

**EFFECT OF EARLY INTERVENTION MEASURES ON SOCIAL INTERACTION
OF CHILDREN WITH AUTISTIC SPECTRUM DISORDERS IN PUBLIC
PRIMARY SCHOOLS IN MUMIAS WEST SUB-COUNTY, KENYA**

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DECLARATION AND APPROVAL

This thesis/project is my original work and has never been presented for any academic award in any institution.

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DEDICATION

This thesis is dedicated to mum Grace Mwondi and my family members for their encouragement, prayers, support and time sacrifice during my study.



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I would like to thank God for his endless and sufficient grace as I undertake the two-year course. I would also like to thank Mount Kenya University for giving me a chance to study and especially the supervisors Dr. Khasakhala and Dr. Okutoyi of School of Education, Mount Kenya University for their endless, constant guidance and support. I also sincerely thank Dr. Chris Omusula and the lecturers in the school of education for imparting me with knowledge and skills in Special Needs Education. Thanks to schools from Mumias West Sub- County and Special Needs teachers that participated in my study during research for data collection. God bless you all. Finally, I thank my family at large for giving me financial support and humble time to do my assignment. Last but not least, all the respondents who participated to the success of this study. May god bless you all.

ABSTRACT

Children with autism have difficulties in social interaction. Lack of interaction skills affects their achievements in school and later in adulthood. Active socialization helps to build a sense of self-realization and increase awareness of their expectations. Children with autism also have difficulties in communication process and are limited in non-verbal communication. They lack skills for interaction with their peers, make unnecessary yells in class, cry without a cause and concentrate on issues of their interest in social situations. These make their peers to reject them thus leaving them lonely and isolated. It is important for these children to develop Social interactions skills which are vital for inclusion. This can be done through early intervention programs which are limited in Mumias West Sub- County. The purpose of the study was to establish the effect of Early Intervention Measures on Social Interaction of children with autism in public primary schools in Mumias West Sub-County. Objectives of the study were: To determine the effect of Restructured Environment on Social Interaction of children with autism in public primary schools in Mumias West Sub County, establish the effect of Picture Exchange Communication System on Social Interaction of children with autism, determine the effect of Sign Language on Social Interaction of children with autism, to establish the effect of Electronic Media on Social Interaction of children with autism. This study adopted a mixed method research design that integrated both qualitative and quantitative data in order to give an in-depth understanding of the effect of Early Intervention Measures on Social Interaction of Children with Autistic Spectrum Disorders in Public Primary Schools in Mumias West Sub-County. Population of the study was 286 teachers teaching in inclusive programs in Mumias West Sub-County. Purposive sampling technique was used to sample out 91 teachers teaching learners with autism in inclusive programs in Mumias West Sub-County. The study was guided by The Social Cultural Learning Theory and Theory of Mind. Research instruments were questionnaires, interview schedule, document checklist and observation checklists. Validity of Instruments was done by experts in the school of education. The instruments were refined based on the comments of experts. Reliability was set at alpha value of 0.70. Qualitative data was analyzed using SPSS and by developing themes and sub themes which was reported thematically. Quantitative data was analyzed using descriptive and inferential statistics. Research findings were; Restructuring of Learning Environment has not been effectively modified to facilitate social interaction. Not much has been done in using Picture Exchange Communication System to improve social interaction, Sign language was not being effectively used to effect social interaction, no much effort are being made to use Electronic Media to improve social interaction. Recommendations were; more resources to be sourced to modify learning environment, Ministry of Education and school administrators to find ways of improving Picture Exchange Communication System, efforts to be made on use of Sign Language to improve Social Interaction, more efforts to be made in the use of Electronic Media. Findings of this study shall be valuable to the ministry of education in planning for early intervention programs for learners with Autistic Spectrum Disorders.

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LIST OF ABBREVIATIONS AND ACRONYMS

AAC:	Augmentative and Alternative Communication
ASD:	Autism Spectrum Disorder
ASL:	American Sign Language
CAI:	Computer Assisted Instruction
DSD:	Descriptive Survey Design
ICAs:	Intentional Communicative Acts
NACOSTI:	National Commission for Science Technology and Instruction
PECS:	Picture Exchange Communication System
SPSS:	Statistical Package for Social Sciences
TEACCH:	Treatment and Education for Autism Children and Communication Handicap
TOM:	Theory of Mind
VSM:	Video self-modeling

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CHAPTER ONE

INTRODUCTION

1.0 Introduction

This chapter discussed the background of the study, statement of the problem, purpose of the study, research objectives, research questions and significant of the study, scope of the study, limitations of the study, assumptions of the study and operational definition of terms.

1.1 Background to the Study

Autism is a neurodevelopmental disorder that involves global impairments in social skills and in verbal and non-verbal communication, as well as the presence of stereotyped patterns of behaviors and interests (Colombi and Constanza, 2017). Autistic Spectrum disorder (ASD) imposes an enormous burden on the society including lifelong disability, high medical care, and increased mental health problems in caregivers (Colombi and Constanza, 2017).

Social Interaction refers to the gaining of relationship, skills and attitudes gradually hence enabling a person to effectively interact with other people in the society (Nagent and Pam, 2013). Active socialization with others helps these children build a sense of self-realization and increases awareness of their expectations. They are able to actively respond to both positive and negative influences around them and play active role in creating and shaping their desired relationships (Hartup, 2014). To help children with autism develop socially, early intervention measures must be taken right at school level to enable them acquire

social skills for both social interaction and social communication, which eventually may enhance behavior relation (Tracey, S. et al 2021).

Early intervention measures refer to a variety of childcare, educational and family support specially designed in order to minimize disability effect or rather prevent future occurrence of developmental and learning difficulties in the child's life presumed to be at risk of such problems (Cusack, et.al,2016). Early intervention measures can be both in the classroom and home based programmes providing compensatory services for children assumed to be at risk for future behavior and learning problems as well as provision of related services for already encountered difficulties or problems (Garguilo, 2016). Early intervention measures include restructured environment, picture exchange communication system and sign language among others, (Khasakhala, 2018).

Restructured environment affect children with autism positively (Schopler, 2014). Children with autism are taught using various methods of instruction including visual support strategies, discrete trial, picture exchange communication system, music/rhythm intervention and sensory integration strategies among others (Schopler, 2014). Treatment and Education for Autistic Children and Communication method provide to children with autism both organization and structure to understand their environment since it depends on five basic principles that include; physical structure, scheduling, work system, routine and visual structure (Khasakhala, 2018). Physical structure refers to the way in which we set up and organize the person's physical environment. It emphasizes where and how we place the furniture and materials in various environments including locker/cubby areas, bedroom, classrooms, workshop/work area, playground and hallways (Khasakhala, 2018).

Close attention to physical structure is essential for a number of reasons: physical structure provides environmental organization for people with autism. Clear physical and visual boundaries help the persons to understand where each area begins and ends. The physical structure minimizes visual and auditory distracters in class. It prevents accidents and promotes concentration during learning (Schopler, 2014).

In the United States, the use of restructured environment to enhance social interaction has shown positive outcomes. Studies established that there exists a direct relationship between the behavior of children with autism, their academic engagement and the general classroom environment. (Guardino and Fullerton, 2010).

A classroom that is organized well promotes positive interaction between the children and their teachers and among themselves hence promoting social interaction and reducing the occurrence of unwanted behavior (Martella and Marchand, 2013). In Kenya, since autism is a disorder that is not well understood, Interventions for children with autism have not been well implemented such as the use of restructured environment in a classroom setting (Matasio, 2011).

The Kenya National Special Needs Education Policy emphasizes on the use of inclusive education to enhance access to education by children with special needs (Matasio, 2011). Matasio (2011), states that use of restructured environment is a key intervention measure in promoting development of social skills in an inclusive classroom for children with autism. In Mumias West Sub County, in order to promote social interaction in children with autism the researcher seeks to establish the effect of restructured environment on

social interaction of children with autism in public primary schools in Mumias West Sub-County.

Picture exchange communication system (PECs) is a visual cue that attracts the child with autism and help in conveying the message such as different animals with their names labeled and where found. In the United Kingdom PECs has shown gains in the children's communicative abilities and that the system aid language development (Khasakhala, 2012).

Children with ASDs are provided with a variety of pre-schools provisions for supporting them, parents and staffs. Most practiced in schools is eclectic and a number of approaches may be used within a school in whole or in part with some or all of the children with ASDs (Khasakhala, Hwaga, 2017).

PECs enables children who have little or no verbal communication ability to communicate with other people using pictures. PECs can be used in the classroom, at home as well as in other settings. Amaoko, Avemega (2016) introduced PECs in Ghana using visuals to investigate communication in children with autism. Sign language tool was used for those unable to communicate verbally. A list of local foods and transport was used and children clicked on the picture to tell what they wanted. It was established that the children performed well when they click on pictures to express what they want. Can picture exchange work in Mumias West Sub-County? The researcher sought to establish the effect

of picture exchange of communication system on social interaction of children with Autistic Spectrum Disorders in public primary schools in Mumias West Sub-county.

Bornman (2015), Haupt and Atlant (2016) point out that majority of AAC (Augmentative and Alternative Communication) development work has been centered in South Africa looking at cross-cultural readability of graphic symbols. According to Goha, Newton, Hartley and Bunning (2013) study on home based intervention using Augmentative and Alternative Communication (AAC) technique in children with complex communication needs in Kilifi County found out that it had some positive transformations towards the children.

Even though sign language was developed to aid communication for individuals with hearing impairment, it can also be used to teach individuals with developmental disabilities and have poor verbal communication skills such as children with autism (Ricamoto, 2010). Research finds from scholar's shows that sign language and other language skills can be taught in conjunction without confusing children thus their sense of realization and actively responds to both positive and negative influences around them hence creating Social Interaction (Hartup, 2014) there are studies which indicate that learners with Autistic Spectrum Disorders may not use sign language; Male, D (2012).

In the United States, it was established through various studies that sign language not only promotes social interaction but it also increases development of early language, growth of the brain and acquisition of motor skills. Children with autism usually have difficulty in both expressive and receptive language (Toth, 2015). Use of sign language helps in the

development of communication skills which directly improves the self-esteem of learners hence making them more willing to interact with others (Nunes, 2010). In Kenya, the use of the Kenya Sign Language when teaching children with autism will not only enable them to develop language skills but also help to develop crucial social interaction skills.

Studies on the use of electronic media to enhance social skills in the United States established that the use of electronic media and technology in general provided a structured and controlled environment where affected learners practiced targeted social skills in the same setting. This is because the repetition on the practice of desired social skills assisted in the maintenance of the outcomes of the treatment even after complete termination of the treatment (Reed, 2011).

Various electronic media that may be used include virtual reality programs, video modeling, interactive computer software, mobile technology and interactive computer software (Shane and Albert, 2010). Shane and Albert (2010) further state that children with autism when given the freedom to choose their desired activities, they will prefer choosing electronic media over other activities. In Africa, there has been limited research on the use of electronic media as an intervention measure for enhancing social skills in children with autism. The researcher aims at establishing the effect of Electronic Media on Social Interaction of children with autism in public primary schools in Mumias West Sub County.

There is a small but steadily growing body of research evidence which indicates that learners with ASDs are likely to drop out of school when early intervention measures are not put in place by schools, Rita and Jones (2017). There is also small but convincing

body of literature which indicates that effective early intervention measures leads to high retention of learners with ASDs in Schools; Sansosti, F.J (2010).

Table 1 below shows that there was a high dropout rate of children with autism in Mumias West Sub-County with most of the drop outs being of older ages of between 13 years to 16 years. The ages of the children at the time of admission ranged between 5 years to 16 years. From a total of 47 children with autism that were admitted into public schools, only 35 were currently attending classes. 12 children with autism dropped out from school with most of them being of the older ages between 13years and 16 years.

Table 1.1: Number of Children with Autism Admitted VS Number of Dropouts

Public School	No. of Children Admitted	No. of Drop Outs	Current No. Of Children In Class
St. Martins Mumias	7	2	5
Ichinga Muslim	4	1	3
Mumias Central	3	1	2
Mumias DEB Primary	4	1	3
Mumias Township	3	1	2
St. Annes Girls Primary	1	0	1
St Peters Mumias Boys	1	0	1
Lukongo Primary	3	1	2
Ingusi Primary	1	0	1
Utende Primary	3	1	2
Bukaya Primary	1	0	1
Etenje Primary	1	0	1
Musanda Primary	1	0	1
Mumias EARC Model School	9	3	6
For Autism			
Shianderema Special Unit	3	1	2
Field Of Life Academy	2	0	2
Total	47	12	35

Notes: age of children on admission 5years – 16 years; age of most dropouts 13 years – 16 years. Source: Researcher 2019.

It was evident that early intervention measures are vital for children with Autistic Spectrum Disorder since they promote social interaction and development. It was

important for these measures to be instilled at very early stages of development for the children to prevent future problems such as social exclusion and peer rejection. This study proposed intervention measures that not only promoted social interaction and development for children with Autistic Spectrum Disorders in public primary schools in Mumias West Sub-County but it also ensured that these children do not drop out of school due to fear of exclusion from other peers in the classroom.

