to purchase/acquire them (Omede, 2013), availability of the devices as explained by the population of learners against the number of computers available ( Mwangi, 2013), extent to which responsible persons and bodies provide computers to the schools and learners as a policy entitlement (SNE, 2009), learners/teachers preference rating on computer-based AATs in comparison to Braille (D'Andrea, 2009) and, an analysis of the uses for which the computers based AATs are put to, i.e., whereas one set use them for educational tasks only like completing schools assignments another set may use them for entertainment, personal research, mobility, and orientation among other uses that are non-academic ( Moodley, 2014).

## **2.2 Awareness of Stakeholders on use of AAT Devices**

According to Conderman et al (2011), leading researchers and practitioners in the use of AAT devices in classroom settings for the wide variety of learners with disabilities (e.g., Bausch & Hasselbring, 2004 and Silver-Pacuilla, 2006) recommended integration of AAT use into teacher training programs as the main basis for enhancing teachers awareness of the environment in which AAT based education is to be provided. However, the most prominent articles about this research area were related AAT use in respect of; employment (D'Andrea 2014), independent travel (Moodley 2014), and success in higher education (Prensky 2001) thus leaving out discussions of AAT policy environment, instructional methods, AAT use evaluation techniques, adaptations and accommodations required, the psychosocial and pathological impact of AAT use and, the differential characteristics of AAT users that this research will concentrate on.

Learning institutions in Kenya are currently integrating technology into their teaching, administration and research work not only because of their usefulness but also for the need to comply with the national ICT policy of 2006. According to Farrel (2007), the policy was deliberately developed by the Ministry of Information and communication to improve the livelihood of all Kenyans by ensuring availability of accessible, efficient, reliable and affordable ICT services. In education, the policy was supposed to encourage the abandonment of traditional teaching methods and devices in favour of the newly emerging ICT based technological devices to improve the quality of teaching and to learn in the schools. Recent research publications on this subject have hinted that the implementation of ICT based learning in general and the use of AAT devices in schools for the visually impaired continues to be a global challenge due to stakeholders' ignorance of the policy environment (condermann et al. 2011). A similar view in Kenya is shared by Kochung (2003) and Ouma (2015) in Kenya hence the need to establish stakeholders awareness of AAT use as



provided/recommended by the Kochung report of 2003, the SNE policy of 2009 and the ICT policy of 2006.

According to NCIP (2014), some questions in regards to; the point at which teachers acquire knowledge of instructional methodologies and, how instruction is provided using AAT devices have independently emerged. Whereas the teachers are expected to have undergone an AAT Integrated pre-service training program, some AATs emerged after completion of their training hence occasioning the need for in-service training on a Inclusive basis. There is no research data as to the distribution of teachers who attended AAT Integrated pre-service training against those who benefited from in-service courses. Abner & Lahm, (2002) argues that, while professional development opportunities are limited for serving teachers, the rapid changes in technology dictates the need for continuous training to keep skills up to date. Further research is therefore required to determine the extent to which the serving teachers are aware of the newly emerging instructional methods for the dynamic AATs available

Effective teaching of a learner with VI requires the teacher to fully; identify learners' needs, be conversant with the wide variety of teaching strategies available and, integrate the most appropriate AAT based interventions. According to SPECED (2005), the teachers of the LVI must necessarily be able to undertake the evaluation. While evaluation may, on the one hand, imply the measure of the Childs' performance in a subject or groups of subjects in a given period, it is also a preparatory tool for determining the most appropriate AAT device to be used by the learner after assessment of his/her abilities and potentials against learning environment. The need to determine teachers' awareness of evaluation methods is therefore critical in establishing teachers' ability to recommend the most appropriate AAT device to use. This research intends to establish teachers/stakeholders awareness of evaluation techniques and measure the outcome of the application of such technique.

Further, the teacher is expected to be aware of the most appropriate adaptation/accommodation needed among the many possible accommodations that exist. Other adaptation areas where awareness is required include, an organization of a learning environment that is uniquely applicable to the use of AAT device, implementation of a positive behaviour support program, effective use of a technical language of the devices, assessment and evaluation procedures of the devices and, professionalism/ethics of using the AAT.

According to Mwakyeja (2013), it is very important that a teacher knows how the loss in vision influence the learning process (Sacks & Silberman, 1998). Visual information is crucial in helping children observe and interpret what happens in the environment. It is also an important prerequisite for conceptual development in a student's learning. Malformation and destruction of this part of the body, brings about a reduced amount of sensory data to the learner, leading to deficit or delay in various skills learned through watching and imitation from others. This impacts language development, reasoning skills, problem-solving abilities and abstract thinking. This finally causes great impact on the individual's learning and performance, because a student cannot observe and use visual information to interpret various learning situations happening in the environment (Bishop, 1996; Fraser & Maguvhe, 2008; Webster & Roe, 1998). If visual impairment occurs during early childhood, cognitive and language development is impaired (Bishop, 1996). But if the loss of vision is after five years, below which visual memories cannot be retained, then there will be some visual memories. This visual memory will be very helpful in the learning process through the construction and formation of images, and concepts later by relating the new concept and experience acquired earlier in life (Webster & Roe, 1998). While it is possible that teachers are aware of the developmental characteristics of learners and the corresponding impact of visual impairment, Prensky (2001), adds that extra awareness is expected of the same team in respect to;

psychosocial implications of using AAT devices among the LVI and the family, the possible pathological implications of using AAT devices and the relationship between the effectiveness of the latest AAT device in comparison to that which was used before.

Stakeholders are equally expected to be aware of individual learner characteristics which may affect learners' abilities, preferences and opportunities in using the AAT devices. For instance; effects of the device on eye conditions, visual behaviour, and attitude of the learner and experiences of the learner are regarded as key factors in determining the differential characteristics of each learner in the use of AAT devices. Whereas learners whose visual behaviour can withstand the bright light of the computer screen may prefer the computer to the audio tape, learners with additional disability in hearing impairment may not have the ability to use the audio alternatives similarly. According to Susan et al (2003), in a situation where two or more learners have been assessed as having the same diagnosis and visual acuity, they may each learn and function in different ways hence the need for the teacher to be aware of characteristics that separate learning needs of one set of learners from the other sets. The scholar moves on to suggest that the expected areas of awareness include; the type and severity of visual impairments, extend to which the learner uses residual vision, resources and equipment available for the learner and, presence of additional disabilities.

### **2.3 Attitude of Stakeholders on use of AAT devices**

Attitude has been recognized as one of the most important barriers to the effective implementation of social and technological interventions for which AAT use in Inclusive primary schools is an integral part (Samah & Fooi, 2009) yet as observed by Mwangi (2013) the impacts, forms, nature, and sources of attitude-related problems on the part of LVI, their teachers and parents have not been explored through research hence the need for further studies on the place of attitude in the education of learners with disabilities.

Available research indicates that teachers are both builders and exercisers of attitude traits. Whereas Teachers can play a significant role in promoting positive attitudes and motivating individual learners who are users of AAT devices by providing different skills, instructions, and relevant practices, the teacher is also bound to break down and become critical of the difficulties surrounding teaching of AAT devices. To this extent, Oxley (2010) identifies attitude as a barrier or handicap that negatively affects the teaching process in the use of AAT devices hence limiting learners' full access to the curriculum. There is need to explore the role of teachers in attitude formation and control in respect to the use of AAT to effectively maximize the cultivation of positive attitude among AAT user and minimize the occurrences of negative attitude on their part.

The attitude problem in school programs has also been noted as deeply ingrained in the language used in reference to learners who use the assistive devices. According to <http://www.hrhc-drhc.gc> (2004), when a learner or teacher refers to his/her peer as the handicapped instead of a person living with disability, the negative attitude is fore grounded much the same way when the resource room that has the assistive technology devices is referred to as the room for the handicapped instead of the accessible or barrier-free classroom. However, the actual spread of such terminologies has never been investigated in Kenya hence the need for this research.

The government of Kenya also looks at the problem of attitude towards learners who use AAT devices. While its research was limited to the source of negative attitude as arising from misconceptions that are prejudicial and discriminative, the research did not concern itself with modern alternative assistive technology devices but the traditional Braille only. According to Groves (2004), attitude is never static and may change with time or situation. While both the time of the Government of Kenya research has changed and new technologies have emerged, there is an absence of data in respect to the changes.

In general, research on attitude towards educational resources has been organised to compare the prevailing situation between girls and boys who share disability issues (GoK, 2009; Murphy 2008 & NEA 2008). In Kenya for instance, the community and society have a negative attitude towards people with special needs and use of AAT devices; however, the situation is worse for the girl child since they face a bigger challenge than their male counterparts. The problem is even deeper since the dropout rate for girls with special needs and disabilities is high due to teachers who may not be sensitive to the needs of these kinds of learners (GoK, 2009). While the foregoing is true, no research has since been conducted to determine the impact of attitude on the supply of AAT devices between the boy and the girl child schooling in Inclusive primary schools in Turkana County.

Conderman et al. (2012) undertook an empirical study to determine teachers' attitudes in relation to four other aspects namely; familiarity with AAT devices, comfort level in the use of AAT devices, teachers preparedness for application of AAT devices and, the level of teachers satisfaction with teaching methods available for imparting knowledge of using AAT devices. His research established that; while both attitude and familiarity were important concepts in determining the level of teachers' preparedness in supporting the use of assistive technology devices, the scores for the two varied so widely that the relationship between them appeared vague. The research further failed to comment on the expected relationship between attitude and teaching methods used as was envisioned. This research shall strive to establish a factor that determines attitude not only of the teachers but also of the concerned students and parents in the resource-strained environment of Turkana County.

In the absence of research evidence from Kenya, work done in other countries may provide useful ideas. Generally, stakeholders' beliefs, practices, and attitudes are important for understanding and improving educational processes. As stressed by Ferguson (2008) attitudes are closely linked to stakeholders' strategies for coping with challenges in their daily

professional lives. Research from different countries shows how several factors contribute to the effectiveness of AAT devices in Inclusive school settings. Some of these factors range from the nature of the disability (Hodkinson, 2009; Corbett, 2001; Moses, 2000, Scruggs and Mastropieri, 1996), children's behaviour (OFSTED (UK), 2004) and extreme behavioural difficulties (MacBeath and Galton, 2007). According to Avramidis and Norwich (2002) teacher's favour the use of AAT devices for children with mild sensory impairments rather than those with severe sensory disabilities.

Provision of internal and external resources and support systems improve the attitude of teachers towards the inclusion of LVI in Inclusive classrooms and use of AAT devices in supporting learning processes. Increased training- especially in the application of technology and its various devices for curriculum access, is also associated with more positive attitudes which make teachers favour the inclusion of students with disabilities in their classes and feel that they can maximize their teaching efficiency in serving these students (Hanko, 2003; Avramidis and Norwich, 2002; Opdal, Wormnaes and Habayeb, 2001; Cornoldi et al., 1998; Scruggs and Mastropieri, 1996). In view of this, it is imperative for this study to determine the support services and training opportunities available for the teachers of Turkana Inclusive primary schools and the impact of the training on attitude change.

Studies in African countries about teachers' attitude towards the inclusion of LVI and their AAT devices such as in Nigeria; Fakolade, Adeniyi, and Tella (2009) and Ghana, Agbeneyga (2007) showed that professionally qualified teachers tend to have a more favourable attitude than teachers who are not professionally qualified. In Nigeria, it showed that teachers who lacked professional knowledge and skills to instruct in the use of AAT devices in Inclusive schools settings had a higher level of negative attitude as compared to the professionally AAT trained counterparts. They also highlighted those female teachers have a more positive attitude towards the use of AAT than their male counterparts regardless of the level of

training and expertise. Whereas the outcome of the study in Nigeria and Ghana may be true, it remains unknown if similar findings are possible for Kenya in general and Turkana in particular. This research shall seek to fill the gap by comparing the attitude of the teachers in the Inclusive primary schools for the VI with respect to professional qualification and the gender divide.

Even though students find it difficult to migrate from the traditional to the new modes of learning when they are not confident in handling the new modes, negative learners' attitude and poor perception towards the new modes have been cited as the possible reason for the reluctance experienced (Datuk & Ali, 2008). In a survey conducted by Harnett et al. (2011) it was established that learning institutions embracing ICT based education realised that students behaved differently to the changing paradigm of learning until when the courses were specifically tailored to support the new learning styles largely due to the negative attitude. Consequently, Koohang & Durante (2003) argued that it was imperative to be.g.in the ICT implementation process by understanding factors that influence students' belief and attitudes towards the new learning modes yet very little scholarly attention has accorded to this area hence the initial rejection commonly experienced. Whereas this research acknowledges the previous contribution, it must also be noted that the concern of the study was open to all ICT based technological devices but not those specific to the ICT based AATs for learners with visual impairments and their schools.

It is important to note that in relation to attitude; the researcher shall use questionnaire and observation schedule where applicable to determine the prevalence of; abusive language used against AAT devices and users, demeaning names given to AAT users in the Inclusive schools, preferential treatment of the boy child as compared to the girl child, teachers influencing learners attitude towards AAT use in schools, curriculums that are inflexible and does not permit appropriate adaptations and accommodations, parents who are unprepared for

the introduction and use of AAT devices due to prohibitive cost of the required devices and, teachers with limited knowledge on handling AAT use and evaluation. The study also investigated the respondents' attitude towards the position that Braille may not be replaced by AATs even though the alternatives are perceived to be more superior.

#### **2.4 Summary of Research Gaps**

The stated problem of this research is that; while the educational environment for LVI seems to favour a paradigm shift from the use of the traditional mode of Braille to the use of audio, electronic and multimedia-based alternatives, the readiness of teachers, learners EARCs and parents who are expected to support the change remains unexplored in scholarly research in respect to device availability readiness, awareness and existing knowledge gap and, psychological preparedness. However, if research continues to ignore this concern and fails to recommend appropriate interventions the current educational and future employment needs of LVI will remain unmet.

The available literature has been insufficient in providing the needed data that can facilitate the formulation of response required. In the analysis of AATs, literature cannot effectively respond to; the number of LVI's against the inventory of AAT devices available for them so as to determine device availability gaps, the inventory of AATs available against the devices suppliers so as to determine the device supply gap, the inventory of devices against stakeholders behavioural input like perceived ease of use, preference and perceived ease of access so as to determine the preference patterns and ease of use gaps.

In the analysis of stakeholders' awareness, the recorded literature cannot effectively respond to gaps in respect to; appropriateness of the source from which awareness of AAT was gained by the stakeholders, stakeholders awareness of other purposes for which the AATs can be used for, stakeholders' knowledge of the philosophical foundation that support use of



AATs in schools, stakeholders' awareness of the psychosocial and pathological implications of AATs, stakeholders awareness of the comparable merit/demerits of different AATs, teachers awareness of the instructional methods to be used in imparting knowledge of using AATs among the LVI, stakeholders awareness of the various accommodations and adaptations that must be in place in order to use AATs, stakeholders knowledge of professional and ethical considerations required in the use of AATs and, stakeholders knowledge of the methods for evaluating LVI using the AATs.

In the analysis of stakeholders' attitudes, the recorded literature cannot effectively respond to; the words/language used by stakeholders in the inclusive learning environment and, differences in the teachers and learners attitudes against the boy and girl child with VI in the inclusive learning environment. (Bureau of Labor Statistics, 2005)

## **CHAPTER THREE**

### **RESEARCH METHODOLOGY**

#### **3.1 Research Design**

To meet the goals of the study, a descriptive survey design was used. The design involved acquisition of information about one or more phenomenon through the use of questionnaires, interview, and observation schedules. It is a design widely used in educational studies and is suitable when the researcher wants to survey, collect and systematically analyse information to answer the questions of what things are like (Gall & Borg, 1996 and De Vaus, 2002). Besides, it allows for the generation of an accurate description of a phenomenon; establish opinions, competencies, attitudes, and suggestions for improvement (Gall & Borg 2007). The descriptive nature of this design makes it suitable for this study since the goal was to establish the level of stakeholders' preparedness in terms of availability of AAT devices, awareness and attitude readiness for the use of AAT devices among LVI in Inclusive primary schools in Turkana County.

#### **3.2 Study Area**

The study was conducted in Turkana County which is located in the upper North-Rift part of Kenya. The County is bordered by Pokot to the Southwest, the republics of Uganda to the west, Southern Sudan north and Ethiopia to the northeast. On its eastern side lies the County of Marsabit. The County grid reference is 1030' latitude and 5000' longitude. The approximate land mass cover is 77,000 km<sup>2</sup>. 98% of the area is classified as arid or semi-arid with a vegetation cover of savannah grasslands, bushes, and shrubs.

According to the latest Wealth distribution survey by the Ministry of Devolution and Planning ( Daily Nation, Nov 11th, 2014), the Turkana region is; The third poorest county in Kenya with a poverty index of 87.5%, has the least mobile phone ownership per family at 15.9%, it is the third poorest county on ownership of television sets at 3.2%, it has the

poorest ownership and access to radio and audio media services at 17.5% and, only 1.8% of the population can access and use multimedia and internet services. Further, a survey by the Kenya National Bureau of Statistics (2014) indicates that the region has; 86.7% level of illiteracy, 56.04% of primary school dropout rates and 69.06% prevalence of persons with VI who has no access to education.

The choice of Turkana County as the area of study was informed by the provided statistic which indicated that the county has the highest vulnerability to poverty, high rates of school drop-out and, poorest access to information that is based on audio, electronic and multimedia technology. All these factors can impact negatively on the level of preparedness of stakeholders to use AAT devices.

### **3.3 Study Population**

The study population was one hundred and two (102) learners with visual impairment, sixty-five (65) teachers, six (6) EARC officials and forty (40) parents. They were drawn from nine (9) primary school with LVI in Turkana County.

### **3.4 Sample Size and Sampling Techniques**

Saturated sampling techniques were used in the study. According to Best & Khan (2006), the technique for selecting a sample size from the study population in research that has more than one cluster of respondents must ensure that all categories of population present are included. In this study, the researcher followed the advice of Borg et al. (2007) who explained that, while studying small homogenous populations; saturated sampling technique is the most recommended since the technique allows for a true percentage measure of 90% across the different clusters of respondents. For the elimination of bias, the remaining 10% of all the clusters were used as the sample for the pilot study hence ensuring that all the members of the

population participated in the study at two different levels. Table 3.1 illustrates the sample sizes based on saturated sampling.

**Table 3.1 Sample frame**

Cluster of respondent	Population size	sample size	% of sample to population
Learners	102	92	90
Teachers	65	58	90
EARCs	06	05	90
Parents	40	36	90

Source: Survey data 2018

### **3.5 Instruments for Data Collection**

Data was collected using instruments/tools whose description based on; target/respondent of the tool, form of the tool e.g. close or open ended, contents of the tool, way/technique of administration e.g. self –administration method and, the type of data e.g. primary or secondary they will collect is as described below;

#### **3.5.1 Learners Questionnaire**

It was a tool for collecting primary data on the issue under investigation from the perspective of the targeted LVI. The form of the tool had only close-ended questions some of which had a five-point Likert scale from which the respondent was expected to make the most appropriate choice. It was designed to elicit responses from the learners regarding; their views on the availability of AAT devices, awareness and attitude of learners towards AAT use facilities and environment. It was self-administered in either braille or print format where applicable to all the learners to take care of the different reading abilities. The tool has been attached as Appendix 1.

### **3.5.2 Teachers Questionnaire**

It was a tool for collecting primary data on the issue under investigation from the perspective of the targeted teachers. The form of the tool had close-ended questions some of which have a five-point Likert scale from which the respondent was expected to make the most appropriate choice. It was designed to elicit responses from the teachers regarding; teachers views on the availability of AAT devices, awareness and attitude of teachers towards AAT use facilities and environment. The tool was administered by way of drop and collect technique as it was appropriate. The tool has been attached as Appendix 2.

### **3.5.3 EARC Officers' Questionnaire**

It was a tool for collecting primary data on the issue under investigation from the perspective of the targeted EARC officials in Turkana County. The form of the tool had close-ended questions some of which have a five-point Likert scale from which the respondent was expected to make the most appropriate choice. It was designed to elicit responses from the EARC officials in assessing schools preparedness in respect to use of AAT devices on; stakeholders' attitude readiness, AAT use facilities readiness and appropriateness of AAT use environment. The tool was administered by way of drop and collect technique as it was appropriate. The tool has been attached as Appendix 3.

### **3.5.4 Parents Interview Schedule**

It was a tool for collecting primary data on the issue under investigation from the perspective of the targeted parents. The form of the tool was mainly open-ended. It was designed to elicit responses from the parents for assessing schools preparedness in respect to use of AAT devices on; parents' attitude, parents' contributions and input, AAT use facilities and appropriateness of AAT use environment. The tool was administered by way of the self-interview technique only. The researcher administered a total of thirty-six (36) interview

schedule for the entire sample population of the parents owing to their perceived inability to read and write.

### **3.5.5 Observation Schedule**

It was a tool for collecting primary data that was self-administered. The purpose of the tool was to facilitate the provision of descriptive accurateness of the device used in respect to the availability of AATs, stakeholders' attitudes and awareness demonstrated by routine practices as was observed. The tool was organised to record and describe all AAT resources observed, and activities/actions/behaviours witnessed.

### **3.6 Validity and Reliability**

Babbie (2010) defines reliability as, 'a matter of whether a particular technique, applied repeatedly to the same object, yields the same result each time. De Vellus (1991) further explains that reliability is, 'the proportion variance attributable to the true measurement of a variable.' Orodho (2004) explains that reliability is a means of estimating the consistency of measurements over time or successful trials. Mugenda (2011) put reliability as the measure of stability. Babbie (2010) suggested that reliability can be established through; test retest method, split half approach, and, use of established measurements. Reliability in this study was attained following test retest method in which the three questionnaires under trial were first piloted to the respective respondents and second administered to the same group over an interval of three weeks. The results of the two pilot tests were compared.

During the first administration, the results for the Pearson correlation coefficients were; learners' questionnaires 0.72, teachers' questionnaires 0.74 and EARC officials' questionnaires 0.82. After the retest the Pearson correlation test coefficient results were; learners' questionnaires 0.74, teachers' questionnaires 0.75 and, EARC officials' 0.85. The higher scores in the retest were attributed to the various adjustments that were made after

detecting the shortcomings in the first administration. The results of the pilot study were however not included in the study.

### **3.6.1 Reliability of Instruments**

### **3.6.2 Validity of Instrument**

This is the extent to which an instrument measures what it purports to measure (Nichiamis, 1998 & Mugenda 2011). Validity measure tends to establish the relationship between the data and the variables. In this sense, it is the degree to which the empirical measure of the concept accurately measures the concept. Orodho (2004) explains that a non-statistical method is the best to enhance the meaningfulness and accuracy of the content employed in the research tool. Orodhos' method of determining validity was used in this research. The study used this method to establish face validity by approaching an expert in research, special education in Maseno University and school administration who give their views for enhancing the relevance of the content of research tool.

### **3.7 Procedure for Data Collection**

The steps that were involved in this procedure included; seeking for permission from the school of postgraduate studies and ministry of education. The local administrators of target schools were notified of the intention to collect data so that they could facilitate access to target teachers, learners, and parents. The researcher then undertook a pre-visit to the target schools and adapted himself with the stations, created rapport with the respondents and pre-tested the tools in two intervals for the targeted 10% population of the respondents. The tools were re-administered after the pilot study.

### **3.8 Methods of Data Analysis and Presentation**

Data collected from the questionnaire was scored and coded manually into the statistical package for social sciences (SPSS) version 21.0. The positively stated statements on the five-

point Likert scale were coded and scored as; strongly agree (SA)=5, agree (A)=4, undecided (UN)=3, disagree (D)=2 and strongly disagree (SD)=1. The negatively stated statements were coded and scored as; strongly agree (SA)=1, agree (A)=2, undecided (UN)=3, disagree (D)=4 and strongly disagree (SD)=5. The range of interpretation and discussion of weighted mean for the individual statements and overall mean for the positively stated statements were strongly disagreed 1.0-1.9, disagree 2.0-2.9, undecided 3.0-3.9, agree 4.0-4.9, strongly agree 5.

Quantitative data were analysed using descriptive statistics such as frequency counts, percentages, arithmetic mean and weighted mean for grouped data and generation of overall mean. Results were presented using tables and graphs generated from the SPSS software output. Qualitative data from observation and interview schedules were organized, put into various categories and reported as themes and sub-themes emerged. From each theme, an appropriate table was developed to facilitate the development of viable and valid descriptive inferences that are statistically verifiable regarding conclusions, summaries, and recommendations.

### **3.9 Ethical Considerations**

Ethical consideration was regarded as consisting of four actions to be undertaken by the researcher as follows;

#### **3.9.1 Strict Adherence to Research Authorization Requirements**

Since data was collected from the school and home setting targeting the parents, teachers and learners as well as the office setting for the EARC officers, the researcher observed strict adherence to the data collection authorization process by; seeking and receiving authority from the University's ethical review committee and the school of graduate studies to proceed to the field for the said data collection. Research Permit License to carry out the research study was sought and received from the National Commission for Science, Technology, and



Innovation (NACOSTI). Subsequent authorization by the County Administration and Education officials in Turkana was sought from the relevant offices at the Turkana County headquarters in Lodwar.

### **3.9.2 Development and Administration of Informed Consent Forms**

The researcher developed and administered an informed consent form with the following contents; sensitization about the research communicated through respondents education, enhanced voluntary participation and asking of questions as a respondent, an explanation of the procedures of maintaining confidentiality based on use of names, pseudonyms and anonymisation of data, etc., data protection procedures based on restricted access research and controlled archive purposes, the inclusion and exclusion criteria based on the signing or no-signing of the study informed consent form and, an explanation of the benefit of the study as being the process by which a platform of addressing existing AAT use readiness gap.

### **3.9.3 Undertaking of Respondents Education**

The researcher conducted a respondents' education with a view of increasing their awareness towards the content and form of the research. The sensitization program was a face to face meeting where the following matters directly affecting the respondents was communicated; filling of the informed consent form, voluntary participation, the steps to be taken to confirm and ensure confidentiality of the process and, referral process and actions to be taken when a vulnerable and needy respondent is encountered

### **3.9.4 Confidentiality**

The researcher collected the data in confidence. Respondents were advised not to disclose their personal and school identity in the instrument. The researcher also added a statement of confidentiality which clearly stated that the information collected would be used for research purposes only and was therefore confidential. In reporting the findings, only pseudo names

were used as opposed to real names, a detailed copy of the respondents' consent form is also attached as Appendix 6 to highlight aspects of confidentiality adhered to.

## **CHAPTER FOUR**

### **RESULTS AND DISCUSSIONS**

#### **4.1 Introduction**

This chapter presents the results and discussion of the study findings. The chapter is organised in three themes relating to the objectives of the research i.e. to;

- 1) Establish the AAT devices available for use by learners with visual impairment in Inclusive primary schools of Turkana County
- 2) Establish stakeholders level of awareness on the use of AAT devices among learners with visual impairments in Inclusive primary schools in Turkana County
- 3) Determine stakeholders' altitude towards the use of AATs devices among learners with visual impairment in Inclusive schools of Turkana County.

Data for each theme is presented analysed and discussed in that order using frequency tables, percentages and means where applicable.