1.2 Statement of the Problem

Social interaction for learners with Autistic Spectrum Disorders is vital for inclusion in their daily learner activities. Learners with Autistic Spectrum Disorders have difficulties in socializing with their peers. Children with poor social interaction skills such as communication and behavior relations find it difficult to be included in most school activities. Lack of Communication and Behavior Relations subject them to rejection by their peers. This phenomenon leads to underdevelopment of social skills necessary for the interaction in a cohesive society.

Studies indicated that if early intervention programs for learners with Autistic Spectrum Disorders were carried out, they were likely to develop good interaction skills later in their lives. Little is known about social intervention programs for learners with Autistic Spectrum Disorders in Mumias West Sub-County. This study therefore intended to establish the effect of Early Intervention Measures for development of social interaction skills for children with Autistic Spectrum Disorders in public primary schools in Mumias West Sub-County.

1.3 Purpose of the Study

The purpose of the study was to establish the effect of early intervention measures on social interaction of children with Autistic Spectrum Disorders in public primary schools in Mumias West Sub County.

1.4 Objectives of the Study

This study sought to:

- 1) Determine the effect of Restructured Environment on Social Interaction of children with Autistic Spectrum Disorder in public primary schools in Mumias West Sub-County.
- 2) Establish the effect of Picture Exchange Communication System on Social Interaction of children with Autistic Spectrum Disorders in public primary schools in Mumias West Sub-County.
- 3) Determine the effect of Sign Language on Social Interaction of children with Autistic Spectrum Disorders in public primary schools in Mumias West Sub-County.
- 4) Establish the effect of Electronic Media on Social Interaction of children with Autistic Spectrum Disorders in public primary schools in Mumias West Sub-County.

1.5 Research Questions

This study sought to answer the following research questions:

- 1) What is the effect of Restructured Environment on Social Interaction of children with Autistic Spectrum Disorders in public primary schools in Mumias West Sub-County?

- 2) What is the effect of Picture Exchange Communication System on Social Interaction of children with Autistic Spectrum Disorders in public primary schools in Mumias West Sub-County?
- 3) What is the effect of Sign Language on Social Interaction of children with Autistic Spectrum Disorders in public primary schools in Mumias West Sub-County?
- 4) What is the effect of Electronic Media on Social Interaction of children with Autistic Spectrum Disorders in public primary schools in Mumias West Sub-County?

1.6 Significance of the study

This study shall provide to the government, Ministry of Education, learners with autism, parents, educationists and policy makers with information on the effect of early intervention measures on social interaction of children with autistic spectrum disorders. This may form a basis for policy interventions to either strengthen or review the criteria in developing social skills for learners with autism spectrum disorders in primary schools.

1.7 Scope of the Study

The research was conducted in Public Primary schools in Mumias West Sub-County, Kakamega County. It was done between the month of June 2019 and December 2019. Learners with autism spectrum disorders, head teachers and the teachers teaching learners with autism spectrum disorders were the main focus.

1.8 Limitation of the Study

This study involved learners with autistic spectrum disorders who are currently in Public Primary schools in Mumias West Sub-County. Therefore, observations on learners with autism spectrum disorders in other geographical regions in Kenya were not considered.

The study only engaged teachers in schools with Learners with autism spectrum disorders. Therefore, other stakeholders like parents, MOE Officials; Politicians, Funding Organizations and well-wishers who could also give information that may have an effect on the findings of the study did not participate. However, the sample chosen is believed to be representative enough to capture the concerns of the left stakeholders. The study used questionnaires, interview schedule and observation checklist for data collection. Questionnaires have ceiling and floor effect which was minimized by interview schedules.

1.9 Delimitation of the Study

Due to time management the researcher had to train a research assistant to help in collecting data to enable her finish the collected data within the stipulated time. Due to financial constraints, the researcher got financed through loans and also pull finances through her family.

The researcher is an alien teacher of learners with autism disorders therefore she had to use an interpreter who understood the culture of the catchment area. The researcher used questionnaire as the main data gathering tool. This was likely to cause floor and ceiling effect where respondents were likely to respond in a certain preferred way. To overcome this problem, data gathered from the questionnaires was collaborated with data from the interviews.

1.10 Assumptions of the Study

This study assumes that;

- 1) Learners with autism had social challenges that subject them to negligence by both teachers and peers.
- 2) The respondents provided valid and reliable information to achieve reliable and valid results.
- 3) It also assumes that teachers in Mumias West Sub-county practiced early intervention measures.
- 4) It also assumes that the government provide enough teaching and learning resources necessary for learning in all schools for learners with Autistic Spectrum Disorders.

1.11 Operational Definition of Key Terms

Early Intervention Measures:	Methods and techniques used to address the problems a learner may be having early enough to help prevent or reduce the effect of the disability in life. They include; Restructured Environment, Picture Exchange Communication System, Use of Sign Language and Use of social media
Restructured Environment:	A modified physical classroom environment that aids in meeting the behavioral and educational needs of children with autistic spectrum disorders. Reasonable adjustments made to this classroom environment help to reduce barriers to learning.
Picture Exchange Communication System:	A form of alternative and augmentative communication whereby a child with autism is taught how to communicate with adults by giving them a card with a picture on it. It is based on the idea that non-verbal children or those with limited functional speech can be taught how to communicate through the use of pictures.
Autism Spectrum Disorders:	A range of neurological disorders that most markedly involve some degree of difficulty with communication, interpersonal relationships, obsessions and repetitive behaviors.
Use of Sign Language:	Sign language is a silent tool of communication in which signs and gestures are used to convey messages by persons lacking speech or verbal communication skills.
Social Interaction:	Social Interaction is the gradual gaining of skills, relationships and attitudes that enable a person to interact in the society.
Public Primary Schools:	The 14 Public Primary Schools in Mumias West Sub-county in Kakamega County.

CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction

This chapter deals with literature review based on children with Autistic Spectrum Disorders. Autistic Spectrum Disorders are a range of neurological disorders that involve a degree of difficulty with communication and interpersonal relationships, obsessions and repetitive behaviors (Jones CRG, Simonoff E., et al (2018)).

This Literature Review was based on the objectives which include; To determine the effect of Restructured Environment on Social Interaction of children with autistic spectrum disorders in public primary schools in Mumias West Sub County; To establish the effect of Picture Exchange Communication System on Social Interaction of children with autistic spectrum disorders in public primary schools in Mumias West Sub County; To determine the relationship of Sign Language on Social Interaction of children with autistic spectrum disorders in public primary schools in Mumias West Sub County; and to establish the effect of Electronic Media on Social Interaction of children with autistic spectrum disorders in public primary schools in Mumias West Sub County. The conceptual framework and literature gap was finally realized.

2.1 Empirical Literature

2.1.1 The effect of Restructured Environment on Social Interaction of Children with Autism in Public Primary Schools

Restructured environment refers to organization of the surrounding learning area to suit the needs of the learner. Such areas include the classroom and home. The physical boundaries are clearly defined with various activities such as music, play, snack area and transitioning. According to Cheshire (2012), creation of an accessible and welcoming environment whereby children can get their education is a major part of inclusive education. A restructured environment should be physically adapted by constructing accessible toilets, building ramps, leveling grounds and painting walls in order to improve lighting (Matasio, 2011). Displayed pictures and charts must be well labeled with words or names of the pictures for better understanding. Avoid overcrowding pictures or charts on the wall for better learning and concentration, Rita and Jones (2017).

2.1.2 Classroom Physical Environments and Effects on Student Behavior

Children with autism in schools have varied needs and an environment that is inaccessible both within and outside the school. The school may alleviate this problem by contributing to their exclusion from learning institution (Matasio, 2011). Teachers in inclusive classrooms are usually concerned about motivating and reaching the learners hence in the best cases are versed in teaching strategies, adapting materials, curricular goals, instructional arrangements as well as lesson formats. (Udvari-Solner, 2011). This means that by creating a restructured environment in the classroom, these teachers were able to

meet both the social and academic needs of students in the classroom. Therefore, to alleviate this problem, the environment needs to be restructured to suit the needs of the children with autism. (UNESCO, 2012a: 2016). Similarly, this study also seeks to establish the effect of Restructured Environment on Social Interaction of Children with Autistic Spectrum Disorders in Public Primary Schools in Mumias West Sub-county, Kakamega County.

Classroom environment can affect behaviors. For example a study carried out in Tanzania (UNESCO, 2012) that investigated classroom environment effect found out that learners in well structured environment achieved a lot in school. This study investigated only the learners' environment. The present study investigated intervention measures that included effect of Restructured Environment on social interaction, Picture Exchange Communication System on Social Interaction, Effect of Sign Language on Social Interaction and effect of Electronic Media on Social Interaction of children with ASDs.

For students with autism in particular, factors such as both auditory and visual distractions, blockage from the line of sight, poor light as well as distractions and noise from vehicular traffic classroom characteristics affect concentration and academic involvement (Kenny L. Hittersley et al (2015). Behavioral academic engagement among students is where the students are actively involved in various academic tasks in the classroom such as following instructions from the teacher, participation in various classroom discussions, being on task and absence or minimized disruptive behaviors that may affect learning.

In students with autism, participation in the classroom is directly related to their academic participation and achievement (Khasakhala E. & Galava (2016). It is evident that active academic engagement in classroom for children with autism can be affected by different school and student factors. However, physical environment in the classroom is one of the factors that can be easily manipulated and controlled for maximum benefits to be harnessed. Physical environment in the classroom can affect learning through changing of student-teacher interaction patterns and further reducing both “downtime” and distractions (Trussell, 2010). There are various forms of seating arrangements that can encourage interactions between the teacher and the student but can cause distractions to the student while undertaking individual tasks (Trussell, 2010).

Cluttered furniture in a classroom can cause constant bumping among the student creating a high possibility of occurrence of disruptive behavior in the classroom (Trussell, 2010). Disorderliness and disorganization in a classroom where both students and teachers face difficulties in accessing various classroom materials limit teaching time and increase possibilities of disruptive behavior among students in the classroom (Trussell, 2010). Physical environment in a classroom can affect the mobility of teachers in a classroom and direct contact with students. This also affects the academic involvement of students in various classroom activities.

Various physical modifications that have been studied include (a) seating arrangement of students in the classroom including creation of designated spaces for personal supplies for

students (b) positioning of the teacher's desk, (c) organization and use of various classroom materials, (d) provision of lighting in the classroom (e) classroom acoustics and noise.

The seating arrangement in a classroom is one of the easiest changes a teacher can make in the classroom as part of restructuring process. Various scholars have explored how student behavior in a classroom can be influenced by changing the seating arrangement of the students in the classroom (Visser, 2016). An early research by Zifferblatt (2011) established active socialization among students can be achieved by grouping their desks together although this may affect the academic engagement of students in the long run. A case study by Hood-Smith and Leffingwell (2016) established that in order to promote academic engagement of students in a classroom, the seating arrangement of students needs to be organized in such a way that a common area is created in the center of the classroom between two rows while at the same time providing the students with more private space.

A proper classroom needs to be able to promote both individual and group work as noted Fullertone (2010) through a study of two classrooms labeled "satisfactory" and "difficult" basing on the behavior of students and their participation in various classroom activities. The study established that in the satisfactory classroom, there were designated areas for both individual and group work. However, in the difficult classroom, there were no designated areas for group and individual work as they both took place at the seats of the students which were grouped into clusters. Fuller (2010) noted that there were fewer

complaints on the behaviors of students in the satisfactory classroom compared to the difficult classroom.

Guardino and Fullerton (2010) involved a teacher to restructure the physical environment in the classroom through creation of separate individual and group working spaces, creation of designated spaces for individual student belongings and rearrangement of furniture in the classroom to promote mobility. After the modifications, and after the classroom was modified, Guardino and Fullerton (2010) noted that there was a 42% increase in academic engagement and a further decrease in disruptive behavior even though unstable. The variations in disruptive behavior was mainly due to inconsistencies in the various classroom modifications for example the chair bags intended for storage of student belongings were turned into catchalls creating an indication that there was need for guidance by both teachers and students on the use of available classroom physical spaces to reduce disruptive behavior. Dye (2015) noted that for students using sign language, the horse or circular seating arrangement can be utilized especially in self-contained classroom in order to promote face to face interactions and communication between students. Dye (2015) further suggests that the best classroom arrangement for students is the one that minimizes academic distractions.

Hayaga and Khasakhala (2012) observed in their studies between satisfactory and difficult classrooms that centrally positioning teacher's desks promoted academic interactions since the teacher can easily observe the students from a comfortable position. This increases the possibility of teacher- student interaction compared to when the teacher's desk is

inaccessible. Increased student-teacher interactions lead to increased academic engagement and performance of students (Ezrailson, 2006).

Improving the organization and accessibility of materials in a classroom leads to reduced disruptive activities in a classroom (Trussell, 2010). A study by Khasakhala and Hwaga (2012) established that improving the organization and visibility of classroom supplies and materials led to increased and appropriate use of these materials by the students. A classroom that is well organized for students with autism is likely to promote minimization of downtime and increased academic engagement time. Disorganization of classroom may lead to visual distractions for learners with autism.

The behaviors of learners with autism may be affected by either too little or too much lighting in the learning environment. Visser (2016) studied students in a classroom of learners with emotional behavior disorders and established that as previous researchers (Proshansky and Wolfe, 2012; Evans and Lovell, 2012; Weinstein, 2012) reported, excessive lighting generates a “dazzling” effect of both students’ desks and white boards leading to visual distractions. However it should be noted that this study focused on learners with Emotional Behavioral Difficulty.

More studies need to focus on learners with Autistic Spectrum Disorders so that they can generate knowledge on how light affects learners with ASDs. Since many learners with autism mainly communicate using their vision, it is important to provide sufficient lighting in a classroom and ensure that there is proper control of excessive lighting in order to have

proper academic attention and engagement. Effective lighting is also crucial for learners who use speech reading to supplement audition (Kaderavek and Pakulski, 2016).

A noisy environment most likely affects the ability of learners to understand what they are taught by their teachers as well as their ability to concentrate on their class (Robinshaw, 2007). Research shows that for learners with disabilities, it is common for them to experience difficulties in understanding in a noisy environment (Bradlow, 2012) even though research on children with hearing disorders established that noisy conditions have minimum effects on both the writing and reading performance of the learners (Weinstein and Weinstein, 2012). It is also noted that for learners with complete hearing loss disorders, the signal to noise ratio, background noise levels in the classroom environment and reverberation time impact directly on their ability to understand spoken language and instruction uptake (Nelson, 2016). Various acoustic modifications that can be fused into the physical environment include installing sound-absorbent materials in the classroom (Robinshaw, 2007). Restructuring of the environment in the classroom needs to be in such a manner that it increases distances from noisy equipment and at the same time promote an increase to the speech-to-noise ratio (Bess, 2010).

Khare and Mullik (2010) study on effect of environment on learners with autism established the relationship between the environment and the needs of learners with Autistic Spectrum Disorders. Teachers in both the USA and India recommended that the environment is important for learners with Autism. Arika (2015) Study in Kisii established

that there should be environmental adaptations to enable the implementation of effective instructional activities.

This includes removal of distracting stimuli, altering features of the environment that cause sensory overload for the student and arranging the classroom to maximize structure and reduce opportunities for undesirable behavior. Kathenya and Mwereria (2007) confirm that for learners to excel, the classroom environment must be conducive to cater for their needs. None of these studies have been done in Mumias Sub County.

2.1.3 Picture Exchange Communication System on Social Interaction of Children with Autism

Picture Exchange Communication Systems (PECS) is a form of augmentative and alternative communication (AAC) specifically designed for children with autism. According to Kluwe (2010) Psychological study in India, it was established that Picture Exchange Communication Systems lead to improvement in communication of children with autism who have difficulty in approaching another person. The child is made in charge of the communication hence learning to articulate some words.

Studies by Travis and Greiger (2010) on The effectiveness of the Picture Exchange Communication System (PECS) for children with autistic spectrum disorder (ASD) in South Africa established that when PECs were introduced, there were considerable increase in intentional communicative acts (ICAs) for children with autism, with marked

increases in requesting (function) and the development of forms of communication (from augmentation of speech with pictures to speech only utterances).

A study by Webb (2000) in the United Kingdom on the use of Picture Exchange Communication Systems by children with autism established that the Picture Exchange Communication Systems increased spoken words in affected children. Bondy and Frost (2016) believed that the use of pictures is likely to facilitate the development of speech. However, Bondy and Frost did not compare the Picture Exchange Communication Systems with other programs to see which one was the best. Picture Exchange Communication Systems differs from other systems of communication in that; (a) it was designed to address the lack of motivation for social reinforcement; (b) it immediately teaches initiating, instead of teaching responding before initiating and (c) it does not require prerequisite skills (Bondy and Frost, 2010).

According to Bondy and Frost (2016), PECS undergoes six phases of training. Phase I (How to communicate) has the main objective of enabling an affected child to pick up a picture of a highly preferred item upon seeing it and releasing it into the trainer's hand. The child is rewarded after a successful session. Phase II (Distance and Persistence) aims at increasing the independence of the affected child by continuous repetition of Phase I until the child can do it by his/her own.

The child learns to remove the picture from a display board for the exchange and engages in more physical movement than in Phase I in order to accomplish the exchange. At this

stage, the child encounters only one symbol on a board at any one time. Phase III (Picture Discrimination) aims at ensuring that the affected child independently requests for the desired item by selecting the desired pictures from an array and delivering it to a communication partner/trainer.

Therefore, child learns to make discriminations comfortably. Phase IV (Sentence Structure) aims at ensuring the affected child can request both present and non-present items using a multi-word phrase by combining the object picture and the carrier phrase “I want” on a sentence strip delivering it to the trainer. Phase V (Responding to “What do you want?”) involves helping the affected child to learn to respond to the “What do you want?” question through exchange of the sentence strip. In order to ensure the child builds his/ her own request vocabulary, more adjectives and words are added gradually hence creating a shift in not only in the communication behavior but also in the commenting behavior of the child. Phase VI (Commenting in response to a question) aims at helping the child to develop naming and labeling skills. The stage is considered successful after the child is able to make spontaneous comments and requests without being influenced by the trainer.

Various case studies and bodies of anecdotal literature have supported Picture Exchange Communication System (Magiati and Howlin 2012; Charlop et al, 2016; Mirenda and Erickson, 2000; Mirenda, 2016). There are few researchers that have investigated the effectiveness of PECS for children with ASD or other developmental disabilities with majority of the contribution made by the developers of PECS, (Andy Bondy and Lori Frost, 2016).

In their first article published in 2010 Bondy and Frost explained in detail how PECs can be used by adults and children with development disabilities. They detailed procedures for training of school based staff in Peru through an extensive period of 5 years. Even though data was not collected formally, it was reported by the school that into 3 months of training 74 learners with PECs, there were 28 students who were still mastering Phase I, 28 students were in Phase II, and 18 in Phase III of the PECs training procedure.

In a different study Bondy and Frost (2010) established from a study of 85 preschool learners with autism aged 5 years and below. The cognitive abilities of the students were estimated ranging from near-normal to profoundly disabled even though they were not assessed. The study established that majority of the students (over 95%) learnt how to use more than two pictures within the exchange format and that almost all students learnt within one month of starting the PECs programme at least one picture. For the 66 Students who used the PECs programme for one year or more, 41 of them were able to acquire the ability to use speech independently while the remaining 25 used a combination of speech and pictures or symbols. All 66 students were able to communicate using pictures and symbols even though not all of them achieved the highest PECs levels.

Anecdotal data presented by Bondy and Frost (2010) from various small-group and single-case studies provided positive effects of PECs on learners with autism such as decreased behavioral problems and increased spontaneous speech and communication between the learners. The effect of PECS on different problem behaviors was also studied by various researches beyond that of Bondy and Frost. For example, PECS was reported in a study by

Frea. (2016) to having a positive impact on the aggressive behavior of a 4 year old child with autism in a pre-school classroom environment. Dooley (2016) in a study on a 3 year old child with pervasive developmental disorders (PDD) established that there was a resultant decrease in problem behaviors and a further increase in compliance during transitions after implementation of the PECs programme.

2.1.4 Sign Language on Social Interaction of Children with Autism

According to Clean cop (2018) study on the use of sign language as a mode of communication to promote Social Interaction, it is beneficial to teach basic sign language during early childhood programs in classrooms and also at home especially for non-verbal children with autism. However, he postulates that many special education experts in developed countries are unwilling to teach American Sign Language to children with Autism or to encourage parents to practice signing at home. In Africa Majority of AAC development work has been centered in South Africa looking at cross cultured readability of graphic symbols. Gana, Newton (2013) study on home based intervention using AAC technique in Kilifi on children with communication need found out it had positive transformation towards the children. No study of the same was carried out in Mumias West. Gana, Newton (2013) study was done using caretakers to use signs, gestures and pictures from home but not in a classroom setting using teachers.

According to Shield and Meier (2013), language deficits of learners with autism are well documented, where they can range from the very mild in highly fluent speaking children to the very severe in children with a total absence of productive spoken language. For learners who completely fail to acquire speech, the most common features of autistic

language include pronoun reversal, echolalia (echoing the utterances of others), idiosyncratic language use and neologisms (the creation of new words), abnormal intonation and vocal quality and difficulty with pragmatics (problems interpreting the use of language in context and the non-literal use of language). Shield and Meier (2013) further state that an interest in the ability of children with autism to learn sign language developed in the late 1960 especially on children who completely failed to acquire speech after intensive speech therapy sessions.

Webstar (2010) suggested that in children with autism who were non-verbal, it was established that they readily complied if demonstration or gesture were used to convey the request. Another study by Stull (2012) stated that “We have found it impossible to teach some children to speak. Yet some of these same children have learned to express themselves quite rapidly once they have been shown how to use their hands”. These early studies on sign language and its impact on children with autism established the need for use of sign language as a possible alternative mode of communication for children with autism who failed to develop communication and language skills.

Studies done in by Carr, (2012) performed interventions with nonverbal autistic hearing children. Children were taught how to use manual signs both independently and with a combination of speech. Results from these papers established that the children were able to learn how to use sign language successfully even in cases where previous attempts of teaching spoken words was unsuccessful. Bonvillian (2010), after conducting a review of 20 studies which involved teaching of sign language to over 100 learners with autism

established that even the slightest teaching of sign language to children with autism has a positive impact on the communication of the learners in terms of the communication skills among children with autism.

Despite the fact that there were varied outcomes from the studies, it was established that every student acquired the ability to comprehend sign language. Bonvillian (2010) reported that the students were able to acquire sign language vocabularies ranging from five to over three hundred and fifty signs although later, Bonvillian and Blackburn (2010) reported that various statements made by researchers and literature on the sizes of sign language vocabulary may not necessarily represent their real working vocabularies since the various signs that were used during training sessions were not used by the learners in outside environment. Researchers also argued that sign language has an edge over speech since the hands of learners can be manipulated, guided, molded and exaggerated to various sizes in order to provide room for extra time for processing (Jordan, 2009).

A study by Pizza (2011), established that mothers who were deaf and had typically developing deaf children sometimes modified their signs by either enlarging them or molding the hands of their children to facilitate the process of acquisition. Notably, most of the acquired signs by the children with autism were mainly nouns, whereas there are contradicting claims from different literature about the ability of affected learners to acquire abstract sign language according to Carr (2012) which included prepositions and pronouns.

A study by Creedon (2010) established that there was a successful acquisition of sign language by children with autism. Creedon (2010) reported that 21 children with autism (ages four to nine) who were previously non-verbal were able to successfully acquire language after an intervention that involved simultaneous communication (use of both spoken and signed language). Bonvillian (2010) further stated that the affected children in many cases graduated to production of more complex sign language during their daily interactions. However, the studies fail to describe clearly the different complex sign languages that are produced by the children during their daily interactions.

The ability to successfully imitate other people is usually impaired in children with autism although the underlying cause of this phenomenon as well as its exact nature has led to a lot of debate (Shield and Meier (2013)). Studies on this subject established an imitation deficit in children with autism. DeMyer (2010) established that in children with autism, there not only exists an imitation deficit in terms of imitating various bodily actions and gestures but also in imitating motor-object actions such as stringing of beads. Curcio (1978) observed in non-verbal children with autism of ages between 4 and 12 posted poor results in imitation of gestures.

Imitation deficits have led to different accounts on the relationship between this impairment and autism. Smith and Bryson (2010) reviewed various studies on the imitation skills of children with autism and concluded the studies prove that there exists a specific deficit in imitations among learners with autism however its nature has not been critiqued. In another review, Williams et al. (2012) noted that from the various literatures on the

nature of the imitation deficit in learners with autism, there exists a specific deficit in self-other mapping ability (Rogers and Pennington, 2010).

This was evidenced from a number of studies (Brown, 2011; Whiten and Brown, 2011; Ohta, 1987; Smith and Bryson, 2011; Hobson and Lee, 2010) which established that attempts by learners with autism to imitate both hand and arm gestures produced by other people lead to reversal of the arm movement directions and orientation of the palm. Ohta (1987) was referred to these gesture imitation deficits as ‘partial imitations’. In his study, the learners with autism tried to imitate a wave-like gesture in which the open palm of the teacher was oriented toward the student with a gesture in which the palm was oriented inward toward the student him/herself.

Smith and Bryson (2011) later established that 180° reversal errors in palm orientations were most common among children with autism compared to other language-impaired children of similar ages and other and typically developing children during imitation of eight bimanual gestures and American Sign Language hand shapes. These errors are specifically unique to autism and have been observed in different contexts such as imitation of pantomimes, object-related actions as well as both meaningful and meaningless gestures (Smith and Bryson, 2011).