#### **4.2 Availability of AAT Devices for Use**

The first objective of the study was to establish the AAT devices available for use by learners with visual impairment in the nine Inclusive primary schools of Turkana County. An assessment of availability of AAT devices across the schools was considered to be significant in providing descriptively accurate and observable information in respect to; the count/number of AAT devices available, the distribution of AAT devices across the target schools, whether the available AAT devices were used or not, providers of AAT devices and, adequacy of the available AAT devices as perceived by stakeholders. The results for the five sub-themes are presented as follows;

### 4.2.1 The Count/number of AAT Devices available for use in Inclusive Schools

Data on the count/number of AAT devices available for use by the LVI in the nine Inclusive primary school of Turkana County was collected using an observation schedule that was self-administered by the researcher. As was proposed in chapter three, the schools were coded using numbers to maintain confidentiality and adherence to the ethical considerations of research. Table 4.1 represents the findings of the count of AAT devices in respect to each of the nine schools.

**Table 4.1: Count of AAT devices available in respective schools.**

<b>Device/school</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>	<b>9</b>	<b>Count</b>
<b>Audio tapes</b>	0	0	0	3	0	0	1	0	0	<b>4</b>
<b>Talking books</b>	0	0	0	1	0	0	1	1	0	<b>3</b>
<b>Live reader</b>	3	4	3	7	1	3	3	2	4	<b>30</b>
<b>Optacon</b>	0	0	0	0	0	0	0	0	0	<b>0</b>
<b>Note taker</b>	0	0	0	0	0	0	0	0	0	<b>0</b>
<b>Computer with speech</b>	0	0	0	1	0	0	0	0	0	<b>1</b>
<b>OCR scanner</b>	0	0	0	0	0	0	0	0	0	<b>0</b>
<b>Refreshable Braille display</b>	0	0	0	0	0	0	0	0	0	<b>0</b>
<b>Total count</b>										<b>38</b>

Source: Survey data 2018

**Key: 1,2,3,4,5-9 represents individual schools**

The findings in table 4 indicate that the count of AAT devices available for use in Inclusive primary schools was; four (4) audiotapes, three (3) talking books, thirty (30) live readers and, one (1) computer with speech output. AAT devices such as optacon, note taker, OCR scanner and refreshable braille display machine were not available in any of the nine schools under investigation.

The finding of the study reveals the deviation from the standard practice of one equipment to one user as was recommended by both national and international policies such as Individuals with disability education Act (1999), Equal opportunity Commission (2010), disability

discrimination ordinance law (2010) and the special needs education policy of Kenya (2009) since all the devices against the number of users did not measure up to the recommended 1:1 ratio. The study further concurs with the Kochung Taskforce report of 2003 that noted the possibility of an acute shortage of electronic AAT devices in comparison to the less sophisticated audio devices used by learners with disabilities in general. In this case, the audio media devices such as audio tapes, talking books, and live reader outnumbered all the mechanised and highly sophisticated electronic devices across the nine schools under investigation.

#### **4.2.2 The Distribution of AAT Devices Available for use in Inclusive Schools**

Data on the distribution of AAT devices available for use by the LVI in the nine Inclusive primary school of Turkana County was collected using an observation schedule that was self-administered by the researcher. The researcher found it significant to examine the distribution of AAT devices across the schools to determine the presence/absence of particular AAT devices across the nine schools. As was proposed in chapter three, the schools were coded using numbers to maintain confidentiality and adherence to the ethical considerations of research. Table 4.2 represents the findings of the distribution of AAT devices in respect to each of the nine schools.

**Table 4.2: Distribution of AAT devices available for use in Inclusive schools**

<b>Device/school</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>	<b>9</b>	<b>Totals</b>
<b>Audio tapes</b>				<i>1</i>			<i>1</i>			<b>02</b>
<b>Talking books</b>				<i>1</i>			<i>1</i>	<i>1</i>		<b>03</b>
<b>Live reader</b>	<i>1</i>	<i>1</i>	<i>1</i>	<i>1</i>	<i>1</i>	<i>1</i>	<i>1</i>	<i>1</i>	<i>1</i>	<b>09</b>
<b>Optacon</b>										<b>0</b>
<b>Note taker</b>										<b>0</b>
<b>Computer with speech</b>				<i>1</i>						<b>1</b>
<b>OCR scanner</b>										<b>0</b>
<b>Refreshable Braille display machine</b>										<b>0</b>

Source: Survey data 2018

*Key: 1,2,3,4,5-9 represents individual schools, within the table represents absent 1 represents presence*

The findings in table 4.2 indicate that, apart from the live reader that was present in all the nine schools and therefore recording 100% distribution, audio tape was distributed in two schools only, talking books in three schools, and computer with speech output in one school only. The Optacon, note taker, OCR scanner and refreshable Braille display machine were absent in all the nine schools.

The study indicates that the AAT devices with presence across the nine schools from the most distributed to the least distributed were the live reader while the least distributed was electronic media alternatives optacon, OCR scanner, refreshable Braille display machine and note taker at zero (0) distribution in all the schools. Other AAT devices were; talking books (03), audio tapes (02) and, computer with speech output (01).

The finding of the study concurs with the outcome of the Kenya National Bureau of Statistics report of (2009) and GoK (2014) surveys which highlighted the acute shortage of electronic-

based devices and the large deviation of Turkana from the national average in respect to presence and ownership electronic devices. In this case, the AAT devices based on electronic format had the least presence and distribution in the schools, yet the audio devices that are manual have the greatest presence and widest distribution across the schools.

### 4.2.3 Use of Available AAT Devices in Inclusive Schools

The study sought to determine the use of AAT devices among learners with visual impairments in Inclusive primary schools in Turkana County. The data was collected through an observation schedule. Table 6 illustrates the findings

**Table 4.3: Use of the available AAT devices in Inclusive schools**

AAT device	Number of schools used	Number of schools not used
Audio tapes	2	7
Talking Books	3	6
Live reader	9	0
Optacon	0	9
Note takers	0	9
Computer speech output	1	8
OCR scanner	0	9
Refreshable braille display	0	9

Source: Survey data 2018

According to table 4.3, live reader was the most used AAT device in nine schools, followed by taking books in three schools, audiotapes was used in two schools and computer with speech in only one school. Devices such as the optacon, note takers, OCR scanner and the refreshable braille machine were not used in any of the nine schools.

The findings concurs with the findings by Mwangi (2013), Kochung task force report (2003) and the Kenya National Bureau of Statistics (2009) which indicated that both the Arid and Semi-Arid Lands (ASAL) and schools in marginalised areas were prone to acute shortage of

basic infrastructural resources such as power connection, resource rooms, technicians, furniture, safety equipment and locks hence making it impossible to use AAT devices for learning activities.

#### **4.2.4 The providers of AAT Devices Available for use in Inclusive Schools**

Swenson (1988), Bettelheim and Zelan (1982) and Southgate (1984) emphasises the importance of building a solid foundation for reading and writing for learners with visual impairments by making the reading and writing assistive devices available. This idea is further reinforced by Moodley (2014) who asserted that the supply of AAT devices to the affected learners had a direct impact on stakeholders' readiness to use AATs in schools. Data on the providers/suppliers of AAT devices available for use by the LVI in the nine Inclusive primary school of Turkana County was therefore collected from fifty-eight (58) teachers and five (5) EARC officials using respective sets of questionnaires that were self-administered by the researcher. A list of seven (7) suppliers including parents, donors, NGOs, government, sight savers international, Kenya Society for the Blind (KSB) and the Kenya National Library Services (KNLS) were pre-identified from which the respondents were to rate with a, yes, to indicate provision of AAT devices or no to indicate non provision of AAT devices. The results are presented in table 4.4.



**Table 4.4: Teachers and EARC rating of providers of AAT devices**

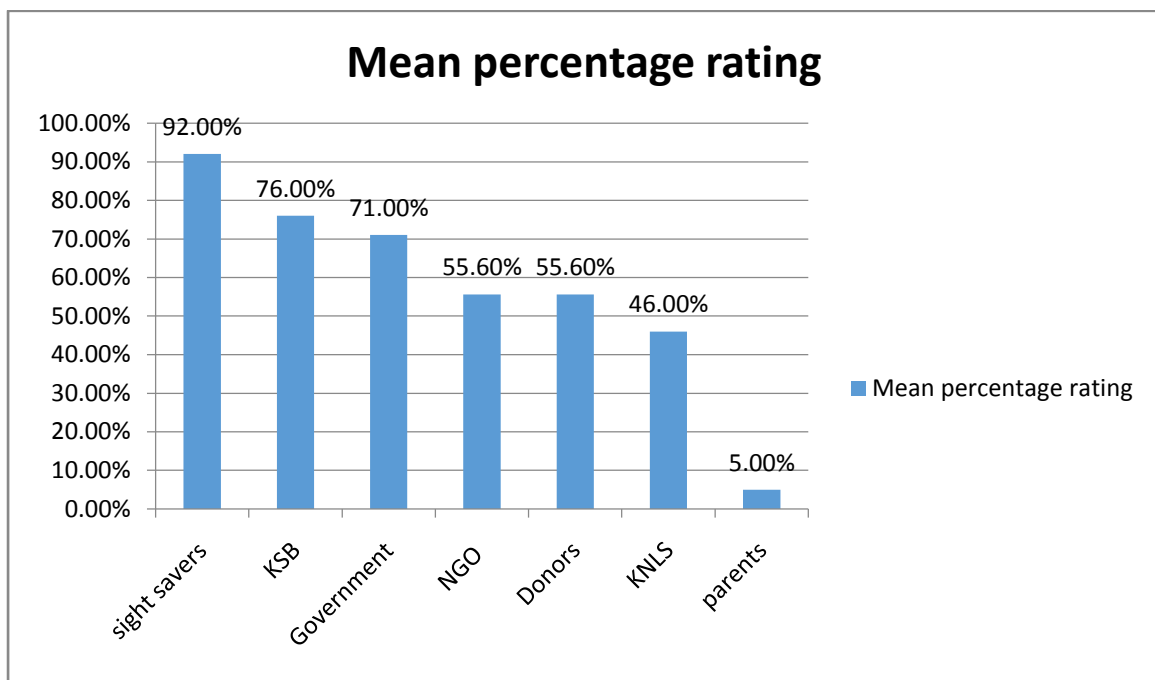
Supplier	Teachers T(n=58)		EARC E(n=05)		% Mean score( (n=T+E/2)
	Provide(yes)	Don't provide(no)	Provide(yes)	Don't provide(no)	
Donors	55.2%(32)	44.8%(26)	60%(03)	40%(02)	55.6%(35)
NGOs	53.5%(31)	46.5%(27)	80%(04)	20%(01)	55.6%(35)
Government	72.4%(42)	27.6%(16)	60%(03)	40%(02)	71%(44)
Sight savers	91.4%(53)	08.6%(05)	100%(05)	0%(0)	92%(58)
KSB	77.6%(45)	22.4%(13)	60%(03)	40%(02)	76%(48)
Parents	03.5%(02)	96.5%(56)	20%(01)	80%(04)	05%(03)
KNLS	46.6%(27)	53.4%(31)	40%(02)	60%(03)	46%(29)

Source: survey data 2018

*Key: % mean score is for provision (yes) only T=teachers, E=EARCs*

Table 4.4 shows the various providers of AAT devices in the Inclusive schools as stated by the fifty-eight (58) teachers and five (05) EARC officials who responded to the respective research questionnaire. Findings revealed that according to the fifty-eight (58) teachers, the AAT device provider with the most supply was sight savers international stated by fifty-three (53) representing by 91.4%, followed by KSB noted by forty-five representing 77.6%, government indicated by forty-two (42) representing 72.4%, donors stated by thirty-two (32) representing 55.2% NGOs reported by thirty-one (31) representing 53.5%, KNLS noted by 27 representing 46.6% while the least provider was parents stated by two (02) representing 03.5%. According to EARC, the provider with the most supply was sight savers international stated by five (05) EARCs representing 100%, NGOs stated by four EARCs representing 80%, both the donors, government and the KSB stated by three (03) EARCs representing 60%, KNLS stated by two (02) EARCs representing 40% while the least was parents stated by one (01) representing 20%.

Further analysis of the data in respect to providers of AAT devices indicated that; On comparing the providers, the average rate of provision from the highest to the lowest was sight savers international stated by 92% of the respondents, KSB stated by 76% of the respondents, Government 71%, NGOs and donors stated by 55.6%, KNLS stated by 46% and parents stated by 05% of all the sixty-three (63) respondents. The ranking are as shown in the graphical figure 4.1.



**Figure 4.1: Suppliers of AAT to Inclusive Schools**

From the findings, it is evident that most respondents stated that sight savers which is an international organization concerned with education for learners with visual impairments is the key supplier of AAT devices to the learners of the target schools with significant participation of local organizations like the Kenya society for the blind, the government and donors while parents were the least participants.

Findings of this study was in agreement with the findings of previous researchers, who pointed out that there exists the problem of the prohibitive cost of AAT devices (Espinola& Croft 1992), unavailability of the devices in markets frequented by parents (D’Andrea 2009)

and, the apparent lack of awareness/information on AAT use (Chong 2003 & Moodley 2014) as the factors limiting parents participation as suppliers of AAT devices. The findings is also consistent with both Kochung report of 2003 and the SNE policy of 2009 findings that the government should play a greater role in ensuring provision and steady supply of all AAT devices to the intended users since LVI are entitled to these devices by law yet the participation of government as AAT providers was lower than that of charitable organization.

#### **4.2.5 Perceived adequacy of the available AAT devices in Inclusive schools**

Data on the adequacy of the available AAT devices as perceived by the different set of stakeholders was collected using the respective questionnaire with a close-ended question. According to D'Andrea (2009), Sider and Maich (2014) and Espinola & Croft (1992), for the stakeholders to be ready for the introduction and use of AAT devices in Inclusive school for learners with visual impairments, there is need to comply with policies which recommend and justifies supply of AATs in numbers that are sufficient. A list of eight (8) AAT devices was presented to the ninety-two (92) learners, the fifty-eight (58) teachers and five (05) EARC officials under investigation to state whether they were adequate or inadequate. The summary findings and results are as presented in the two sets of table 4.5.