These deficits in imitation abilities reflect a general ability to imitate gestures and words and also difficulties with the shifts in perspective required in the correct use of pronouns in spoken language pronouns and correct imitation of manual gestures (Smith and Bryson,

2011). Children with autism usually try to imitate different body movements from their personal point of view rather than what is demonstrated by the instructors they are required to imitate from (Smith and Bryson, 2011).

This finding has direct impacts on the acquisition of sign language by children with autism since the orientation of the palm as well as the arm movements direction have a great linguistic value in sign language (Shield and Meier, 2013). In the American Sign Language for example, the signs CLEAN and PAPER differ on the movement direction of the hand that is dominant. When the affected learner imitates a gesture based on his/her own perspective, the error distorts the intended meaning hence leading to confusion. This error is also evident in situations where a pair of ASL signs may differ depending on the orientation of the palm for example the signs TOILET (palm outward) and TUESDAY (palm inward) (Shield and Meier, 2013). Shield and Meier (2013) state that the same reversal errors found in the imitation of gestures by hearing children with autism also appear in the imitation of similar signs by children who are deaf and with autism.

Despite the fact that a number of studies have been done acquisition of sign language by children with autism, the available data is insufficient , the studies do not question further if social interaction is achieved after final acquisition of sign language by the affected children. This study hence aims to bridge this gap by seeking to establish the effect of this Sign Language on Social Interaction of the affected children.

2.1.5 Electronic Media and Social Interaction of Children with Autism in Public Primary Schools

Bellerin and Akullian (2007) study in the UK points out that using electronic media eliminates unnecessary distractions and stress during learning thus increasing attention to the modeled behavior. Electronic media includes the use of video, television or projector machine to display and show to a child with autism a model depicting the desired social behaviors (Amanda, 2011). Models can be adults, self, peers or siblings (Buggey, 2007). In Mumias West Sub County, no such study has been carried out on the use of electronic media.

According to Mazurek (2011), various clinical and anecdotal reports indicate that individuals with autism spectrum disorders (ASD) usually have the tendency of being preoccupied with screen based media including video games, computers and television. There is also existing evidence proving that the use of screen-based media has use can have negative impact on the behaviours, social development, health and academic performance of typically developing youths as well as individuals with autism (Anderson. 2010; Sharif and Sargent 2006). This is a very important study area in Autism Spectrum Disorder particularly on functioning areas as they relate to overall social development outcomes. This is despite the fact that children especially youth may be at risk for excessive use of screen-based media.

A study by Mazurek (2011) examined the prevalence and correlates of screen-based media use among a large nationally representative sample of youths with ASD. He established

that there existed a very high rate of use of solitary screen-based media such as video games and television among youths with ASD, with markedly lower rates of use of socially interactive media (i.e., email and chat room participation). Television use was highest among those with ASD compared to those with other learning disabilities or speech/language impairments. The study established that the percentage of youths with ASD who spent majority of their free time watching television was approximately equal to that among youths with intellectual disabilities. These results are consistent with other studies seeking to examine the active participation among those with disabilities. For example, studies have found that individuals with intellectual disabilities such as ASD participate in fewer adaptive leisure activities than both typically developing individuals and those with other disabilities (e.g., cerebral palsy, hearing loss, seizure disorder. (Van, Nard, Braun et al. 2006). Children with intellectual disabilities such as ASD participate in fewer physical activities than their typically developing peers beginning in childhood (Foley et al. 2010), and these rates of participation further decline during adolescence (Kozub 2012).

A study by Nally (2000) established that parents of children with autism reported in various focus group discussions that television and videos are often used as distraction technique to prevent tantrums and to control behavior. Earlier arguments by Gadow and Sprafkin (2010) in their discussions of television use among children with disruptive behavior disorder observed that parents use television as an opportunity for “peace and quiet”. Mazurek (2011) states that television viewing is a preferred activity for youths with ASD regardless of symptom profile, functional level, or family status. A study by

Nally, (2000) established that parents of children with autism reported in focus groups that television and videos are often used as a distraction technique, to prevent tantrums, and to control behavior (Nally, 2000).

Hagiwara and Myles (2010) implemented interventions using computer-based social stories for children with ASD, which consisted of reading and listening to stories targeting specific tasks on a computer screen. Students later watched a short movie clip portraying them performing the same task as a form of video modeling. Bellini and Peters (2010) describe video modeling as involving an individual watching a video demonstration of positive behavior and then imitating the behavior of the model. Video self-modeling (VSM) is identified as a specific application of video modeling where the individual learns by watching his or her own positive behavior.

Bellini and Akullian (2007) suggest video modeling and VSM are an effective intervention strategy for addressing social-communication skills, behavior functioning, and adaptive skills in children with ASD. Results also indicated video modeling and VSM effectively promote skill acquisition and skills acquired through video modeling and VSM are generally maintained over time and transferred across peers and settings. Bellini, Akullian, and Hopf (2007) used VSM to increase social engagement of preschool children with ASD. Preschool children were prompted to interact with peers during free play; the children viewed one Current Research 13 video per school day for 4 weeks. The intervention resulted in rapid social engagement and effects were maintained after the videos were no longer shown.

Video modeling is a modern approach to promote social interactions among children with autism that involves showing a video to an autistic child with a model depicting various desirable social behaviors (Amanda, 2011). The models presenting various desirable social behaviours can be an adult, sibling, self or peer (Buggey, 2007). This is done with the hope that the autistic child will watch the model and be able to perform social behaviors that are desired such as reciprocating play, imitation, greetings, and sharing (Amanda, 2011). Children with autism may be stimulated to develop socializing skills such as socializing and interacting with new individuals. Use of videos eliminates distractions deemed to be unnecessary as well as stress during the training session. Learners with autism may also find the process of watching videos rewarding, which promotes an increased attention by the affected learners to the modeled and desired behaviors (Bellini and Akullian, 2007)

The results from the studies above provide insights to the prevalence of use of electronic media such as television, computers and video modeling and views on the impacts to behaviors of children with autism. However, they fail to state how these media can be used in a classroom setting to promote social interaction among the children. This is an important issue in the ASD field due to the substantial evidence showing that excessive use of such media has detrimental effects on youth outcomes in the general population, particularly with regard to academic performance, social engagement, behavioral regulation, attention, and health (Anderson et al. 2010; Sharif and Sargent 2006).

Clinical studies in the area of application of digital technologies as an intervention measure for ASD mainly focus on the effectiveness of various modern approaches such as

Computer Assisted Instruction (CAI). Computer Assisted Instruction (CAI) was established as an intervention measure for development of reading skills (Luckevich, 2010) as well as listening skills, vocabulary skills and language skills (Massaro, and Bosseler, 2006). This visual learning dimension when incorporated in digital technologies proves to be very supportive for the visual modality of students with ASD (Shane and Ducoff, 2010). The use of electronic screen media as a video modeling strategy for development of social stories and social skills in children with autism provided support for successful learning of basic communication competencies (Sansosti and Powell-Smith, 2010) and completion of activity schedules and tasks (Mechling, 2006). Symbolic play and social skills were developed successfully the use of virtual environments (Herrera, 2010, Moore, 2005).

There exist arguments basing on various studies done to determine the effectiveness of screen based media technologies being insufficient due to the inability to generalize results across the entire ASD population (Mineo, 2015). Individuals affected with autism spectrum disorder do not form a homogenous group and the type of technology which suits one student with ASD may not necessarily meet the learning needs of another student with ASD. Nearly all of the available research concentrates on discrete clinical trials with small numbers of participants (usually 1, 2 or 3), which have examined very specific skills.

There are few studies that have been carried out in the applied setting of an authentic classroom environment where it would be harder for the teacher to maintain the fidelity of the intervention. One of the few studies which implemented a low technology intervention (interactive books with visual supports and music) in a classroom setting with a group of

students with autism, found that it was hard for the teacher to control the exact number of questions from each intervention session to the next (Carnahan, 2015)

2.2 Theoretical Literature

Theoretical literature refers to a collection of ideas which are interrelated basing on theories it accounts for and explains the phenomena being studied (Tromp and Kombo, 2013). The researcher will exclusively review the Socio-Cultural Learning Theory and the Theory of Mind (TOM) for purposes of this study.

2.2.1 The Socio Cultural Learning Theory

The Socio-Cultural Learning Theory established by Leo Vygotsky argues that social interaction precedes development with the end products of behavior and socialization being cognition and consciousness. Vygotsky (1978), states that in a child's cultural development, every function appears twice; on the social level (between people-inter-psychological) and later on the individual level (inside the child intra-psychological). This similarly applies to concept formation, voluntary attention and logical memory. Higher functions therefore begin as actual interpersonal relationships (Vygotsky, 1978).

The theory develops on the idea that for cognitive development to be successful, there need to be full development of the zone of proximal development and this depends entirely on social interaction guided by development of social skills that can be developed either through peer collaboration or adult guidance. An example is the learning of language where one develops first utterances with adults or fellow peers for communication purposes and in the process internalizes and masters the language to allow for inner

speech. The theory establishes that consciousness is the end product of successful socialization.

This theory has an impact to special needs education especially in children with autism who face difficulties in social interaction. It emphasizes on the need and importance of educating children with various impairments. This comes in handy with the aim of this study which is to provide early intervention measures for children with autism in order to enhance social interaction.

2.3 The Theory of Mind

The theory of mind proposes a cognitive deficit. This refers to the ability to recognize one's own and others mental states in order to effectively make sense of behaviors. According to the Theory of Mind Module (TOMM) by Leslie (2016) the Meta-representation function is impaired in autism. This function is very crucial for children as it enables them to represent others' mental states and to believe or take part in them. Leslie states that 'Autistic children are impaired or delayed in their capacity to form or process meta-representations. This impairment (delays) their capacity to acquire a theory of mind' (Jordan, 2010) clearly explains how the structure of mind in the brain gives human beings the ability to understand the feelings and thinking of others. This is very critical and determines the understanding, shaping and predicting of behaviors of other people.

Children with autism usually have difficulties in assuming or perceiving thoughts and intentions of other people (mind blindness). This leads to particular behaviors such as unfriendly or fear relations, lack of empathy since they don't understand emotions, and

lack of social interaction with others since they are unable to understand the emotions of other people. The theory of mind explains the typical behaviors of autism and impairments that teachers should understand when dealing with children. Children with autism show poor TOM capabilities especially in new environments compared to unfamiliar areas. By developing strategies that will help the child with autism to develop the TOM application, social interaction skills must be developed for the affected child (Sansosti, 2010).

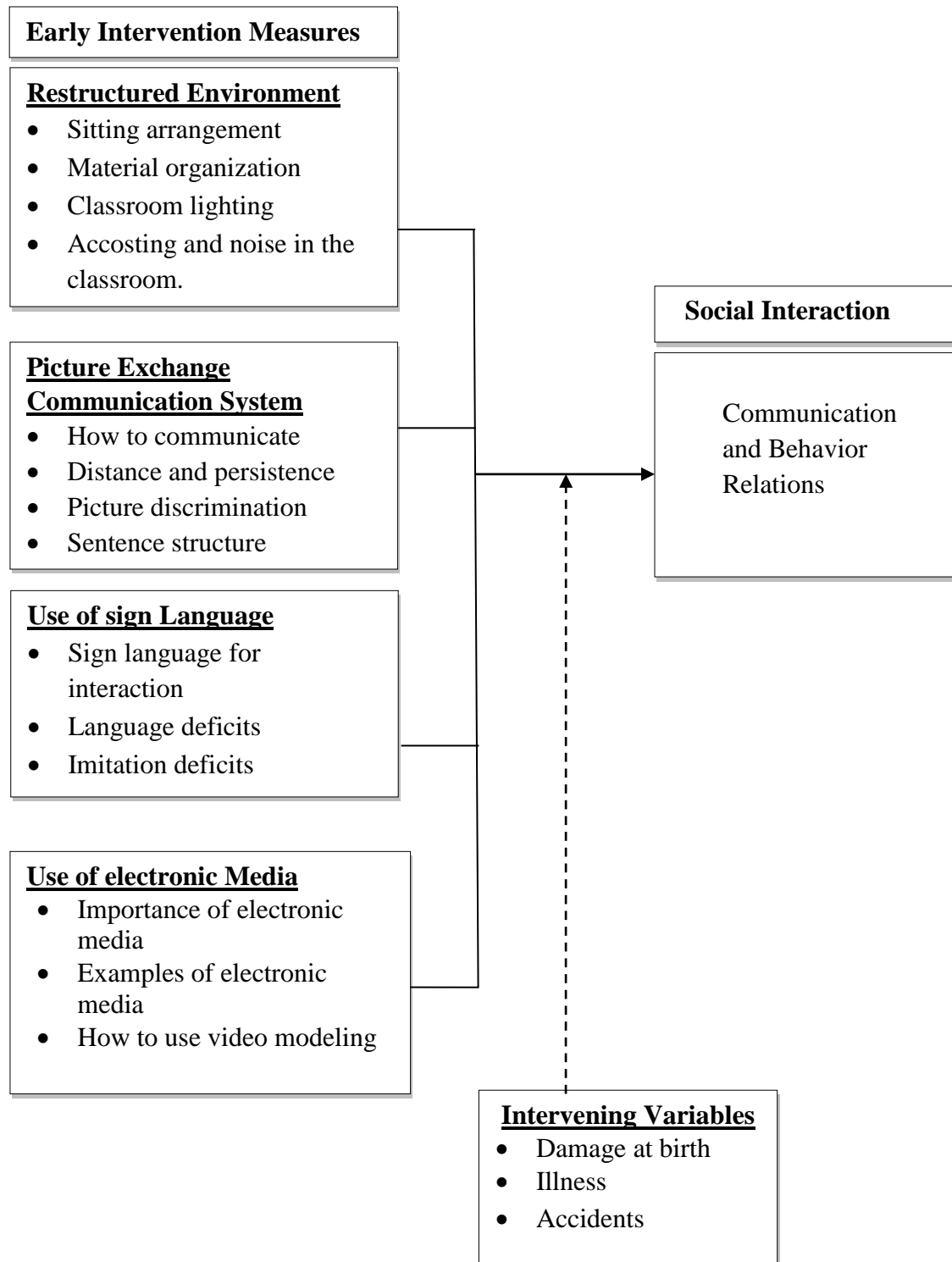
2.4 Conceptual Framework

The independent variable is Early Intervention Measures for children with autism. Early intervention measures include; Restructured Environment, Picture Exchange Communication System, use of Sign Language and use of Electronic Media in teaching children with autism in order to promote social interaction. The dependent variable is Social Interaction of the children with autism. Intervening variables are illness, accidents, diseases and damage at birth. Severe illnesses such as meningitis and German measles, birth injuries, severe accidents may cause brain damage to a child.

Brain damage leads to mental disability thus causing impairment in social interaction, communication and behavior. (Hwaga, Khasakala, Safa, Kavuli, 2012). Early intervention measures have effect on children with autism particularly in regard to promoting academic performance, communication, social engagement, behavioral regulation, attention and health. These benefits not only affect the learner but also the family and the community at large.

Independent Variables

Dependent Variable



Source: Author, 2020

Figure 2.1: Conceptual Framework Showing Interaction of Study Variables

Early intervention measures are meant to assist to improve social interaction of children with autism spectrum disorders. This implies that early intervention measures are a greater determinant in improving social interactions of children with autism spectrum disorders. Therefore, this study considers early intervention measures as a major determinant in acquisition of social interaction skills of children with autism spectrum disorders in public schools in Mumias West.

Therefore, the independent variable in this study is the early intervention measures categorized into usage of Restructured Environment, Picture Exchange, sign Language and electronic Media. The effect of early intervention measures on acquisition of social interaction skills of children with autism spectrum disorders in Mumias West is measured through frequency counts in descriptive statistics and coefficients from Pearson correlation coefficient computations.

2.5 Research Gaps

The literature review established that there were very few studies on effects of early intervention measures on social interaction of children with autism spectrum disorders in developing countries like Kenya. None of the studies has been done in public primary schools in Mumias West Sub County to be precise. Most studies have been done comprehensively in developed countries where autism has been given a lot of attention and coverage. Various Early Intervention measures have also been implemented on learners with autism in order to promote social interaction. On the other hand, in developing nations such as Kenya, data on the effects of early intervention measures is limited hence this study aimed at filling this gap. The various intervention measures include;

Restructured Environment, Picture Exchange Communication System, Sign Language and Electronic Media. There's also the belief that learners with autism are retarded mentally, have inability to socially interact and have an educable ability that is limited.

The reviewed literature on the effect of Restructured Environment on Social Interaction of children with autism established that research on the effects of classroom physical environments on student behavior is scanty and much of the cited research was conducted more than 30 years ago (Proshansky and Wolfe, 2004).

Other studies focused on various ways the environment can be restructured in order to promote social interaction in children with autism. This includes studies by Arika (2015); Khare and Mullik (2010); Trussell (2010); Guardino and Fullerton (2010). However, it is established that there is no research that provides evidence on the kind of seating and classroom arrangements that are most beneficial for children with autism or rather on the relationship between the placement of the teacher's desk and the teacher's interaction with affected students.

Reviewed literature on the effect of Picture Exchange Communication System on Social Interaction of children with autism established that there are few experimental studies done in order to specifically investigate the effectiveness of PECS for children with ASDs or other developmental disabilities. This includes studies by Travis and Greiger (2010), Webb (2000), Frea, (2016); Dooley (2016). The studies established various impacts in the behavior of children with autism. Furthermore, the majority of the anecdotal literatures

reviewing the effectiveness of PECS were contributed by its developers, Bondy and Frost (2010) who described the six phases of training PECS (Bondy and Frost, 2016). This study aims at bridging this gap by testing the effectiveness of PECS in promoting social interaction of children with autism in Mumias West Sub County, Kenya.

Reviewed literature on the effect of Sign Language on Social Interaction of Children with autism established that most of the studies have been done in developed nations with few studies done in Africa (Clean cop, 2018). Majority of AAC development work has been done in South Africa with specific focus on cross cultured readability of graphic symbols (Clean cop, 2018).

A study done in Kilifi by Gana, Newton (2013) established that the using the AAC technique as a home based intervention measure had positive effects on communication and socialization of children. Various studies were done in Studies done in 1970s and early 1980s by Bonvillian, (2010) and Carr, (2012) focused in the impact of sign language on nonverbal autistic hearing children with positive outcomes on their interactions and communication skill. However, no study has been done to test the effectiveness on sign language in a classroom setting for children with autism to promote social interaction. This study therefore aims at bridging this gap by testing the effectiveness of sign language on social interaction in Mumias West Sub-County.

Review of the literature on establishing the effect of Electronic Media on Social interaction of children with autism such as Bellerin and Akullian (2007), Mazurek (2011), Nally *l*

(2000), Hagiwara and Myles (2010) provided various insights on prevalence of the use of electronic media and varied views on the impacts to the behaviors of children with autism. However, the studies failed to clearly show how these media could be used in a classroom setting in order to promote social interaction among children with autism.

There is also limited research on the effectiveness of modern electronic media technologies such as Computer Assisted Instruction (CAI) since the results are always generalized to suit the entire ASD population rather than keeping in mind that each affected learner responds differently as shown in studies by Luckevich (2010), Massaro and Bosseler (2006). There is also limited research on the best classroom environment that electronic media can be utilized in order to maintain the effectiveness of the intervention. This study bridges this gap by testing the effectiveness of various early intervention measures on social interaction of children with autism in Mumias West Sub-County.

Mount Kenya

CHAPTER THREE

RESEARCH METHODOLOGY

3.0 Introduction

This chapter presents the methodology that was used to carry out this study. The chapter presents information on the research design, study area, study population, sample size and sampling procedures, pilot study, validity, reliability, data collection instruments, data collection procedures, methods of data analysis and ethical considerations.

3.1 Research Design

This study adopted a mixed-method research design which integrated both qualitative and quantitative research in order to give an in-depth understanding of the effect of Early Intervention Measures on Social Interaction of Children with Autism Spectrum Disorders in Public Primary Schools in Mumias West Sub- County. According to De Leeuw (2005), a mixed method research design involves successful mixing of both qualitative and quantitative data and research in order to ensure the researcher obtained a deeper understanding of the variables while minimizing the weaknesses associated with using independent approaches in the study.

Quantitative data included behaviors and performance of children with autism collected through observation checklist and questionnaires were analyzed and the scores used to make conclusions. Qualitative data consisted of information that is open ended collected mainly through observations, interviews and focus group discussions with various target

groups in order to obtain a deeper knowledge on autism and effects of the intervention measures.

3.2 Location of the Study

The study area was Mumias West Sub-county in Kakamega County, Kenya. Mumias is linked by road to Kakamega (in East), Busia (West), Bungoma (North) and Butere (South). Mumias West Sub-County neighbors Matungu to the North, Siaya to the West, Butere to the South and Mumias East to the East. The area has a warm climate with temperature between 23 to 28 degrees. It has two rainy seasons; long rains begin from March to June, while short rains begin from October to December. It lies between latitude 0.3335° East and 6.40° East and longitude 34° and 11° East. It has a population of 168,743 with an urban population of 32,965 (Kenya National Bureau of Statistics, 2015).

Most people living in Mumias West Sub-County are Luhyas (Abawanga). Traditionally, leisure and entertainment go hand in hand in the community. The extended family and the clan are at the center of the Wanga culture. They previously practiced polygamy and a man was given more respect depending on the number of wives he had and the dowry paid. However, today polygamy is no longer widely practiced. Dowry for wives is paid either by giving cattle, sheep and goods or in form of money. Marrying a person from one's own clan is considered a taboo. Traditionally, male circumcision is an important ritual amongst the Abawanga. It marks the initiation from boyhood to manhood.

The Abawanga grow maize, beans, cassavas and bananas for food. They grow sugarcane as their cash crop and sell it to Mumias Sugar Company. Two Rivers; River Lusumu and

River Nzoia flow through the sub county. Most people living in the study area are Christians while a few are Muslims.

3.3 Target Population

The target population was special needs teachers in both special and inclusive public primary schools. The study targeted 286 special needs teachers from 14 schools within the study area as shown in table 2 below; with sample size of $n=(30\%N)$ of target population. It also targeted a total of 28 children with Autism Spectrum Disorders in public primary schools in Mumias West Sub-County.

Table 3.1: Target Population

Public School	Target Population (N)	Sample Size n = (30% N)
	Teachers	Teachers
St. Martins Mumias	26	8
Ichinga Muslim	25	8
Mumias Central	36	11
Mumias Deb Primary	29	9
Mumias Township	28	9
St. Annes Girls Primary	31	10
St. Peters Mumias Boys	30	9
Lukongo Primary	11	4
Ingusi Primary	13	4
Utende Primary	11	4
Bukaya Primary	10	3
Etenje Primary	13	4
Musanda Primary	19	6
Mumias EARC Model School For Autism	4	2
Total	286	91

Note: Sample Size = 30% of the Target Population (N)

Source: researcher, 2018

3.4 Sample Procedure

In order to obtain the view of respondents on the effect of early intervention measures on Social Interaction of children with Autism Spectrum Disorders in public primary schools in Mumias West Sub-County, a representative sample of 91 special needs teachers (30% of 286 teachers) as above was targeted as shown in table 2 above.

3.5 Piloting of the Instruments

A half – split- half testing during pilot study was done to test reliability and validity of the research instruments at one of the schools. The respondents that participated in the pilot study were excluded during the actual study time.

3.6 Validity and Reliability of the Research Instruments

3.6.1 Validity of the Research Instruments

Validity refers to the accuracy and meaningfulness of inferences made based on results obtained. It is asking a relevant question framed in the least way (White, 2005). It is the agreement between the researcher's conclusion and the actual reality. For the purposes of this study, the researcher adopted content validity to measure the validity of the instruments that were used. Mugenda and Mugenda, (2015) explains that Content validity enables data being collected to be reliable in representing the specific content of a particular concept. Supervisors and experts in the School of Education were used to evaluate the applicability and appropriateness of the content, clarity and adequacy of the research instrument.

3.6.2 Reliability of Research Instruments

Reliability test sets the internal consistency and stability of the data collected. The closer the Cronbach's Alpha is to one, the higher the internal consistency of reliability (Sekaran, 2012). A pilot study was conducted in one of the public schools to determine reliability of research instruments. Reliability of the instruments were said to be ensured when the results of pilot study yielded a Cronbach's alpha value greater than 0.70.

3.7 Data Collection Instruments

This study used a questionnaire for teachers, interview schedule for headteacher and observation check list for learners to gather the required data. Kombo and Tromp, (2006) assures that Questionnaires are considered appropriate as they are used to collect adequate data from many respondents within a short time with minimal costs. Observation and interviews were used to correlate information generated by Questionnaires.

3.7.1 Questionnaires for Teachers

Questionnaires were designed for all the teachers. The questionnaires contained closed ended questions. The closed ended questions solicited information on the extent to which early intervention measures can be used to improve social interaction of children with autism spectrum disorders in Public Primary Schools in Mumias West Sub-County.

3.7.2 Interview Schedules for Head teachers

Interview Schedules were administered to head teachers for the purposes of finding their views on the early intervention measures used in their schools to develop social interaction of children with Autism Spectrum Disorders. Data from the interview was to help find out if there was any variance in the tools or a positive support.

3.7.3 Observation check list

Observation check list was used for collecting information on level of social interaction of children with autism disorder. The tool enabled the researcher to observe the learners behavior, communication and interaction skills both in the classroom and out of class to be able to report if there is any variance in the tools and report.