**Table 4.5 Respondents rating of the adequacy of the audio devices**

AAT device	Learners (n=92)		Teachers (n=58)		EARC n=5		$\frac{(L+T+E)}{155}$
	Adequate (L)	inadequacy	Adequate (T)	inadequate	Adequate (E)	inadequate	Average adequacy
Talking books	04(4.3%)	88(95.7%)	08(13.8%)	50(86.2%)	01(20%)	04(80%)	13(8.4%)
Audio tapes	20(21.7%)	72(78.3%)	11(18.9%)	47(81.1%)	01(20%)	04(80%)	32(20.7%)
Live reader	20(21.7%)	72(73.8%)	56(96.6%)	02(3.4%)	01(20%)	04(80%)	77(49.7%)

Source: survey data 2018

The table shows respondents rating of the perceived adequacy of the available audio device equipment. Among the learners, the study found out that; live reader and talking books were perceived as the most adequate at 21.7% represented by twenty (20) out of the total ninety (92) learners while audio tapes rated at 4.3% adequacy represented by four (04) out of the 92 learners. Among the teachers, live readers were perceived as the most adequate at 96.6% represented by fifty six (56) teachers, followed by talking books at 18.6% represented by eleven (11) while audio tapes at 13.8% represented by eight (08) teachers. Among the EARC officials, all the three devices scored 20% adequacy rating represented by one (1) official. According to these findings, the average rating of adequacy by respondents revealed that live reader was the most adequate indicated by 77(49.9%), followed by talking books at 32(20.7%) and audio tapes indicated by 23(14.8%).

**Table 4.6: Respondents rating of the adequacy of the available electronic media equipment**

AAT device	Learners (n=92)		Teachers (n=58)		EARC (n=5)		$\frac{(L+T+E)}{155}$
	A	I	A	I	A	I	Average adequacy (n=155)
Optacon	0(0.0%)	92(100%)	0(0.0%)	58(100%)	0(0.0%)	05(100%)	0(0.0%)
Note taker	0(0.0%)	92(100%)	0(0.0%)	58(100%)	0(0.0%)	05(100%)	0(0.0%)
Comp with speech output	0(0.0%)	92(100%)	0(0.0%)	58(100%)	0(0.0%)	05(100%)	0(0.0%)
OCR scanner	0(0.0%)	92(100%)	0(0.0%)	58(100%)	0(0.0%)	05(100%)	0(0.0%)
Refreshable Braille display	0(0.0%)	92(100%)	0(0.0%)	58(100%)	0(0.0%)	05(100%)	0(0.0%)

Source: survey data 2018

Key; A is adequate, I is inadequate

The table shows respondents rating of the adequacy of the available electronic media equipment as perceived by the three groups of respondents. Findings revealed that; all the five electronic media equipment of optacon, note taker, computer with speech output, the OCR scanner and refreshable Braille display machine were perceived by the one hundred and fifty-five (155) respondents to be inadequate since all the devices were lacking. However, there was one computer with speech output machine in the nine schools which were also thought to be inadequate for the need of the intended users.

The findings of the study in respect to adequacy of the available AAT devices are in line with the findings of Moodley(2014), Rodgers (2003) and McBroom (1997) who observed that; while learners and teachers may best prefer electronic media devices as compared to audio and Braille producing equipment, their preference may not be satisfied due to the complexity of the electronic devices, the prohibitive costs attached to them and the general absence of additional infrastructure such as power supply needed to be installed alongside the devices. Due to these reasons, the electronic device may be least adequate while the live reader might

be the most adequate. The researcher viewed the above finding as contradicting the recommendation by Espinola and Croft (1992) as well as Sider and Maich (2014) who argued that existing policies recommend and justify provision of all categories of AATs to LVI in adequate number/measure yet the stakeholders perceived the devices to be in very limited supply and therefore inadequate for the needs of the learners.

### **4.3 Stakeholders Level of Awareness**

The second objective of the study was to establish awareness of stakeholders on issues related to AAT devices among learners with visual impairment in the Inclusive primary schools of Turkana County. An assessment of stakeholders awareness of AAT devices across the schools was considered to be significant in providing descriptively accurate information in respect to; stakeholders awareness of AAT devices, stakeholders awareness of purposes that AAT devices can be used for, stakeholders awareness of factors affecting AAT use and sources from which stakeholders acquired awareness of how to use AAT devices. The results for the four sub-themes are presented as follows;

#### **4.3.1 Stakeholders awareness of AAT devices**

Data on the awareness of stakeholders of the AAT devices used by learners with visual impairments was collected using three separate questionnaires with close-ended questions. A list of eight (8) AAT devices organised into two categories was presented to the ninety-two (92) learners, the fifty-eight (58) teachers and five (05) EARC officials and thirty-six parents (36) under investigation to state whether they were aware or not aware of the devices. The summary findings and results are as presented in the two sets of table 4.7.

**Table 4.7: Respondents awareness of audio media equipment**

AAT device	Learners (n=92)		Teachers (n=58)		EARC (n=5)		Average awareness n=155
	Aware	Unaware	aware	unaware	aware	unaware	
Audio tapes	19(20.6%)	73(79.4%)	58(100%)	00(0.0%)	05(100%)	00(0.0%)	82(52.9%)
Talking books	14(15%)	78(85%)	24(41%)	34(59%)	05(100%)	00(0.0%)	43(27.7%)
Live readers	46(50%)	46(50%)	58(100%)	00(0.0%)	05(100%)	00(0.0%)	109(70.3%)

Source: survey data 2018

The table shows respondents awareness of audio device equipment. Among the learners, the study found out that; for the audio media equipment, learners were most aware of live readers indicated by 50%, followed by audiotapes indicated by 20.6% while the least was talking books indicated by 15%. Teachers were most aware of live reader at 100%, followed by tapes at 100% and least aware of talking books indicated by 41%. For EARCs, officials were aware of all the three audio media devices at 100%. According to these findings, stakeholders were most aware of live readers indicated by an average of 109(70.3%) respondents. This was followed by audiotapes indicated by an average of 82(52.9%). The least known was talking books indicated by 43(27.7%).

The findings are in tandem with the findings of Moodley (2014) and Arter (1997) that; owing to the differences of the three audio media devices in respect to suitability and simplicity, stakeholders were most likely to be aware of the foremost and the simplest live reader, followed by audio-tapes and talking books.

**Table 4.8: Respondents awareness of the electronic media equipment in number and percentage**

Awareness	Learners (n=92)		Teachers (n=58)		EARC (n=5)		Average n=155
	aware	Unaware	aware	unaware	aware	Unaware	
Optacon machine	0(0.0%)	92(100%)	09(16%)	49(84%)	03(60%)	02(40%)	12 (7.7%)
Note taker	0(0.0%)	92(100%)	20(34%)	38(66%)	04(80%)	01(20%)	24(15.5%)
Comp with speech	09(10%)	83(90%)	38(66%)	20(34%)	04(80%)	01(20%)	51(32.9%)
OCR scanner	0(0.0%)	92(100%)	09(16%)	49(84%)	03(60%)	02(40%)	12(7.7%)
Refreshable Braille display	0(0.0%)	92(100%)	07(20%)	51(80%)	02(40%)	03(60%)	09(5.8%)

Source: survey data 2018

The table shows respondents awareness of electronic media equipment. Findings revealed that; computer with speech output was the device with most awareness at 10% among the learners represented by nine (09) learners, 66% among teachers represented by thirty-eight (38) teachers and 80% among EARC officials represented by four (04) EARCs. No learner was aware of the note taker, 34% among teachers represented by twenty (20) teachers and 80% among EARCs represented by four (04) officials were aware of the note taker. No learner was aware of the, and OCR scanner, 16% among the teachers and 60% of the EARCs represented by three (03) officials were aware of the two devices. The average awareness was highest for the computer with speech output indicated by 51(32.9%) respondents, then note taker indicated by 24(15.5%), followed by optacon and the OCR scanner indicated by 12 (7.7%) respondents. The least known device was the refreshable Braille display indicated by 09(5.8%) respondents.

Findings of the study were in agreement with the findings by Moodley (2014), Caton (1991) and Arter (1997) who stated that there is a likelihood of stakeholders to have greater



awareness of both Braille producing and audio media AAT devices as compared to the electronic-based AATs due to simplicity, convenience, suitability, portability and availability of such devices respectively in comparison to the Optacon, note taker, computer with speech out, OCR scanner and the refreshable Braille display machine. The findings were also in agreement with those of Moodley (2014) who stated that; stakeholders in resource-strained countries might have a lesser awareness of AAT devices such as the Optacon and electronic note taker whose use requires the additional provision of infrastructural resources like electricity.

#### **4.3.2 Stakeholders Awareness of usage of AAT Devices**

Data on the variety of uses to which AAT devices could be put on was collected using four respective research tools for the learners, teachers, EARC officials, and parents. A list of seven (07) pre-identified uses of AAT devices such as writing, listening, calculating, printing, IT interaction and social media, gaming, and reading was presented to the four groups under investigation to state whether they were aware or not aware of the listed uses. The summary findings and results are as given in four sets of table 4.9, 4.10, 4.11 and 4.12.

**Table 4.9: Awareness of AAT uses among learners**

	Writing	Listening	Calculate	Printing	IT	Gaming	Reading
Aware	92(100%)	41(45%)	46(50%)	33(35%)	26(28%)	28(30%)	92(100%)
Not Aware	0(0.0%)	51(55%)	46(50%)	59(65%)	66(72%)	64 (70%)	0(0.0%)
Total	92(100%)	92(100%)	92(100%)	92(100%)	92(100%)	92(100%)	92(100%)

Source: survey data 2018

Table 4.9 shows learners' level of awareness of the uses of AAT devices. Findings revealed that; 100% were aware that AATs could be used for writing, 45% were aware of listening while 55% were not aware, 50% were aware of calculating while 50% were not aware, 35% were aware of printing while 65% were not aware, 28% were aware of IT while 72% were not aware, 30% were aware of gaming while 70% were not and 100% were aware of reading. Findings of this study concur with the Moodley (2014), D' Andrea (2009) and Rodgers (2003) findings that the learner as the primary user of AAT devices either uses them for completing immediate educational tasks like reading and writing more than for non-academic purposes like gaming and entertainment. In this study, this was revealed by learners' expressing highest awareness to educational uses of AAT devices like writing at 100%, reading at 100% and calculation at 50% but with significant lower level awareness of non-educational uses like printing at 35%, IT interactions and social media at 28 % and gaming at 30 %.

**Table 4.10: Awareness of AAT uses among Teachers**

	Writing	Listening	Calculat	Printing	IT	Gaming	Reading
Aware	48(80%)	37(64%)	37(64%)	21(36%)	26(46%)	32(55%)	37(64%)
Not Aware	10(20%)	21(36%)	21(36%)	37(64%)	32(54%)	26(45%)	21(36%)
Total	58(100%)	58(100%)	58(100)	58(100%)	58(100)	58(100%)	58(100)

Source: survey data 2018

Table shows teachers' level of awareness of the uses of AAT devices. Findings revealed that; 80% were aware of writing while 20% were not aware, 64% were aware of listening while

36% were not aware, 64% were aware of calculating while 36% were not aware, 36% were aware of printing while 64% were not aware, 46% were aware of IT while 54% were not aware, 55% were aware of gaming while 45% were not and 64% were aware of reading while 36% were not aware.

Findings of this study concur with the Moodley (2014), D’ Andrea (2009) and Rodgers (2003) findings that the teachers as the primary user of AAT devices either uses them for completing immediate teaching tasks like writing, listening, reading and calculating more than for non-academic purposes like IT and gaming. In this study, this was revealed by teachers’ expressing highest awareness to teaching uses of AAT devices like writing at 80%, listening at 64%, reading at 64% and calculation at 64% but with significant lower level awareness of non-teaching uses like printing at 36%, IT interactions and social media at 46 % and gaming at 55 %.

**Table 4.11: Awareness of AAT uses among EARC**

	Writing	Listening	Calculat	Printing	IT	Gaming	Reading
Aware	5(100%)	5(100%)	5(100%)	5 (100%)	5(100%)	5(100%)	4(80%)
Not Aware	0(0.0%)	0(0.0%)	0.0(0.0)	0(0.0%)	0(0.0%)	0(0.0%)	1(20%)
Total	5 (100%)	5 (100%)	5(100%)	5 (100%)	5 (100%)	5(100%)	5(100%)

Source: survey data 2018

Table 4.11 shows EARCs’ level of awareness of the uses of AAT devices. Findings revealed that; 100% were aware of all the seven pre-identified uses of writing, listening, calculating, printing, IT and social media, gaming, and reading.

Findings of this study concur with the Mwakyeja (2013), D’ Andrea (2009) and Mwangi (2013) findings that education officials had been significantly exposed to in-service training and sensitization on the use of new educational equipment as they emerged.

**Table 4.12: Awareness of AAT uses among parents**

	Writing	Listening	Calculat	Printing	IT	Gaming	Reading
Aware	3(8.3%)	5(13.9%)	2(5.6%)	1 (2.8%)	1(2.8%)	0(0.0%)	8(22.2%
Not Aware	33(91.7%)	31(81.1%)	34(94.4%)	35(97.2%)	35(97.2%)	36(100%)	28(77.8%
Total	36 (100%	36 (100%	36(100%	36 (100%	36 (100%	36(100%	36 (100%)

Source: survey data 2018

Table 4.12 shows parents' level of awareness of the uses of AAT devices. Findings revealed that; 8.3 were aware of writing while 91.7% were not aware, 13.9% were aware of listening while 81.1% were not aware, 5.6% were aware of calculating while 94.4% were not aware, 2.8% were aware of printing while 97.2% were not aware, 2.8% were aware of IT while 97.2% were not aware, 0% were aware of gaming while 100% were not and 22.2% were aware of reading while 77.8% were not aware.