3.8 Data Collection Procedure

Before collecting data, the researcher sought an introductory letter from Mount Kenya University to request for a research permit from the National Commission for Science, Technology and innovations (NACOSTI). The permit was used to seek permission from the school authorities and county education officials to collect data. The researcher visited all the sampled schools to inform them about the study, the subjects involved, the instruments to be used and the areas required for document analysis. All the participants were thanked for their time and cooperation.

3.9 Data Analysis Methods

Data was collected from the field using questionnaires, interview schedules and observation checklists, sorted, coded and entered into the computer for analysis using the Statistical Package for Social Sciences (SPSS) version 21.0 for windows. Kombo and Tromp (2006) explain that data analysis involves examining raw information collected during research investigation.

The researcher therefore extracted vital variables and scrutinized collected information to establish faults before the analysis. Data was analyzed by use of both qualitative and quantitative techniques. Qualitative data was analyzed by use of frequency counts and graphs as descriptive statistics. Data was recorded and classified into Themes and Sub Themes which were reported.

Table 2.2: Summary of Proposed Statistical Data Analysis

Objective	Independent Variable	Dependent Variable	Statistical Tool
To determine the effect of restructured environment on social interaction of children with autism spectrum disorders in public primary schools in Mumias West Sub County.	Restructured Environment	Social Interaction	Frequency Counts and Graphs.
To determine the effect of sign language on social interaction of children with autism spectrum disorders in public primary schools in Mumias West Sub County.	Sign Language	Social Interaction	Frequency Counts and Graphs.
To establish the effect of picture exchange communication system on social interaction of children with autism spectrum disorders in public primary schools in Mumias West Sub County.	Picture Exchange Communication System	Social Interaction	Frequency Counts and Graphs.
To examine the effect of electronic media on social interaction of children with autism spectrum disorders in public primary schools in Mumias west sub county.	Electronic Media	Social Interaction	Frequency Counts and Graphs.

3.10 Ethical Considerations

Informed consent to collect data from Mount Kenya University and respondents was sought from the Education Offices in Mumias West Sub-County. Participation in the study was voluntary since respondents had the right to refuse to divulge certain information. Each of the questionnaires had an introduction which seek respondents consent to provide the necessary information including the nature and purpose of the research.

Confidentiality and anonymity of respondents was guaranteed during the study by assuring the participants that information arising from the study was kept confidential and the data obtained used for the purpose of the research only. The researcher ensured that individual identity of respondent was protected by not including or writing names of respondents on the instruments. Further, the researcher ensured that for confidentiality nobody could link data collected to specific subjects and substitute names with numbers so that only a person who had access to the code identifies the respondent or participant.

To enhance ethics in the study the researcher notified the respondent on the aims methods, anticipated benefits and hazards of the research. The researcher ensured that no individual became part of the research without being given a notice and having an informed consent that he or she wanted to participate in the research. This was ensured through the consent forms to all the correspondents since the research involved learners with Autism Spectrum Disorders permission was sought through the heads of the schools where the research was carried out.

CHAPTER FOUR

RESEARCH FINDINGS, ANALYSIS AND PRESENTATION

4.0 Introduction

This chapter presents the analysis of the data presented and discussions of the findings, which were done in line with the research objectives namely to: - determine the effect of restructured environment, picture exchange communication system, Sign language and electronic media on social interaction of children with autism in public primary schools in Mumias West Sub-County. For the researcher to determine this effect she used descriptive statistics, and correlation analysis. The findings are presented in frequency tables and graphs after demographic data analysis. The section discussed the social and demographic characteristics of the selected samples. They included age and gender of respondents. The results were presented in table forms with generated respective frequencies and percentages for each demographic characteristic.

4.1 Response Rate

This study administered 91 questionnaires to its respondent the selected teachers. A total of 89 questionnaires were properly filled and returned. This represented an overall successful response rate of nearly 97.8%. Scholars consider a response rate of 60% as appropriate while others consider a response rate of 80 % as excellent in a both qualitative and quantitative research in social sciences (Kothari C.R. 2012). However, a response rate of over 85% is considered excellent for self-filled questionnaires (Mugenda, Mugenda, 2012).

Therefore, the response rate of 97.8% realized in this study was considered excellent for a valuable data analysis.

4.2 Demographic Data

The study analyzed the respondents' biographic details ranging from age, and gender. Their responses were recorded in frequency tables. Biographical data was used to determine the respondents' characteristics to predict their performance (Mugenda Mugenda, 2000). Biographical data contains answers to questions about past behaviour, allowing assumptions about future behaviour to be made. Biographic characteristics of respondents give value to the validity and reliability of the information they give in research (Orodho, 2012).

Table 3.1: Gender of the Respondents

Respondents		Gender		Total
		Male	Female	
Teachers	Count	32	57	89
	%	36 %	64%	100%

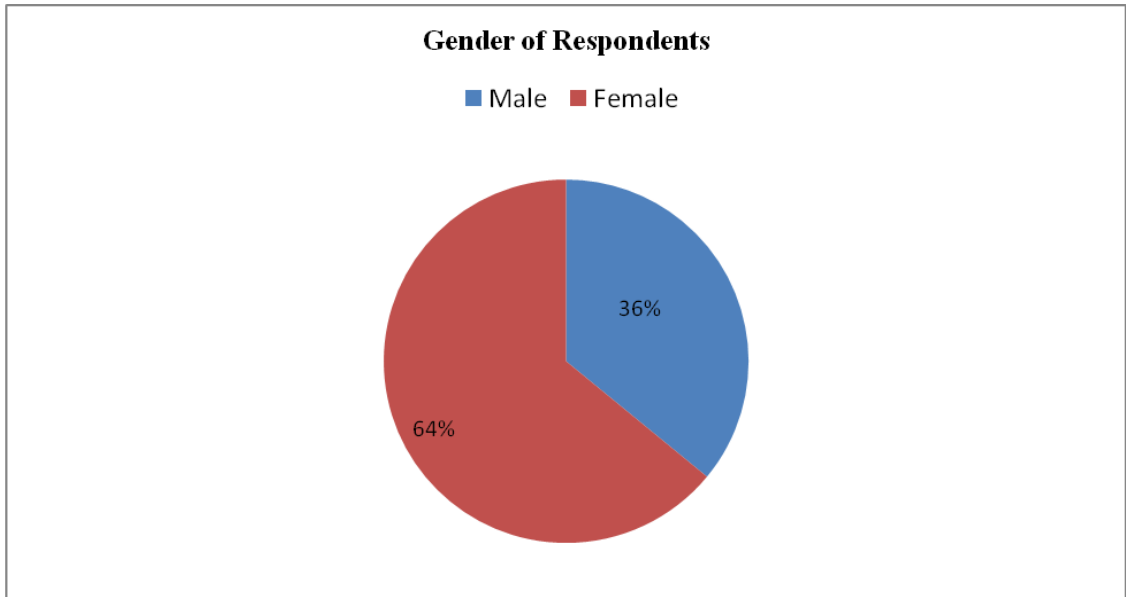


Figure 4.1: Gender of the Respondent

Figure 2 shows the results of respondents' gender. Male teachers were 32 (36%) while females were 57 (64%). This study therefore observed gender affirmative policy that requires that in every social undertaking either gender should not exceed two thirds of the total individuals being engaged (Kenya Constitution, 2010).

Table 4.2: Age of Teachers

Age of Respondents in Years	Frequency	Percent	Valid Percent	Cumulative Percent
	12	13.5	13.5	13.5
25 – 30	31	34.8	34.8	48.3
31 – 45	39	43.8	43.8	92.1
46 – 50	7	7.9	7.9	100.0
Over 51				
Total	89	100.0	100.0	

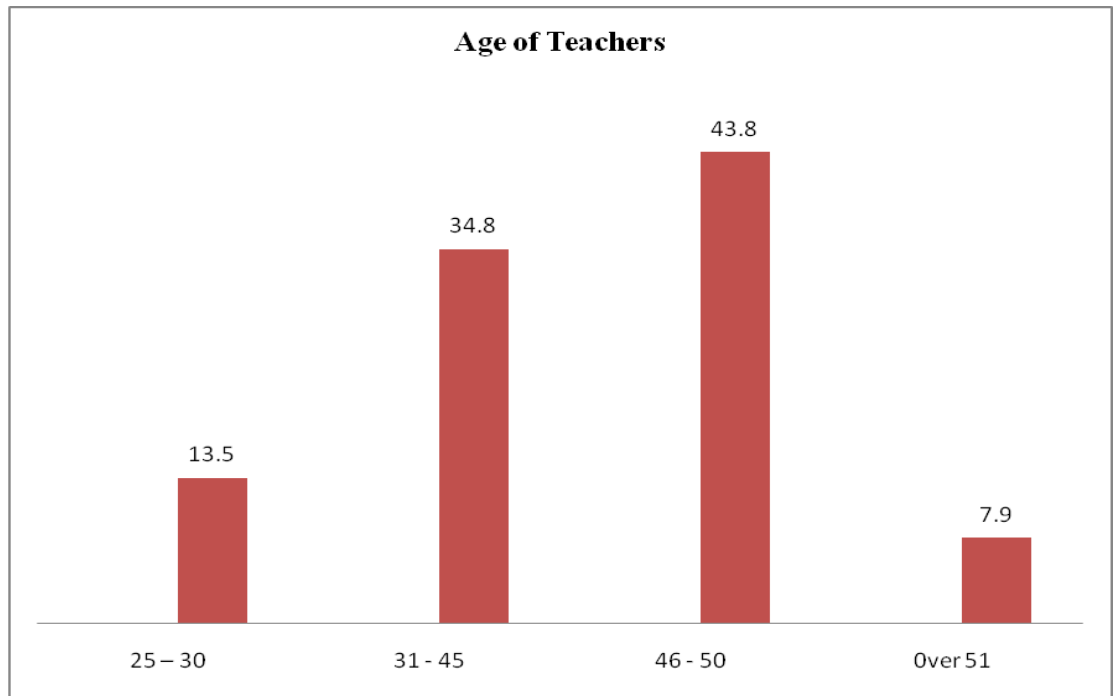


Figure 4.2: Age of teachers

Table 4.2 shows that majority of the respondents 39(43.8%) were in the bracket of 46 - 50 years. followed by 31(34.8%) in the bracket of 31 - 45 years. There were only 7(7.9%) respondents in the bracket of over 50 years. This implied that the majority of the respondents were youthful teachers who are usually found in their most productive stage.

Table 4.3: Teachers' Experience

Experience	Frequency	Percent	Valid Percent	Cumulative Percent
Below 5years	6	6.7	6.7	6.7
6 - 10 years	20	22.5	22.5	29.2
11 - 15 years	18	20.3	20.3	49.5
16 - 20 years	22	24.7	24.7	74.2
Above 20	23	25.8	25.8	100.0

Experience	Frequency	Percent	Valid Percent	Cumulative Percent
Below 5years	6	6.7	6.7	6.7
6 - 10 years	20	22.5	22.5	29.2
11 - 15 years	18	20.3	20.3	49.5
16 - 20 years	22	24.7	24.7	74.2
Above 20	23	25.8	25.8	100.0
Total	89	100.0	100.0	

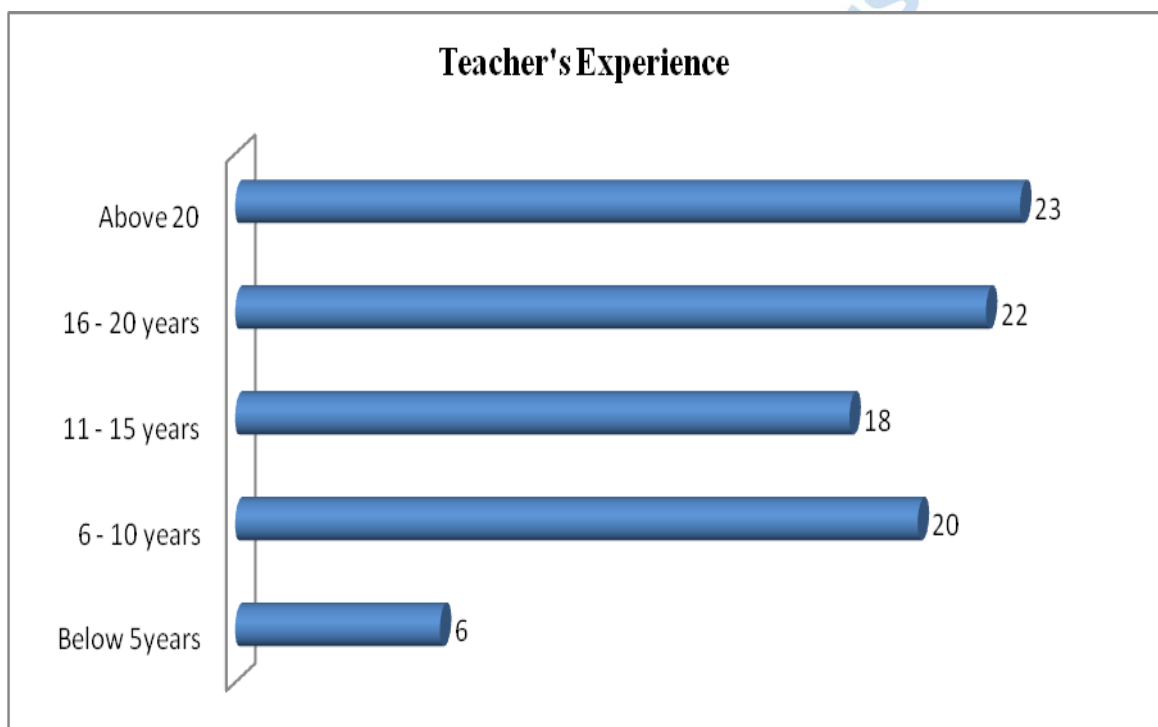


Figure 1.3: Teachers' Experience

Table 4.3 showed that teachers below five years' experience were 6 (6.7%) while those with 6-10 years' experience were 20(22.5%). The study also showed that some 18 (20.3%) of the Teachers had 11 - 15 years' experience. 22 (24.7%) of them 16 -20 years of experience. The majority of them had 23(25.8%) above 20 years' experience. These results implied that the respondents had enough experience that could be used to establish the effect of restructured environment, picture exchange communication system, sign language

and electronic media on social interaction of children with autism in public primary schools in Mumias West Sub-County.