Findings of this study concur with the Moodley (2014), D' Andrea (2009) and Rodgers (2003) findings that the parents as the remote users of AAT devices either for helping their children complete school-related tasks mainly reading than for any other purpose. In this study, this was revealed by parents' expressing highest awareness of school tasks of AAT devices like reading at 22.2%.

#### **4.3.3 Stakeholders Awareness of Factors affecting AAT use**

Data on the stakeholders' awareness of factors enhancing AAT use was collected using four respective research tools. A list of nine (09) factors was presented to ninety-two (92) learners, fifty-eight (58) teachers, five EARC officials (05) and thirty-six (36) parents under investigation to state whether they were aware or not aware of the identified factors. These factors were; Are you aware that policy documents and provisions exist for the use of AAT in Kenya? Are you aware that users of AATs are capable of being socially and psychologically affected? Are you aware that AAT users can or have already developed health complications? Are you aware that Merit/demerits of different AATs cannot be compared (some are better or

worse than others)? Are you aware that there are distinct methods that are used/should be used to impart knowledge of how to use AATs? Are you aware that class/school must do some accommodations/adaptations to use AATs effectively? Are you aware that there is a professional code of conduct and ethics that must be followed in the use of AAT? Are you aware that evaluation of AAT use requires special skills and approaches? Are you aware that individual characteristics of learners determine the choice of AAT? The findings are presented in table 4.13.

**Table 4.13: Awareness of respondents of factors enhancing AAT use**

<b>Factors Awareness</b>	<b>Learners Awareness (n=92)</b>	<b>Teacher Awareness (n=58)</b>	<b>EARC Officials (n=5)</b>	<b>Parents Awareness (n=36)</b>	<b>Mean Awareness (n= 191)</b>
Policy	4(4.4%)	42(72.4%)	5(100%)	12(33.3%)	63(33%)
Impact	24(26.1%)	30(51.7%)	5(100%)	9(25%)	68(35.6%)
Complication	12(13%)	35(60.3%)	1(20%)	7(19.4%)	55(28.8%)
Comparison	48(50.5%)	39(67.2%)	4(80%)	13(36.1%)	104(54.5%)
Methodology	17(17.7%)	30(51.7%)	5(100%)	10(27.8%)	62(32.5%)
Adaptation	38(39.6%)	40(69%)	4(80%)	21(58.3%)	103(53.9%)
Ethical code	35(36.5%)	39(67.2%)	5(100%)	15(41.7%)	94(49.2%)
Evaluation	49(53.3%)	40(69%)	5(100%)	19(52.8%)	113(59.2%)
Skills	44(49%)	39(67.2%)	5(100%)	11(30.6%)	99(51.8%)

Source: Survey data 2018

Table 4.13 shows stakeholders' awareness of factors that may promote the shift from Braille to the use of AAT devices. Stakeholders should be aware of these factors to be ready for the introduction and use of AAT devices in Inclusive schools for learners with visual impairments. Findings of this study revealed that; stakeholders were aware that, policy documents exist to guide the implementation of AAT use in Kenya as stated by 4.4% of learners, 72.4% of teachers, 100% of EARC officials and 33.3% of parents, special skills and approaches are required to evaluate AAT use as stated by 53.3% for learners, 69% for

teachers,100% for EARC officials and 52.8% for parents, individual characteristics of learners determine choice of AAT devices as stated by 49% of learners,67.2% for teachers,100% for EARC officials and 30.6% for parents, ethical and professional conduct must be followed in using AAT devices as stated by 36.5% for learners, 67.2% for teachers,100% for EARC officials and 41.7% for parents, there are distinct methods of imparting AAT use knowledge among learners as stated by17.7% for learners, 51.7% for teachers, 100% EARCs officials and 27.8% of parents, adaptation to be made to accommodate the LVI in Inclusive classrooms as stated by 39.6% of learners, 69% for teachers, 80% for EARC officials and 58.3% for parents and, that there were complications of using AAT devices as stated by 13% for learners, 60.3% for teachers, 20% for EARC officials and 19.4% for parents.

While using the average, the findings of the study shows that; stakeholders were most aware of evaluating use of AAT requires special skills and approaches indicated by 113(59.2%) respondents, followed by merits/demerits of different AATs indicated by 104(54.5%) respondents, then the class/school accommodation/adaptation indicated by 103(53.9%), individual characteristics of learners determine the choice of AAT indicated by 99 (51.8%), existence of ethical code of conduct indicated by 94 (49.2%), users of AATs are socially and psychological affected indicated by 68 (35.6%), policy documents and provisions in Kenya on AATs use indicated by 63 (33%) and, they were least aware of the fact that AAT users face the threat of developing complications and some distinct methodology exist for teaching AAT use indicated by 62(32.5%).

Findings of this study agreed with the findings of Conderman et al (2011), Kochung (2003) and Mwangi (2013) who observed that use of AAT devices for learners with visual impairments continues to be a challenge due to stakeholders' ignorance of the policy

environment of AAT use. The result in this research indicated that only the minority (33%) of respondents were aware of the policy environment while the majority (67%) were ignorant of the policy factors. The study further noted the existence of great digital divide among teachers and learners and teachers ignorance of how to bridge the gap due to lack of awareness on teaching methodologies scored that scored a low average mean of 32.5% represented by 62 respondents.

#### 4.3.4 Sources of Stakeholders Awareness of how to use AAT Devices

A list of pre-identified sources from which stakeholders could acquire knowledge on how to use AATs was provided to the respondents. For learners, the list had self, teachers, peers, parents, and others. The teachers list had self, learners, peer and institutions/others. The choice of teachers and learners to comment was pre-identified sources of knowledge on how to use AAT was informed by the view that the two respondents are the primary day to day AAT users while parents and EARC officials were remote observers of AAT use. The results for the ninety-two (92) learners and the fifty-eight (58) teachers are as presented in the two sets of table 4.14 and 4.15.

**Table 4.14: Sources of awareness on how to use AATs among learners**

Source of awareness for learners	Learners (n=92)	
	Yes	No
Self	65(70.7%)	27(29.3%)
Classroom Teachers	92(100%)	00(0%)
Peers	74(80.4%)	18(19.6%)
Parents	09(9.8%)	83(90.2%)
Itinerant teachers	55(59.8%)	37(40.2%)

Source: Survey data 2018

Table 4.14 shows the various sources from which learners acquire knowledge on how to use AAT devices. The findings of the study revealed that learners with visual impairments acquire knowledge on how to use AAT devices mostly from classroom teachers as stated by 92 (100%). This was followed by peers stated by 74 (80.4%), by self-stated by 65(70.7%), itinerant stated by 55 (59.8%). The least stated source was parents 09 (9.8%). The study indicates that the most common source of knowledge was classroom teachers while the least source was parents.

The finding of the study is both in conflict and in agreement with the findings of other researchers. According to McMahon(1998), Mason & Davidson (2000), it is estimated that between 73%-96% of learners with visual impairments in America are now taught AAT use skills in Inclusive schools by their classroom teachers. The scholar further notes that; while some learners received AAT use instruction in separate settings, such as resource rooms, most were served in the Inclusive education classroom by an itinerant teacher of learners with visual impairments. The position held by the foregoing scholar concurs with the findings of this study since an excess of 96% of learners confirmed that the teacher was the main source of knowledge and the input of itinerant teacher was acknowledged by 60% of learners. However, according to Hatlen (2000), since the itinerant teacher generally is not able to be at one school all day, reinforcing AAT uses skills all too often is left to someone else, such as the learners themselves or their peers, neither of whom could be counted on to be proficient or knowledgeable in teaching AAT use skills. The shortcoming of the peers is however overlooked by fellow learners since the LVI acknowledged the input of their peers as a source of learning at 80% which seems to contradict the findings as postulated by Forster &Holbrook, (2005).



**Table 4.15: Sources of awareness on how to use AATs among teachers**

Source of awareness for teachers	Teachers (n=58)	
	yes	No
Self	40(69%)	18(21%)
Learners	06(10%)	52(90%)
Peers	52(90%)	06(10%)
Schools and institutions	58(100%)	00(05%)
Itinerant teachers	35(60%)	23(40%)

Table 18 shows the various sources from which teachers of learners with visual impairments acquire knowledge on how to use AAT devices. The findings of the study revealed that teachers of LVI acquired knowledge on how to use AAT devices mostly from schools and institutions stated by 58 representing (100%). This was followed by peers stated by 52 representing (90 %), the self-stated by 40 (69%), itinerant stated by 35 (60%). The least stated source was learners at 06 representing (10%). The study indicates that the most common source of knowledge was schools and institutions while the least source was learners.

The findings of this study do not agree with the findings of D'Andrea (2014) who stated that; many cases have been reported in schools throughout the world about teachers who were unable to make technology work in the classrooms and had to consult their learners as experts in making the devices work yet, the findings of this study postulated that learners were the least ranked source from which teachers acquired knowledge of AAT use.

#### **4.4 Stakeholders Attitude towards AAT Use**

The third objective of the study was to determine the attitude of stakeholders towards the use of AAT devices among learners with visual impairments in the nine Inclusive primary schools of Turkana County under investigation. An examination of stakeholders' attitude towards the use of AAT devices across the schools was considered to be significant in providing descriptively accurate information in respect to; attitude of stakeholders towards opinion statements and, attitude of stakeholders towards strategies employed by schools to promote inclusion of learners with visual impairments and use of AAT in Inclusive schools. The results of the two sub-themes are presented, analysed and discussed as follows;

##### **4.4.1 Stakeholders Attitude towards AAT use Factors**

A list consisting of nine (9) attitude statements was presented to the ninety-two (92) learners, fifty-eight (58) teachers, five (5) EARC officials and thirty-six (36) parents as the four sets of the study respondents. The data was collected using five-point Likert scale questionnaire format which in the negatively stated statements were scored positively as follows; strongly agree (SA)=5, agree (A)=4, neutral or undecided (U)=3, disagree (D)=2, and strongly disagree (SD)=1. The score was reversed for the positively stated statements. The results for the set of opinion statement is presented, analysed and discussed in the four sets .

**Table 4.16 Learners Attitude**

Statement	SA	A	UN	D	SD	Mean
Language use by other stakeholders towards me as a learner is harsh.	11	79	0	2	0	4.1
As a learner I believe that girl child with VI should not be given lesser attention than boy child with VI.	30	62	0	0	0	4.3
As a learner I believe that the attitude of AAT users greatly depends on the input of their teachers.	33	59	0	0	0	4.4
As a learner I believe that learners, teachers, EARC officials and parents mostly think that AAT should be used in special schools only.	0	0	4	81	7	2.0
As a learner I believe that the curriculum is inflexible and does not prepare us for necessary adaptations to promote use of AAT.	28	46	7	10	1	4.0
As a learner I believe that there is wide spread unpreparedness of parents in the introduction and use of AAT devices in the Inclusive schools.	17	58	1	14	2	3.8
As a learner I have observed that the number of teachers with knowledge of teaching use of AAT is limited.	23	55	0	8	6	3.9
As a learner I have observed that the cost of AAT is prohibitive and out of reach of schools and this is the main reason for unpreparedness.	22	58	12	0	0	4.1
As a Learner I have observed that AAT may not necessarily replace Braille even though it is presumed to be better and more superior.	23	32	0	21	16	3.3
Overall Mean						3.8

Source: survey data, 2018

Table 4.16 shows that the overall attitude of learners to AAT use was 3.8 indicating mixed attitude on a variety of individual statement positions as shown; agreed that the language used against them as AAT users was harsh at a mean of 4.1, agreed that there should not be preferential treatment of the boy child at a mean of 4.3, agreed that their attitude towards AAT was influenced by their teachers at a mean of 4.4, disagreed with the view that other stakeholders perceive that AATs should be used in special schools only at a mean of 2.0, agreed that the curriculum was inflexible at a mean of 4.0, agreed that the there was

widespread unpreparedness of parents towards AAT use at a mean of 3.8, agreed that teachers knowledge of teaching AAT was limited at a mean of 3.9, agreed that the cost of AAT devices was prohibitive hence the unpreparedness and were neutral/undecided on the view that AAT devices may not replace braille even though they are presumed to be superior at a mean of 3.3. The overall attitude of learners was recorded at a mean of 3.8. The attitude indicated that the learners were neither positive nor negative since they were in the scope of 3.0 to 3.9.

**Table 4.17 Teacher Attitude**

Statement	SA	A	UN	D	SD	Mean
Language use by other stakeholders towards me as a teacher is harsh.	15	28	0	13	1	3.7
As a teacher I believe that girl child with VI should not be given lesser attention than boy child with VI.	30	28	0	0	0	4.5
As a teacher I believe that the attitude of AAT users greatly depends on the input of their teachers.	0	0	0	12	46	1.2
As a teacher I believe that learners, teachers, EARC officials and parents mostly think that AAT should be used in special schools only.	0	23	0	12	23	2.4
As a teacher I believe that the curriculum is inflexible and does not prepare us for necessary adaptations to promote use of AAT.	0	10	45	3	0	3.2
As a teacher I believe that there is wide spread unpreparedness of parents in the introduction and use of AAT devices in the Inclusive schools.	23	34	0	0	1	4.3
As a teacher I have observed that the number of teachers with knowledge of teaching use of AAT is limited.	27	27	4	0	0	4.4
As a teacher I have observed that the cost of AAT is prohibitive and out of reach of schools and this is the main reason for unpreparedness.	12	46	0	0	0	4.2
As a teacher I have observed that AAT may not necessarily replace Braille even though it is presumed to be better and more superior.	12	18	0	15	13	3
Overall Mean						3.4

Source: survey data, 2018

Table 4.17 shows that the overall attitude of teachers to AAT use was 3.4 indicating mixed attitude on a variety of individual statement positions as shown; agreed that the language used against them as AAT users was harsh at a mean of 3.7, strongly agreed that there should not be preferential treatment of the boy child at a mean of 4.5, strongly dis-agreed that their attitude towards AAT was influenced by their teachers at a mean of 1.2, disagreed with the view that other stakeholders perceive that AATs should be used in special schools only at a mean of 2.4, were undecided about the flexibility/inflexibility of the curriculum at a mean of 3.2, agreed that there was widespread unpreparedness of parents towards AAT use at a mean of 4.3, agreed that teachers knowledge of teaching AAT was limited at a mean of 4.4, agreed that the cost of AAT devices was prohibitive hence the unpreparedness at a mean of 4.2 and were neutral/undecided on the view that AAT devices may not replace braille even though they are presumed to be superior at a mean of 3.0. The overall attitude of teachers was recorded at a mean of 3.4. The attitude indicated that the teachers were neither positive nor negative since they were in the scope of 3.0 to 3.9.

**Table 4.18: EARC Official Attitude**

Statement	SA	A	UN	D	SD	Mean
Language use by other stakeholders towards me as an EARC official is harsh.	4	1	0	0	0	4.8
As an EARC official I believe that girl child with VI should not be given lesser attention than boy child with VI.	5	0	0	0	0	5.0
As an EARC official I believe that the attitude of AAT users greatly depends on the input of their teachers.	4	1	0	0	0	4.8
As an EARC official I believe that learners, teachers, EARC officials and parents mostly think that AAT should be used in special schools only.	3	2	0	0	0	3.8
As an EARC official I believe that the curriculum is inflexible and does not prepare us for necessary adaptations to promote use of AAT.	5	0	0	0	0	5
As an EARC official I believe that there is wide spread unpreparedness of parents in the introduction and use of AAT devices in the Inclusive schools.	4	1	0	0	0	4.8
As an EARC official I have observed that the number of teachers with knowledge of teaching use of AAT is limited.	5	0	0	0	0	5
As an EARC official I have observed that the cost of AAT is prohibitive and out of reach of schools and this is the main reason for unpreparedness.	3	2	0	0	0	3.8
As an EARC official I have observed that AAT may not necessarily replace Braille even though it is presumed to be better and more superior.	0	0	0	3	2	1.6
Overall Mean						4.3

Source: survey data, 2018

Table 4.18 shows that the overall attitude of EARC officials to AAT use was 4.3 indicating a positive attitude on a variety of individual statement positions as shown; strongly agreed that the language used against AAT users was harsh at a mean of 4.8, strongly agreed that there should not be preferential treatment of the boy child at a mean of 5.0, strongly agreed that attitude towards AAT use was influenced by teachers at a mean of 4.8, agreed with the view that other stakeholders perceive that AATs should be used in special schools only at a mean of 3.8, strongly agreed that the curriculum was inflexible at a mean of 5.0, strongly agreed that there was widespread unpreparedness of parents towards AAT use at a mean of 5.0, agreed that teachers knowledge of teaching AAT was limited at a mean of 3.8, agreed that the

cost of AAT devices was prohibitive hence the unpreparedness at a mean of 3.8 and disagreed with view that AAT devices may not replace braille even though they are presumed to be superior at a mean of 1.6. The overall attitude of EARC officials was recorded at a mean of 4.3. The attitude indicated that the EARC official were positive since they were in the scope of 4.0 to 4.9.

**Table 4.19: Parents views on Attitude statements**

Statement	SA	A	UN	D	SD	Mean
Language use by other stakeholders towards me as a parent is harsh	15	11	10	0	0	4.2
As a parent I believe that girl child with VI should not be given lesser attention than boy child with VI.	10	11	15	0	0	3.9
As a parent I believe that the attitude of AAT users greatly depends on the input of their teachers.	0	0	10	11	15	1.9
As a parent I believe that learners, teachers, EARC officials and parents mostly think that AAT should be used in special schools only.	15	11	10	0	0	4.2
As a parent I believe that the curriculum is inflexible and does not prepare us for necessary adaptations to promote use of AAT.	0	0	0	20	16	1.6
As a parent I believe that there is wide spread unpreparedness of parents in the introduction and use of AAT devices in the Inclusive schools.	16	10	9	1	0	4.1
As a parent I have observed that the number of teachers with knowledge of teaching use of AAT is limited.	12	15	4	3	2	3.9
As a parent I have observed that the cost of AAT is prohibitive and out of reach of schools and this is the main reason for unpreparedness.	20	16	0	0	0	4.6
As a parent I have observed that AAT may not necessarily replace Braille even though it is presumed to be better and more superior.	23	13	0	0	0	4.6
<b>Overall Mean</b>						<b>3.7</b>

Source: survey data, 2018

Table 4.19 shows that the overall attitude of parents to AAT use was 3.7 indicating a mixed attitude on a variety of individual statement positions as shown; agreed that the language used against AAT users was harsh at a mean of 4.2, agreed that there should not be preferential treatment of the boy child at a mean of 3.9, disagreed that their attitude towards AAT was influenced by teachers at a mean of 1.9, agreed with the view that other stakeholders perceive that AATs should be used in special schools only at a mean of 4.2, disagreed that the curriculum was inflexible at a mean of 1.6, agreed that there was widespread unpreparedness of parents towards AAT use at a mean of 4.1, agreed that teachers knowledge



of teaching AAT was limited at a mean of 3.9, strongly agreed that the cost of AAT devices was prohibitive hence the unpreparedness at a mean of 4.6 and strongly agreed that AAT devices may not replace braille even though they are presumed to be superior at a mean of 4.6. The overall attitude of parents was recorded at a mean of 3.7. The attitude indicated that the parents were neither positive nor negative since they were in the scope of 3.0 to 3.9.

**Table 4.20: Comparison of stakeholders Attitude**

Statement	Learners	Teachers	EARC	Parents	Mean
Language use by other stakeholders towards me is harsh	4.1	3.7	4.8	4.2	4.0
As a stakeholder I believe that girl child with VI should be given lesser attention than boy child with VI.	4.3	4.5	5	3.9	4.3
As a stakeholder I believe that the attitude of AAT users greatly depends on the input of their teachers.	4.4	1.2	4.8	1.9	3.0
As a stakeholder I believe that learners, teachers, EARC officials and parents mostly think that AAT should be used in special schools only.	2	2.4	3.8	4.2	2.6
As a stakeholder I believe that the curriculum is inflexible and does not prepare us for necessary adaptations to promote use of AAT.	4	3.2	5	1.6	3.3
As a stakeholder I believe that there is wide spread unpreparedness of parents in the introduction and use of AAT devices in the Inclusive schools.	3.8	4.3	4.8	4.1	4
As a stakeholder I have observed that the number of teachers with knowledge of teaching use of AAT is limited.	3.9	4.4	5	3.9	4.1
As a stakeholder I have observed that the cost of AAT is prohibitive and out of reach of schools and this is the main reason for unpreparedness.	4.1	4.2	3.8	4.6	4.2
As a stakeholder I have observed that AAT may not necessarily replace Braille even though it is presumed to be better and more superior.	3.3	3	1.6	4.6	3.4
Overall Mean					3.7

The overall attitude of stakeholders was recorded at a mean of 3.7. The attitude indicated that the stakeholders were neither positive nor negative since they were in the scope of 3.0 to 3.9 hence the view that they displayed mixed attitude towards AAT use.

In respect to language use, The findings of this study agree with the findings of Bootha (2000) who stated that; learners, teachers, parents and educational officials interacting in an inclusive environment where learners with visual impairment learn alongside their sighted peers are very much aware of the social barrier that inhibits education of the LVI as demonstrated by the use of harsh language and inappropriate forms of communications since the mean score of 3.7 to 4.8 across the four sets of stakeholders demonstrated significant levels of agreement that AAT users are given harsh names. Further observation by Oxley (2010), Mwangi (2013) and, Anstey & Bull (2006) that; the presence of derogative language and demeaning names is common in educational settings is also supported by the findings.

In respect to the view that the female AAT user should not get lesser attention than the male counterpart, the findings of this study agree with the findings of Murphy (2008) that; though many societies and communities in Africa places the boy child at a vantage position as compared to the girl child in respect to access of education and the support services for enhancing learning due to negative attitude towards the girl child, there has emerged a new crop of parents, teachers and learners who advocate for equality of the two groups due to a more positive attitude towards the needs of the girl child as was witnessed by the mean range of 3.9 to 5.0 which indicated strong disapproval to the preferential treatment of the boy child. Murphy further adds that the attitude change has resulted to a significant decrease in the drop-out rates of the girl child and improved sensitivity of the teachers to the needs of the girl child with a special need who is an AAT user.

In respect to teachers influence, the findings of this study agree with the findings of Conderman et al (2012) that; while teachers may not be quick to recognize themselves as shapers of stakeholders' attitudes towards AAT use, learners will be quick to acknowledge the significant role played by teachers in cultivating a positive attitude towards AAT use by providing the learners with the relevant skills and appropriate instruction on AAT use. The

mean score for teachers influence was 4.4 for learners and 4.8 for EARCs which indicates positive acknowledgment of teachers influence.

In respect to stakeholders' perception as to the use of AATs in Inclusive schools, the findings of this study tend to disagree with the findings of Grooves (2004) that; the challenge of integrating AAT use in Inclusive schools arise from the position that more learners, teachers, educational officials and parents only believe that the best place for using the AATs is the special school and not the inclusive setting. According to this study, both teachers and learners expressed disagreement with the position that they are not prepared for the introduction and use of AATs in Inclusive schools.

In respect to the inflexibility of the curriculum, the findings of this study agree with the findings of Conderman et al. (2012) that; the relationship between teachers and learners views in respect to the flexibility or otherwise of the curriculum could not be determined since the score varied so widely. According to this study, though the mean score of the teachers' attitude showed a significant deviation from that of the learners, the individual score varied so widely.

The findings of this study agree with the findings of previous researchers, who pointed out that there exists the problem of prohibitive cost of AAT devices (Espinola & Croft 1992), unavailability of the devices in markets frequented by teachers (D'Andrea 2009) and, the apparent lack of awareness/information on AAT use (Chong 2003 & Moodley 2014) as the main reasons why parents may not be prepared for the introduction and use of AAT devices. The findings is also consistent with both Kochung report of 2003 and the SNE policy of 2009 findings that parents should be encouraged to play a greater role in ensuring provision and steady supply of all AAT devices to the intended users since LVI are entitled to these devices by law and policies.

The findings of this study agree with the findings of Ferguson (2008), Conderman et al. (2012) and MacBeath & Galton (2007) who pointed out that; stakeholders in the education of learners with visual impairments will most probably express a negative attitude towards teachers handling the LVI when; the teachers are not familiar with AAT devices, the teachers are not comfortable with AAT devices and, when the teachers express dissatisfaction with their ability to impart knowledge of teaching AAT use. The result is also in agreement with the findings of Murphy (2008) that; teachers' preparedness in supporting the use of AAT devices in an environment where learners with visual impairments learn alongside their sighted peers is greatly affected by both teachers' and learners' belief that teachers are not proficient in teaching AAT use. This is true of the study since more than 90% of teachers and 80% of learners confirmed that teachers had limited knowledge of teaching AAT use.

The findings of this study agree with the findings of Hanko (2003), Avramidis and Norwich (2002) and Cornoldi et al. (1998) who pointed out that; when the cost of purchasing AAT devices is prohibitive, and the opportunities for teachers to access training services for supporting AAT learning process are unavailable due to high costs, stakeholders may cultivate a negative attitude and will not favour the inclusion of learners with disabilities in Inclusive schools. The study is also in agreement with the findings of Scruggs & Mastropieri (1996) who stated that; the high cost of acquiring AAT devices may make the teachers and learners feel that they are unable to maximize the learning efficiency expected by the education system since the absence of the required AAT devices inhibits learners preparedness in progressing to higher levels of learning. This is true of the study since more than 99% of both the teachers and the learners confirmed that the capacity of both the schools and the parents to acquire AAT devices is limited by the high cost of purchasing the devices.

#### **4.4.2 Strategies used to Promote Positive Attitude towards AAT use in Inclusive Schools**

The study pre-identified eight (08) observable behaviors and action whose presence and availability in the schools collectively contributes to a more positive attitude towards learners with visual impairments who are AAT users schooling alongside the sighted peers. While using an observation schedule that was self-administered, the researcher sought to establish the behaviors across the nine schools under investigation. As was proposed in chapter three, the schools were coded using numbers for the purpose of maintaining confidentiality and adherence to the ethical considerations of research. Table 4.21 illustrates the findings.

**Table 4.21: Observed behaviours for promoting positive attitude towards AATs devices and users in Inclusive schools**

Observed strategy/behaviour in Inclusive schools for promoting positive attitude towards AAT devices and users	Schools									total
	1	2	3	4	5	6	7	8	9	
Both sighted and LVI share a desk in the classroom	I	I	I	I	I	I	I	I	I	09
Both the sighted and the LVI play together in the field	I	I	I	I	I	I	I	I	I	09
The LVI and their sighted peers participate in group discussions	I	I	I	I	I	I	I	I	I	09
Both the LVI and their sighted peers learn Braille together from time to time										00
Both the LVI and the sighted sit for the same examination	I	I	I	I	I	I	I	I	I	09
LVI are rewarded by the teachers whenever they answer question correctly	I	I	I	I	I	I	I	I	I	09
LVI and their sighted peers use audio devices together when being taught				I			I	I		03
Both the LVI and the sighted are taught using real teaching aids by their teachers.	I	I	I	I	I	I	I	I	I	09

Source: Survey data 2018

*Key 1-9 represents schools, represents presence of behavior*

According to table 4.21 the strategies used by schools to promote a positive attitude towards AAT devices and AAT users as observed in classrooms of the nine (09) Inclusive schools. The most implemented strategy was; sharing of desks in nine (9) 100% of the schools, playing together in nine (9) 100% of the schools, participation in joint group discussion in nine (9) 100% of the schools, sitting for the same examination in nine (9) 100% of the schools, rewarding of LVI whenever they answer questions correctly in nine (9) 100% of the schools and, sharing of learning aid in nine (9) 100% of the schools. This was followed by the strategy of joint use of audio devices in three (03) 33.3% of the schools. The least implemented strategy was having the LVI and their sighted peers learning Braille together from time to time in zero 0 (0%) schools.