Table 4.4: Teachers' Qualifications

Qualification	Frequency	Percent	Valid Percent	Cumulative Percent
PTE trained SNE	28	31.4	31.4	31.4
Diploma trained SNE	34	38.2	38.2	69.6
BED trained SNE	20	22.4	22.4	92.1
MED trained SNE	7	7.9	7.9	100
Total	89	100	100	

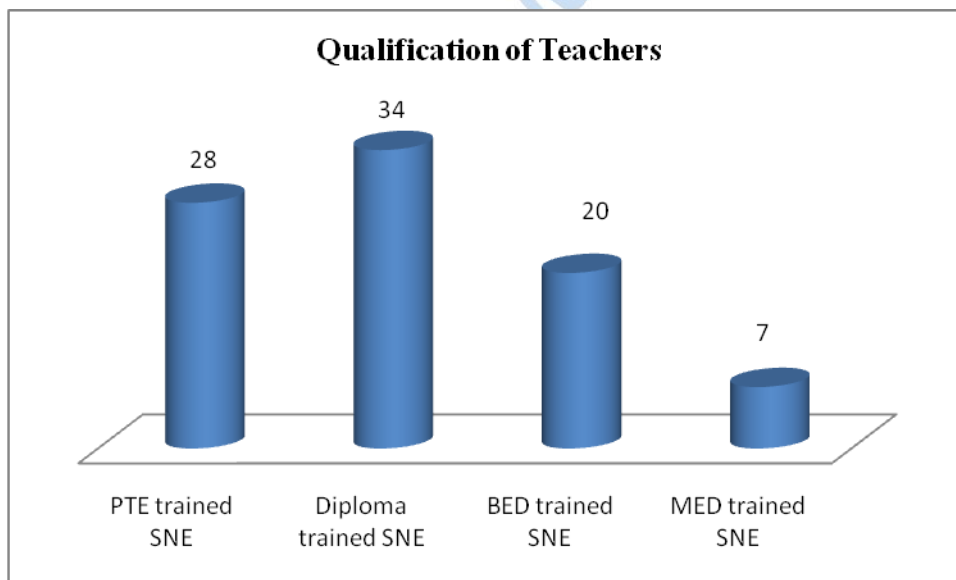


Figure 4.4: Qualification of Teachers

Data revealed varied qualifications for Teachers. About 28(31.4%) were trained in special needs education with a primary teacher education certificate qualification. 34(38.2%) were trained in special needs education with a diploma in teacher education qualification. 20(22.4%) were trained in special needs education with a of Bachelor of Education qualification degree and 7(7.9%) were trained in special needs education with a Master of Education qualification degree. This implied that most of the Teachers who participated in the study had the right qualifications to help the researcher establish the effect of restructured environment, picture exchange communication system, sign language and electronic media on social interaction of children with autism in public primary schools in Mumias West Sub-County.

4.3 Restructured Environment on Social Interaction

The first objective of this study was to determine the effect of Restructured Environment on Social Interaction of children with autistic spectrum disorders in Public Primary Schools in Mumias West Sub County. To achieve this objective, the researcher sought the opinions of teachers. She recorded and analyzed the opinions thematically as shown in table 4.5.

Table 4.5: The effect of Restructured Environment on Social Interaction

Item	SA	A	N	D	SD
Adequate space for free movement in classrooms has improved communication and behavior relations of children with autism	18 20.2%	12 13.5%	18 20.2%	30 33.7%	11 12.4%
Permanent sitting arrangement in classrooms has improved behavior relations of children with autism.	19 21.3%	11 12.4%	12 13.5%	18 20.2%	29 32.6%
Decongesting of learning aids in the classroom environment has improved communication and behavior relations of children with autism	14 15.7%	13 14.6%	18 20.2%	23 25.8%	21 23.6%
Painting of classroom walls/ceiling boards with cool colors has improved behavior relations of children with autism.	19 21.3%	14 15.7%	11 12.4%	27 30.3%	18 20.2%
Use of sound proof materials/noise suppressors in classrooms has improved communication and behavior relations of children with autism	18 20.2%	15 16.9%	12 13.5%	28 31.5%	16 18%
Moderate lighting in classrooms has improved communication and behavior relations of children with autism	18 20.2%	12 13.5%	17 19.1%	20 22.5%	22 24.7%

Key: SA - Strongly Agree A - Agree D - Disagree SD -Strongly Disagree

A total of 30(33.7%) out of 89 teachers either Strongly Agreed or just agreed that adequate space for free movement in classrooms has improved communication and behavior relations of children with autism. The remaining 41(46.1%) teachers did not support this agreement. A total of 18(20.2%) teachers were neither in agreement nor disagreement. On whether permanent sitting arrangement in classrooms had improved behavior relations of children with autism or not, again a total of 30(33.7%) teachers either strongly agreed or just agreed. Majority 47(52.8%) strongly disagreed or disagreed. 12(13.5%) remained neutral.

On whether Decongesting of learning aids in the classroom environment has improved communication and behavior relations of children with autism in Public Primary Schools in Mumias West Sub-County, only 27(30.3%) generally agreed. 44(49.3%) disagreed that this arrangement has improved communication and behavior relations of children with autism in public primary schools in Mumias West Sub-County. 33(37.1%) either *Strongly* agreed or just agreed that painting of classroom walls/ceiling boards with cool colors has improved behavior relations of children with autism. A few 11(12.4%) remained neutral while the majority 45(50.6%) generally disagreed that painting of classroom walls and ceiling boards with cool colors has improved behavior relations of children with autism. 33(37.1%) Teachers also strongly agreed or just agreed that the use of sound proof materials/noise suppressors in classrooms has improved communication and behavior relations of children with autism. Again 12(13.5%) remained neutral while a majority 44(49.4%) disagreed that the use of sound proof materials/noise suppressors in classrooms

has improved communication and behavior relations of children with autism in public primary schools in Mumias West Sub-County.

About 20(22.5%) teachers agreed in general that moderate lighting in classrooms has improved communication and behavior relations of children with autism. 12(13.5%) neither supported nor were at the contrary. The majority 42(41.2%) disagreed that moderate lighting in classrooms has improved communication and behavior relations of children with autism in public primary schools in Mumias West Sub-County. the results of this analysis showed that the way schools have restructured their learning environment has not caused a greater effect on social interaction of children with autism in public primary schools in Mumias West Sub County. This implied that the majority of the teachers agreed that there is not enough space for free movement in classrooms to improve communication and behavior relations of children with autism in public primary schools in Mumias West Sub-County.

These findings agree with scholars like Trussell, (2010); Khasakhala and Galava (2016) and Matasio, (2011) assert that participation of learners with autism in the classroom is directly related to their academic participation and achievement. It is evident that active academic engagement in classroom for children with autism can be affected by different school and student factors. However, physical environment in the classroom is one of the factors that can be easily manipulated and controlled for maximum benefits to be harnessed. These scholars argue that Physical environment in the classroom can affect learning through changing of student-teacher interaction patterns and further reducing both “downtime” distractions.

During the interview interactions, the head teachers remarked:

“Yes, to some extent it is true that Restructured Environments promote Social Interaction in children with autism. Structured environment describes the appearance of the surrounding learning area of a learner. This area must be suitable to the needs of the learner. These areas include the classroom; play fields, libraries among others. A restructured environment should include Displayed pictures and well labeled charts with words or names of the pictures for better understanding. It should have accessible toilets, building ramps, level grounds and painted walls for improved lighting”.



Mount Kenya

University

4.4 Picture Exchange System on Social Interaction

STATEMENT:	SA	A	N	D	SD
teachers have been: -					
Selecting a picture for a word to improve communication and behavior relations in children with autism.	19 21.3%	10 11.2%	18 20.2%	12 13.5%	30 33.7%
Pointing to a picture for a word to improve communication and behavior relations in children with autism.	18 20.2%	18 20.2%	12 13.5%	11 12.4%	30 33.7%
Using pictures for words to increase communication and behavior relations in children with autism.	16 18.0%	15 16.9%	10 11.2%	23 25.8%	25 28.1%
Using of pictures alongside words to facilitate development of speech that improves communication and behavior relations of learners with autism	10 11.2%	18 20.2%	11 12.4%	20 22.5%	30 33.7%
Using pictures for words to motivate learners with autism to communicate and create interest in staying in school	20 22.5%	16 18.0%	12 20.2%	11 12.4%	30 33.7%
<p><i>Key: SA - Strongly Agree A - Agree D - Disagree SD -Strongly Disagree</i></p>					

29(32.6%) teachers affirmed that selecting a picture for a word has improved communication and behavior relations in children with autism in public primary schools. 18 (20.2%) were neutral and the majority 42(41.2%) generally disagreed that teachers have been selecting a picture for a word to improve communication and behavior relations in children with autism in public primary schools in Mumias West Sub County.

36(40.4%) teachers agreed in general that pointing to a picture for a word has improved communication and behavior relations in children with autism. 12 (13.5%) were neutral and the majority 41(46.1%) generally disagreed that teachers have been pointing to pictures for word to improve communication and behavior relations in children with autism in public primary schools in Mumias West Sub County. Out of 89 teachers, 36(40.4%) agreed in principle that using pictures for words has increased communication and behavior relations in children with autism.

Only 28(31.5%) teachers affirmed that using pictures alongside words has facilitated development of speech that improves communication and behavior relations of learners with autism. Most 50(31.5%) teachers did not agree that using pictures alongside words has facilitated development of speech that improves communication and behavior relations of learners with autism in public primary schools in Mumias West Sub County. A few 11(12.4%) were neutral. 36(40.4%) noted that using pictures for words has motivated learners with autism to communicate and create interest in staying in school. 12 (13.5%) were neutral and the majority 41(46.1%) generally disagreed that using pictures for words has motivated learners with autism to communicate and create interest in staying in school in public primary schools in Mumias West Sub County.

These results again implied that the majority of the teachers agreed that there is not enough use of picture exchange system to improve communication and behavior relations of children with autism in public primary schools in Mumias West Sub County.

The result of this study is in tandem with studies by Travis and Greiger (2010) and Webb (2000) in the United Kingdom who noted that with effective use of Picture Exchange Communication System (PECS), there are considerable increase in intentional communicative acts (ICAs) for children with autism, with marked increases in requesting (function) and the development of forms of communication (from augmentation of speech with pictures to speech only utterances). Bondy and Frost (2016) also established that the use of Picture Exchange Communication Systems increased spoken words in affected children. The researcher also asserts that the use of pictures is likely to facilitate the development of speech.

The head teachers observed *“It is true that Picture Exchange System has a positive effect on Social Interaction of children with autism disorders. Picture Exchange Communication Systems acts as a form of augmentative and alternative communication. It leads to improvement in communication of children by improving their approaches in handling one another through articulation of some words in picture form. Picture Exchange Communication can be used by adults and children with developmental disabilities through an extensive period of five years to acquire social interaction skills”*

4.5 Sign Language on Social Interaction

STATEMENT:	SA	A	N	D	SD
Sign Language has made it possible to teach non-verbal children with autism who fail to develop communication and language skills.	30 33.7%	18 20.2%	18 20.2%	12 13.5%	11 12.4%
Using Sign language has motivated learners with autism to communicate and interact with each other	29 32.6%	19 21.3%	12 13.5%	11 12.4%	18 20.2%
Using Sign Language in learners with autism has improved behavior relations in children with autism.	23 25.8%	14 15.7%	18 20.2%	13 14.6%	21 23.6%
Use of Sign Language alongside words has promoted communication and social interaction among learners with autism	27 30.3%	19 21.3%	11 12.4%	14 15.7%	18 20.2%
Using Sign Language has made it possible to teach non-verbal children with autism who fail to develop communication and language skills.	28 31.5%	18 20.2%	12 13.5%	15 16.9%	16 18.0%
Sign Language has made it possible to teach non-verbal children with autism on how to participate in co-curricular activities.	20 22.5%	18 20.2%	17 19.1%	12 13.5%	22 24.7%

Key: SA - Strongly Agree A - Agree D - Disagree SD -Strongly Disagree

48(53.9%) teachers either strongly agreed or just agreed that sign Language has made it possible to teach non-verbal children with autism who fail to develop communication and

language skills. 18(20.2%) neither agreed nor disagreed. A minority 23(53.9%) teachers either strongly disagreed or just disagreed that Sign Language has made it possible to teach non-verbal children with autism who fail to develop communication and language skills in school in public primary schools in Mumias West Sub County. 48(53.9%) teacher respondents either strongly agreed or just agreed that using sign language has motivated learners with autism to communicate and interact with each other freely. 12 (13.4%) neither agreed nor disagreed.