The findings concur with those of Halloran (2002), D'Andrea (2009) and Moodley(2014) who indicated the importance of allowing both the visually impaired and their sighted peers

learning in an inclusive environment to share different learning and social experiences to develop a positive attitude towards each other. The sharing and joint use of school resources have also been cited by Hanco (2003) as a strategy for enhancing purposeful interaction between the LVI and their sighted peers hence improving their attitude towards AAT use.

## **CHAPTER FIVE**

### **SUMMARY OF FINDINGS, CONCLUSION AND RECOMMENDATIONS**

#### **5.1 Introduction**

The chapter outlines the summary of findings, conclusions and recommendations.

#### **5.2 Summary of the Findings**

The summary of the study's findings were presented based on the stated objectives. The findings were organized into main themes and their corresponding sub themes as follows;

##### **5.2.1 Availability of AAT Devices for use by Learners with Visual Impairments in Inclusive Schools**

The study established that;

- i. The following AATs were available as follows; 30 live readers, 4 audio tapes, 3 talking books and 1 computer with speech output. The category of electronic AAT devices of optacon, note taker, OCR scanner and refreshable Braille display machine were not available.
- ii. The distribution of AAT devices was as follows; live readers in nine schools, talking books in three schools, audio tapes in 2 schools and computer with speech output in one school. Electronic AAT devices of optacon, note taker, OCR scanner and refreshable Braille display machine were not distributed in any school.
- iii. The AAT devices that were used across the nine Inclusive schools by learners with visual impairment were audio tapes, talking books, live reader and computer with speech output. AAT devices such as optacon, note taker, OCR scanner and refreshable braille display were not used.



- iv. The most frequent suppliers of AAT devices as perceived by the stakeholders was; sight savers at 92%, Kenya society for the Blind at 76%, Government at 71%, NGOs and donors at 55%, KNLS at 46% and parents at 5%.
- v. The stakeholders perceived AAT devices as adequate in the following measures; live readers at 49.8%, audio tapes at 20.7% and talking books at 8.4%. The five AAT devices of optacon, note taker, computer with speech output, OCR scanner and refreshable Braille display machine were perceived to be adequate at 0%.

### **5.2.2 Awareness of Stakeholders on the use of AAT devices among Learners with Visual Impairments in Inclusive Schools**

The study established that;

- i. Stakeholders were aware of all the eight AAT devices in different levels as follows; 70.3% for live reader, 52.9% for audio tapes, 32.9% for computer with speech output, 27.7% for talking books, 15.5% for note taker, 7.7 % for both OCR scanner and optacon respectively and 5.8% for refreshable braille display machine.
- ii. Stakeholders were aware that AAT devices could be used for a variety of purposes such as writing, listening, calculation, printing, IT and social media, gaming and reading. It also emerged that writing was the most recognized use of AAT indicated by 90% of all the respondents, while IT and social media interaction activities like whatsapp and face booking was the least used as was indicated by 34.7% of the respondents.
- iii. The stakeholders expressed limited awareness of key factors affecting the use of AAT as follows; complication factors at 28.8%, methodology at 32.5%, policy 33% and impact 35.6%. However there was comparatively higher levels of

awareness towards evaluation factors at 59.2%, comparison at 54.5%, adaptation 53.9%, skills 51.8%, ethics 49.2% respectively.

- iv. There was mixed sources of awareness to use AAT devices among the two different groups of stakeholders as follows. Learners acquired the most from classroom teachers at the score of 100% and acquired knowledge the least from parents at the score of 9.8%. Teachers acquired the most from schools and institutions at the score of 100% and the least from learners at 10%

### **5.2.3 Attitude of Stakeholders on the use of AAT Devices among Learners with Visual Impairments in Inclusive Schools**

The study determined that;

- i. The stakeholders' attitude on the use of AAT devices ranged from 3.7 to 4.3. However, the overall attitude was 3.7 which indicated mixed feelings showing that the stakeholders' attitude was neither positive nor negative towards AAT use. The average mean score for individual statements was as follows;
  - a. EARC officials expressed strongest agreement to the existence of the use of harsh language against AAT users at a mean 4.8. The other stakeholders also agreed at mean of 4.2 for parents, 3.9 for learners and 3.7 for teachers.
  - b. EARC and Teachers expressed strongest disagreement towards preferential treatment of the boy child in comparison to the girl child at mean 1.0 and 1.4 respectively. Other stakeholders also disagreed at a mean of 2.1 for parents and 1.7 for learners.
  - c. EARC and learners expressed strongest agreement that teachers were instrumental in shaping attitude towards AAT use at means of 4.8 and 4.4 respectively. However, parents and teachers expressed a disagreement and strong disagreement at means of 1.9 and 1.2 respectively.

- d. Parents and EARC expressed agreement with restricting AAT use to special schools only at means of 4.2 and 3.8 respectively. But teachers and learners disagreed that the use of AAT use should be restricted to special schools only at means of 2.4 and 2.0 respectively.
- e. EARC and learners strongly agreed and agreed that the curriculum was inflexible at means of 5.0 and 4.0 respectively. Teachers were undecided at a mean of 3.2 while parents disagreed at a mean of 1.6.
- f. EARC expressed strong agreement that other stakeholders were unprepared to use AATs at mean score of 4.8. Teachers, parents and learners expressed agreement with the statement with means of 4.3, 4.1 and 3.8 respectively.
- g. EARC strongly agreed that teachers had limited knowledge of teaching AAT use at a mean of 5.0 while teachers, learners and parents agreed with the statement at means of 4.4, 3.9, and 3.9 respectively.
- h. Parents expressed strong agreement that the cost of AAT devices was prohibitive at a mean of 4.6 while teachers, learners and EARC expressed agreement at a mean of 4.2, 4.1 and 3.8 respectively.
- i. Parents strongly agreed that AAT may not replace braille at a mean of 4.6. Both teachers and learners were undecided at means of 3.0 and 3.3 respectively. However, EARC strongly disagreed with the statement at a mean of 1.6.
- ii. The strategies that had been most adopted by schools to promote a positive attitude towards AAT devices and AAT users were; sharing of desks with LVI, joint group discussion, rewarding of LVI, sitting for similar examinations and teaching using real objects observed in 9(100%) schools. The strategy that was least used was use of audio devices together observed in 3(33.3%) schools. There was no school in which

the strategy of mixing both the LVI and their sighted counterparts in learning Braille was practised.

### **5.3 Conclusions**

From the study findings it was concluded that:

#### **5.3.1 Preparedness Levels of Stakeholders**

All the four key stakeholders as well as the inclusive schools were not fully preparedness for the use of AATs but in different ways. This is explained as follows;

1. Learners levels of preparedness was low due to poor access to AAT devices given their limited availability, lack of awareness of fundamental AAT devices such as optacon and how to apply them for educational purposes and a mixed attitude towards AAT use showing they were neither positive nor negative at a mean score of 3.8
2. Teachers levels of preparedness was equally low due to; limited access due to unavailability of the devices, varying degrees of awareness in respect to utility and application of different AATs and, an attitude that is neither positive nor negative towards AAT use at a mean score of 3.4
3. EARC were the most prepared stakeholders despite the challenge of limited supply of AAT devices in the schools of their jurisdiction. The officials' level of awareness on policy environment of AAT use was 1005 while their attitude was positive at a score of 4.3
4. Parents readiness was equally poor due to limited awareness of their roles in supporting AAT use, limited capacity to purchase AAT devices due to cost constraints, lack of awareness of the AAT use environment and an attitude that is neither positive nor negative at a mean score of 3.7
5. The schools as a stakeholder was also not prepared due to; lack of infrastructural installation to support AAT use, poor mechanism of sourcing for the AAT devices

from the suppliers and lack of internal mechanism to support attitude boosting on use of AAT device

### **5.3.2 Availability of AAT Devices for use by Learners with Visual Impairments in Inclusive Schools**

The AAT devices such Optacon note taker, OCR scanner and refreshable braille display machine were unavailable while audio tapes, live readers and talking books were available but limited in number, distribution, supply and perceived adequacy.

### **5.3.3 Awareness of Stakeholders on the use of AAT devices among Learners with Visual Impairments in Inclusive Schools**

There were significantly lower levels of awareness amongst stakeholders in respect to AAT devices available, uses of AAT devices, factors affecting AAT use.

### **5.3.4 Attitude of Stakeholders on the use of AAT Devices among Learners with Visual Impairments in Inclusive Schools**

The overall attitude of stakeholders towards AAT use was 3.7 indicating that they were neither positive nor negative towards AAT use hence the conclusion that there was a mixed attitude.

## **5.4 Recommendations for Policy**

Following from the findings of this study it is recommended that:

- i. The government should increase the supply and distribution of AAT devices to the Inclusive primary schools so as to improve their number and adequacy for the purpose of meeting the policy recommended threshold of device user ratio of 1:1 across all Inclusive schools.

- ii. The stakeholders of education for the learners with visual impairments should be sensitized on AAT use in respect to existing AAT devices, uses of AAT devices and factors affecting AATs use.
- iii. All stakeholders should participate towards identification and implementation of strategies that will promote a positive attitude towards AAT use in Inclusive primary schools.

### **5.5 Recommendations for Further Studies**

Based on the study findings the following topics are recommended for further research:

- i. Use of audio media devices as alternative assistive technologies for learners with visual impairments in primary schools of Turkana County
- ii. Use of Braille producing devices as alternative assistive technologies for learners with visual impairments in primary schools of Turkana County
- iii. Use of multimedia devices as alternative assistive technologies for learners with visual impairments in primary schools of Turkana County
- iv. Impact of teacher professionalism on preparedness of stakeholders on the use of AATs among LVI.

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## APPENDICES

### APPENDIX 1 LEARNERS QUESTIONNAIRE LEARNERS QUESTIONNAIRE

Thank you for accepting to participate in this study whose purpose is to establish preparedness of stakeholders on the use of alternative assistive technological devices among learners with visual impairment in Inclusive primary schools of Turkana County. The information collected shall be utilized strictly for research purposes only and shall be treated with the confidentiality it deserves. Respond to the questions by ticking where appropriate only.

Name of your school.....

a) Which of the devices listed below do you use in this school?

Devices	Usage	
	Used	Not used
Audio Tape		
Talking Books		
Live Reader		
Optacon		
Note Taker		
Computer with Speech Output		
OCR Scanner		
Refreshable Braille Display Machine		

b) Who are the providers/suppliers of the AATs you use in this school ( Tick where appropriate in the box provided)

AAT	Provider/supplier						
	KNLS	Government	Donors	Parents	Sight Savers	NGOs	KSB
Audio Tape							
Talking Books							
Live Reader							
Optacon							
Note Taker							
Computer with Speech Output							
OCR Scanner							
Refreshable Braille Display Machine							

c) Which of the devices listed below do you perceive as adequate in this school?

Devices	Adequacy	
	Adequate	Inadequate
Audio Tape		
Talking Books		
Live Reader		
Optacon		
Note Taker		
Computer with Speech Output		
OCR Scanner		
Refreshable Braille Display Machine		

d.) Which of the devices listed below are you aware of?

Devices	Awareness	
	Aware	Not Aware
Audio Tape		
Talking Books		
Live Reader		
Optacon		
Note Taker		
Computer with Speech Output		
OCR Scanner		
Refreshable Braille Display Machine		

e.) State your awareness of the following uses that AAT devices can be put to?

Awareness/Use	Writing	Listening	Calculation	Printing	IT	Gaming	Reading
Aware							
Not Aware							

f.) What is your awareness of the following statements (Tick the appropriate box)

Statement	Aware	Not aware
There are policy documents and provisions in Kenya on AATs use		
Users of AATs are socially and psychologically affected		
AAT users can or have already developed health complications		
Merit/demerits of different AATs (for some are better or worse than other)		
There are distinct methods that are used/should be used to impart knowledge of how to use AATs		
The class/school must do some accommodations/adaptations in order to use AATs effectively		
There are some professional code of conduct and ethics that must be followed in the use of AATs in schools		
Evaluating use of AAT requires special skill and approaches		
Individual characteristics of learners determine the choice of AAT		

g.) What is your view on the following statements (Tick where appropriate)

Statement	SA	A	UN	D	SD
Language use by other stakeholders towards me as a learner is harsh.					
As a learner I believe that girl child with VI should be given lesser attention than boy child with VI.					
As a learner I believe that the attitude of AAT users greatly depends on the input of their teachers.					
As a learner I believe that learners, teachers, EARC officials and parents mostly think that AAT should be used in special schools only.					
As a learner I believe that the curriculum is inflexible and does not prepare us for necessary adaptations to promote use of AAT.					
As a learner I believe that there is wide spread unpreparedness of parents in the introduction and use of AAT devices in the Inclusive schools.					
As a learner I have observed that the number of teachers with knowledge of teaching use of AAT is limited.					
As a learner I have observed that the cost of AAT is prohibitive and out of reach of schools and this is the main reason for unpreparedness.					
As a learner I have observed that AAT may not necessarily replace Braille even though it is presumed to be better and more superior.					

Key: SA- Strongly agree, A- Agree, UN- Undecided, D- Disagree and SD- Strongly disagree

h.)What is the source of your awareness on how to use AATs (Tick where appropriate)

Source/Confirmation	Self	Teacher	peer	Parent
Yes				
No				

**APPENDIX 2 TEACHERS QUESTIONNAIRES**

**TEACHERS' QUESTIONNAIRE**

Thank you for accepting to participate in this study whose purpose is to establish preparedness of stakeholders on the use of alternative assistive technological devices among learners with visual impairment in Inclusive primary schools of Turkana County. The information collected shall be utilized strictly for research purposes only and shall be treated with the confidentiality it deserves. Respond to the questions by ticking where appropriate only.

Name of your school.....

a) Which of the devices listed below do you use in this school?

Devices	Usage	
	Used	Not used
Audio Tape		
Talking Books		
Live Reader		
Optacon		
Note Taker		
Computer with Speech Output		
OCR Scanner		
Refreshable Braille Display Machine		

b) Who are the providers/suppliers of the AATs you use in this school ( Tick where appropriate in the box provided)

AAT	Provider/supplier						
	KNLS	Government	Donors	Parents	Sight Savers	NGOs	KSB
Audio Tape							
Talking Books							
Live Reader							
Optacon							
Note Taker							
Computer with Speech Output							
OCR Scanner							
Refreshable Braille Display Machine							

c) Which of the devices listed below do you perceive as adequate in this school?

Devices	Adequacy	
	Adequate	Inadequate
Audio Tape		
Talking Books		
Live Reader		
Optacon		
Note Taker		
Computer with Speech Output		
OCR Scanner		
Refreshable Braille Display Machine		

d.) Which of the devices listed below are you aware of?

Devices	Awareness	
	Aware	Not Aware
Audio Tape		
Talking Books		
Live Reader		
Optacon		
Note Taker		
Computer with Speech Output		
OCR Scanner		
Refreshable Braille Display Machine		

e.) State your awareness of the following uses that AAT devices can be put to?

Awareness/Use	Writing	Listening	Calculation	Printing	IT	Gaming	Reading
Aware							
Not Aware							

f.) What is your awareness of the following statements (Tick the appropriate box)

Statement	Aware	Not aware
There are policy documents and provisions in Kenya on AATs use		
Users of AATs are socially and psychologically affected		
AAT users can or have already developed health complications		
Merit/demerits of different AATs (for some are better or worse than other)		
There are distinct methods that are used/should be used to impart knowledge of how to use AATs		
The class/school must do some accommodations/adaptations in order to use AATs effectively		
There are some professional code of conduct and ethics that must be followed in the use of AATs in schools		
Evaluating use of AAT requires special skill and approaches		
Individual characteristics of learners determine the choice of AAT		

g.) What is your view on the following statements (Tick where appropriate)

Statement	SA	A	UN	D	SD
Language use by other stakeholders towards me as a teacher is harsh.					
As a teacher I believe that girl child with VI should be given lesser attention than boy child with VI.					
As a teacher I believe that the attitude of AAT users greatly depends on the input of their teachers.					
As a teacher I believe that learners, teachers, EARC officials and parents mostly think that AAT should be used in special schools only.					
As a teacher I believe that the curriculum is inflexible and does not prepare us for necessary adaptations to promote use of AAT.					
As a teacher I believe that there is wide spread unpreparedness of parents in the introduction and use of AAT devices in the Inclusive schools.					
As a teacher I have observed that the number of teachers with knowledge of teaching use of AAT is limited.					
As a teacher I have observed that the cost of AAT is prohibitive and out of reach of schools and this is the main reason for unpreparedness.					
As a teacher I have observed that AAT may not necessarily replace Braille even though it is presumed to be better and more superior.					

Key: SA- Strongly agree, A- Agree, UN- Undecided, D- Disagree and SD- Strongly disagree

h.)What is the source of your awareness on how to use AATs (Tick where appropriate)

Source/Confirmation	Self	Teacher	peer	Parent
Yes				
No				



**APPENDIX 3 INTERVIEW SCHEDULE FOR THE PARENTS**  
**PARENTS' INTERVIEW SCHEDULE**

Thank you for accepting to participate in this study .The purpose of this study is to establish preparedness of stakeholders on the use of alternative assistive technological devices among learners with visual impairment in Inclusive primary schools of Turkana County. The information collected shall be utilized strictly for research purposes only and shall be treated with the confidentiality it deserves.

a) Which of the devices listed below do you use in this school?

Devices	Usage	
	Used	Not used
Audio Tape		
Talking Books		
Live Reader		
Optacon		
Note Taker		
Computer with Speech Output		
OCR Scanner		
Refreshable Braille Display Machine		

b) Who are the providers/suppliers of the AATs you use in this school ( Tick where appropriate in the box provided)

AAT	Provider/supplier						
	KNLS	Governmen t	Donors	Parents	Sight Savers	NGOs	KSB
Audio Tape							
Talking Books							
Live Reader							
Optacon							
Note Taker							
Computer with Speech Output							
OCR Scanner							
Refreshable Braille Display Machine							

c) Which of the devices listed below do you perceive as adequate in this school?

Devices	Adequacy	
	Adequate	Inadequate
Audio Tape		
Talking Books		
Live Reader		
Optacon		
Note Taker		
Computer with Speech Output		
OCR Scanner		
Refreshable Braille Display Machine		

d.) Which of the devices listed below are you aware of?

Devices	Awareness	
	Aware	Not Aware
Audio Tape		
Talking Books		
Live Reader		
Optacon		
Note Taker		
Computer with Speech Output		
OCR Scanner		
Refreshable Braille Display Machine		

e.) State your awareness of the following uses that AAT devices can be put to?

Awareness/Use	Writing	Listening	Calculation	Printing	IT	Gaming	Reading
Aware							
Not Aware							

f.) What is your awareness of the following statements (Tick the appropriate box)

Statement	Aware	Not aware
There are policy documents and provisions in Kenya on AATs use		
Users of AATs are socially and psychologically affected		
AAT users can or have already developed health complications		
Merit/demerits of different AATs (for some are better or worse than other)		
There are distinct methods that are used/should be used to impart knowledge of how to use AATs		
The class/school must do some accommodations/adaptations in order to use AATs effectively		
There are some professional code of conduct and ethics that must be followed in the use of AATs in schools		
Evaluating use of AAT requires special skill and approaches		
Individual characteristics of learners determine the choice of AAT		

g.) What is your view on the following statements (Tick where appropriate)

Statement	SA	A	UN	D	SD
Language use by other stakeholders towards me as a parent is harsh.					
As a parent I believe that girl child with VI should be given lesser attention than boy child with VI.					
As a parent I believe that the attitude of AAT users greatly depends on the input of their teachers.					
As a parent I believe that learners, teachers, EARC officials and parents mostly think that AAT should be used in special schools only.					
As a parent I believe that the curriculum is inflexible and does not prepare us for necessary adaptations to promote use of AAT.					
As a parent I believe that there is wide spread unpreparedness of parents in the introduction and use of AAT devices in the Inclusive schools.					
As a parent I have observed that the number of teachers with knowledge of teaching use of AAT is limited.					
As a parent I have observed that the cost of AAT is prohibitive and out of reach of schools and this is the main reason for unpreparedness.					
As a parent I have observed that AAT may not necessarily replace Braille even though it is presumed to be better and more superior.					

h.)What is the source of your awareness on how to use AATs (Tick where appropriate)

Source/Confirmation	Self	Teacher	peer	Parent
Yes				
No				

### APPENDIX 4 EARC QUESTIONNAIRE

Thank you for accepting to participate in this study .The purpose of this study is to establish preparedness of stakeholders on the use of alternative assistive technological devices among learners with visual impairment in Inclusive primary schools of Turkana County. The information collected shall be utilized strictly for research purposes only and shall be treated with the confidentiality it deserves. Respond to the questions by ticking where appropriate only.

a) Which of the devices listed below do you use in this school?

Devices	Usage	
	Used	Not used
Audio Tape		
Talking Books		
Live Reader		
Optacon		
Note Taker		
Computer with Speech Output		
OCR Scanner		
Refreshable Braille Display Machine		

b) Who are the providers/suppliers of the AATs you use in this school ( Tick where appropriate in the box provided)

AAT	Provider/supplier						
	KNLS	Government	Donors	Parents	Sight Savers	NGOs	KSB
Audio Tape							
Talking Books							
Live Reader							
Optacon							
Note Taker							

Computer with Speech Output							
OCR Scanner							
Refreshable Braille Display Machine							

c) Which of the devices listed below do you perceive as adequate in this school?

Devices	Adequacy	
	Adequate	Inadequate
Audio Tape		
Talking Books		
Live Reader		
Optacon		
Note Taker		
Computer with Speech Output		
OCR Scanner		
Refreshable Braille Display Machine		

d.) Which of the devices listed below are you aware of?

Devices	Awareness	
	Aware	Not Aware
Audio Tape		
Talking Books		
Live Reader		
Optacon		
Note Taker		
Computer with Speech Output		
OCR Scanner		
Refreshable Braille Display Machine		

e.) State your awareness of the following uses that AAT devices can be put to?

Awareness/Use	Writing	Listening	Calculation	Printing	IT	Gaming	Reading
Aware							
Not Aware							

f.) What is your awareness of the following statements (Tick the appropriate box)

Statement	Aware	Not aware
There are policy documents and provisions in Kenya on AATs use		
Users of AATs are socially and psychologically affected		
AAT users can or have already developed health complications		
Merit/demerits of different AATs (for some are better or worse than other)		
There are distinct methods that are used/should be used to impart knowledge of how to use AATs		
The class/school must do some accommodations/adaptations in order to use AATs effectively		
There are some professional code of conduct and ethics that must be followed in the use of AATs in schools		
Evaluating use of AAT requires special skill and approaches		
Individual characteristics of learners determine the choice of AAT		

g.) What is your view on the following statements (Tick where appropriate)

Statement	SA	A	UN	D	SD
Language use by other stakeholders towards me as an EARC official is harsh.					
As an EARC official I believe that girl child with VI should be given lesser attention than boy child with VI.					
As an EARC official I believe that the attitude of AAT users greatly depends on the input of their teachers.					
As an EARC official I believe that learners, teachers, EARC officials and parents mostly think that AAT should be used in special schools only.					
As an EARC official I believe that the curriculum is inflexible and does not prepare us for necessary adaptations to promote use of AAT.					
As an EARC official I believe that there is wide spread unpreparedness of parents in the introduction and use of AAT devices in the Inclusive schools.					
As an EARC official I have observed that the number of teachers with knowledge of teaching use of AAT is limited.					

As an EARC official I have observed that the cost of AAT is prohibitive and out of reach of schools and this is the main reason for unpreparedness.					
As an EARC official I have observed that AAT may not necessarily replace Braille even though it is presumed to be better and more superior.					

Key: SA- Strongly agree, A- Agree, UN- Undecided, D- Disagree and SD- Strongly disagree

h.)What is the source of your awareness on how to use AATs (Tick where appropriate)

Source/Confirmation	Self	Teacher	peer	Parent
Yes				
No				

**Thank you for participating**



## APPENDIX 5 OBSERVATION SCHEDULE

### A) Items/AAT resources observed

S/no	AAT observed	Count	Distribution
1	Audio Tape		
2	Talking Books		
3	Live Reader		
4	Optacon		
5	Note Taker		
6	Computer with Speech Output		
7	OCR Scanner		
8	Refreshable Braille Display Machine		

### B) Strategies and behaviours observed

S/no	Actions observed	Remarks (conditions etc)
1	Both sighted and LVI share a desk in the classroom	
2	Both the sighted and the LVI play together in the field	
3	The LVI and their sighted peers participate in group discussions	
4	Both the LVI and their sighted peers learn Braille together from time to time	
5	Both the LVI and the sighted sit for the same examination	
6	LVI are rewarded by the teachers whenever they answer question correctly	
7	LVI and their sighted peers use audio devices together when being taught	
8	Both the LVI and the sighted are taught using real teaching aids by their teachers.	

## Appendix 6:MUERC RESEARCH PERMIT



### MASENO UNIVERSITY ETHICS REVIEW COMMITTEE

Tel: +254 057 351 622 Ext: 3050  
Fax: +254 057 351 221

Private Bag – 40105, Maseno, Kenya  
Email: muerc-secretariate@maseno.ac.ke

**FROM:** Secretary - MUERC

**DATE:** 3<sup>rd</sup> August, 2017

**TO:** William Emoru Ejore  
PG/MED/015/2009  
Department of Special Needs Education  
School of Education, Maseno University  
P. O. Box, Private Bag, Maseno, Kenya

**REF:** MSU/DRPI/MUERC/00394/17

**RE: Preparedness of Stakeholders on the use of Alternative Assistive Technology among Learners with Visual Impairment in Regular Primary Schools in Turkana County, Kenya. Proposal Reference Number MSU/DRPI/MUERC/00394/17**


This is to inform you that the Maseno University Ethics Review Committee (MUERC) determined that the ethics issues raised at the initial review were adequately addressed in the revised proposal. Consequently, the study is granted approval for implementation effective this 3<sup>rd</sup> day of August, 2017 for a period of one (1) year.

Please note that authorization to conduct this study will automatically expire on 2<sup>nd</sup> August, 2018. If you plan to continue with the study beyond this date, please submit an application for continuation approval to the MUERC Secretariat by 3<sup>rd</sup> July, 2018.

Approval for continuation of the study will be subject to successful submission of an annual progress report that is to reach the MUERC Secretariat by 3<sup>rd</sup> July, 2018.

Please note that any unanticipated problems resulting from the conduct of this study must be reported to MUERC. You are required to submit any proposed changes to this study to MUERC for review and approval prior to initiation. Please advise MUERC when the study is completed or discontinued.

Thank you.

  
Dr. Bonuke Anyona,  
Secretary,  
Maseno University Ethics Review Committee



Cc: Chairman,  
Maseno University Ethics Review Committee.

MASENO UNIVERSITY IS ISO 9001:2008 CERTIFIED