A minority 29(32.6%) teachers either strongly disagreed or just disagreed that using sign language has motivated learners with autism to communicate and interact with each other freely in school in public primary schools in Mumias West Sub-County. 37(41.6%) accepted that teacher use of sign language in learners with autism has promoted behavior relations in children with autism. 18(20.2%) were neutral. A minority 29(32.6%) teachers either strongly disagreed or just disagreed that sign language in learners with autism has promoted behavior relations in children with autism in Mumias West Sub-County.

46(51.7%) teachers agreed in general that Use of Sign Language alongside words has promoted communication and social interaction among learners with autism. 11(12.4%) were neutral. A minority 32(36.0%) teachers either strongly disagreed or just disagreed that Use of Sign Language alongside words has promoted communication and social interaction among learners with autism in Mumias West Sub-County. 46(51.7%) teachers agreed in general that Using Sign Language has made it possible to teach non-verbal children with autism who fail to develop communication and language skills.

12(13.4%) neither agreed nor disagreed. A minority 32(36.0%) teachers either strongly disagreed or just disagreed that Using Sign Language has made it possible to teach non-verbal children with autism who fail to develop communication and language skills in Mumias West Sub-County. 38(42.7%) teachers agreed in general that Sign Language has made it possible to teach non-verbal children with autism on how to participate in co-curricular activities. 17(19.1) were neutral. 32(36.0%) teachers either strongly disagreed or just disagreed that Sign Language has made it possible to teach non-verbal children with autism on how to participate in co-curricular activities in Mumias West Sub-County. These results again meant that the majority of the teachers disagreed that the use of sign language has improved communication and behavior relations of children with autism in public primary schools in Mumias West Sub-County.

This study confirms that the use of sign language as a mode of communication promotes Social Interaction. It is beneficial to teach basic sign language during early childhood programs in classrooms and also at home especially for non-verbal children with autism. Researchers like Clean Cop (2018) and Bonvillian (2010), postulate that in Africa, language deficit of learners with autism is well documented. They however note that children can be able to learn how to use sign language successfully even in cases where previous attempts of teaching spoken words was unsuccessful.

During the interview, one of the head teachers remarked: *“I agree that sign language can be used to improve Social Interaction of children with autism. Teachers have found it possible to teach some children with autism spectrum disorders to speak and interact. The children have learned to express themselves quite rapidly by use their hands and gestures.*

Teachers improve socialization of these children by giving basic signing skills for communication”.

4.6 Electronic Media on Social Interaction

Item	SA	A	N	D	SD
Use of Electronic media such as video, television or projector has modified social behaviors in children with autism	18 20.2%	12 13.5%	18 20.2%	30 33.7%	11 12.4%
Use of video modeling has stimulated children with autism to develop socializing skills such as socializing and meeting new people.	19 21.3%	11 12.4%	12 13.5%	18 20.2%	29 32.6%
Use of Computer Assisted Instruction (CAI) facilitates effective development of reading skills, vocabulary, language and listening skills in learners with autism	14 15.7%	13 14.6%	18 20.2%	23 25.8%	21 23.6%
A combination of interactive books with visual supports and music in a classroom setting with a group of students with autism promotes effective social interaction in learners with autism	19 21.3%	14 15.7%	11 12.4%	27 30.3%	18 20.2%
Use of Electronic media such as video, television or projector modify social behaviors in children with autism	18 20.2%	15 16.9%	12 13.5%	28 31.5%	16 18%

Key: SA - Strongly Agree A - Agree D - Disagree SD -Strongly Disagree

30(33.7%) accepted that teachers use of electronic devices such as video, television or projector has modified social behaviors in children with autism. 18 (20.2%) were neutral. 41(46.1%) generally disagreed that teachers use of electronic devices like video, television or projector has modified social behaviors in children with autism schools in Mumias West Sub-County. Similarly, 30(33.7%) teachers agreed that the use of video modeling has stimulated children with autism to develop socializing skills such as meeting and accommodating new people. 12(13.5%) were neutral. 47(52.8%) generally disagreed that teachers use of video modeling has stimulated children with autism to socializing in meeting new people in Mumias West Sub-County.

27(30.3%) accept that teachers' use of Computer Assisted Instruction (CAI) has facilitated effective development of reading skills, vocabulary, language and listening skills in learners with autism in Mumias West Sub-County. 12(13.5%) were non-committal while 44(49.4%) generally disagreed. 33(37.1%) teachers agreed that a combination of interactive books with visual supports and music in a classroom setting with a group of students with autism promotes effective social interaction in learners with autism. 11 (12.4%) were non-committal while 45(50.6%) generally disagreed that a combination of interactive books with visual supports and music in a classroom setting with a group of students with autism promotes effective social interaction in learners with autism in Mumias West Sub-County.

33(37.1%) generally agreed that teachers use of electronic media such as video, television or projector has modified social behaviors in children with autism. 12(13.5%) were non-committal while 44(49.4%) generally disagreed. 44(49.4%) generally disagreed that teachers use of electronic media such as video, television or projector has modified social

behaviors in children with autism in Mumias West Sub-County. The analysis of the effect of electronic media on social interaction of children with autism showed that the majority of the teachers agreed that the use of electronic media has not to a large extent improved communication and behavior relations of children with autism in public primary schools in Mumias West Sub-County.

The researcher agrees with Anderson (2010); Sharif and Sargent (2006); Buggey (2007) and Mazurek (2011), who have vouched that children with autism have the tendency of being preoccupied with screen-based media. These include video games, computers and television. There is also existing evidence proving that the use of screen-based media promotes social development and academic performance of typically developing youths as well as individuals with autism. The researcher also opines that electronic devices should be accessed by learners to facilitate interactions that are much needed for development of social skills in learning environments.

The head teachers observed that: *“Use of televisions, videos, films tablets and laptops can greatly affect Social Interaction of children with Autism. We use tablets and videos in this school to display and show children with autism models depicting the desired social behaviors. In this school, we use televisions and videos cassette more to develop learning abilities such as speech and social skills. The learners are highly attracted to screen-based teachings”*.

4.7 Observation Check list

Table 4.6: Observation Checklist

Social Interactions	Category				Mean
	Exceeds expectations	Meets expectations	Approaches expectations	Below expectation	
	4	3	2	1	
Communicating & responding in sign language	0	0	0.179	0.178	0.0895
Identifying pictures for communication.	0.107	0.142	0.214	0.535	0.2495
Easily making friendships with peers	0	0.107	0.357	0.392	0.214
Freely Interacting and playing with peers	0	0.107	0.107	0.500	0.1785

The results in table 4.6 showed that in Communication & responses in sign language a few 17.9% children approached expectations. The rest of the children in the schools under investigation fell below expectations. On identification of pictures for communication, 10.7% children exceeded expectations, 14.2% met expectations, 21.4% approached expectations and 53.5% fell below expectation. 10.7% children easily made friendships with peers, 35.7% approached expectations in making easy friendships with peers and 39.2% children were below expectation. On children who freely interact and play with peers 10.7% children both met and approached expectations.

A half (50%) of the children who were observed had Below Expectation interms of Free Interaction and play with peers. From the table, it was concluded that the highest achievement level of this children was recorded in Identifying pictures for communication (mean = 0.2495), followed by easy making friendships with peers (mean = 0.214) and Free Interaction and play with peers (mean = 0.1785). The lowest level of achievement was recorded in Communication & response in sign language (mean = 0.08925). This data was supported by one student, the first student aged 14years old who was weak in communication using basic sign language skills during social interaction. This was a below standard performance considering his age.



Mount Kenya University

CHAPTER FIVE

SUMMARY OF THE FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

5.0 Introduction

This chapter presented summaries of the study findings as per the set objectives, conclusions and recommendations based on the study findings. The paper investigated effects of early intervention measures on social interaction of children with autistic spectrum disorders in public primary schools in Mumias West Sub-County. The chapter was divided into three sections; summary of findings, conclusions, recommendations and suggestions for further research in this field.

5.1 Summary of the Findings

This part presents the summarized result interpretations based on the effect of Restructured Environment on Social Interaction of children with autism in public primary schools in Mumias West Sub-County; the effect of Picture Exchange Communication System on Social Interaction of children with autism, the effect of Sign Language on Social Interaction of children with autism and the effect of Electronic Media on Social Interaction of children with autism.

5.1.1 The effect of Restructured Environment on Social Interaction

Twenty five percent of the teachers who participated in the study observed that although restructured environment positively promoted social interaction of children with autism, not much had been done to modify learning environment of children with autism in public primary schools in Mumias West Sub-County. The indicators of the restructured

environment were; modified Sitting arrangement, Material organization, classroom lighting and controlled noise in the classroom. These were the areas that required modification to facilitate social interaction of children with autism. On average about thirty percent efforts had been achieved in this area.

5.1.2 Picture Exchange Communication System on Social Interaction

From the analyzed results teachers and the interviewed head teachers were in agreement that social interaction of children with autism in public primary schools in Mumias West Sub-County had been fairly influenced by picture exchange communication system. The children were to some extent able to communicate by constructing sentences using pictures. Respondents were of the opinion that although Picture Exchange Communication System can immensely promote social interaction of children with autism, not much has been done to use this technique in promoting social interaction of children with autism in Mumias West Sub-County.

5.1.3 Sign Language on Social Interaction

From the findings, almost a half of the teachers suggested that Sign Language had influenced Social Interaction of the children with autism disorders. They implied that Sign Language as a medium of communication has not been effectively used to improve socialization of children with Autism in Mumias West Sub County schools yet children learn to express themselves quite rapidly by use of their hands and gestures as reported by the head teachers who were interviewed.

5.1.4 Electronic Media on Social Interaction

Data analyzed showed that on average about thirty percent of the teachers either strongly agreed or just agreed that the use of Electronic Media had improved Social Interaction of children with Autism. Majority suggested that the use of Electronic Media in teaching and learning processes in Mumias West Schools does not effectively aid in improving social interaction of the learners. The results from head teachers' interviews seemed to suggest that although electronic media can be used to socialize learners, not much effort has also been put in place to effectively play this role.

They noted that the use of televisions, videos, films tablets and laptops can greatly affect Social Interaction of children with Autism. They use tablets and videos in their schools to display and show children with autism models depicting the desired social behaviors. They also use televisions and video cassettes more to develop learning abilities such as speech and social skills. They observed that the learners were highly attracted to screen-based teachings.

5.2 Conclusions

This part presents the conclusions of the summarized result interpretations based on the effect of Restructured Environment on Social Interaction of children with autism in public primary schools in Mumias West Sub-County, the effect of Picture Exchange Communication System on Social Interaction of children with autism, the effect of Sign Language on Social Interaction of children with autism and the effect of Electronic Media on Social Interaction of children with autism.

5.2.1 Restructured Environment on Social Interaction

From the summarized results, not much has been done to modify learning environment of children with autism in public primary schools in Mumias West Sub-County. The study concluded that some Restructuring of learning Environment has not been effectively modified to facilitate social interaction of children with autism.

5.2.2 Picture Exchange Communication System on Social Interaction

The results showed that children were to some extent able to communicate by constructing sentences using pictures. However, some participants opined that although Picture Exchange Communication System can immensely improve social interaction of children with autism, little has been done to promote social interaction of children with autism in Mumias West Sub-County using this technique. The study concludes that not much has been done in using picture exchange communication system to improve social interaction of children with autism in public primary schools in Mumias West Sub-County.

5.2.3 The effect of Sign Language on Social Interaction

Summary of data analyzed shed that most of the teachers reported that Sign Language had not effectively influenced Social Interaction of children with autistic spectrum disorders in Mumias West Sub-County Schools, The study also concluded that not much has been done in using sign language to improve social interaction of children with autistic spectrum disorders in public primary schools in Mumias West Sub-County.

5.2.4 Electronic Media on Social Interaction

Since thirty percent of the teachers generally agreed that Electronic Media has improved Social Interaction of children with Autism. Seventy percent suggested that Electronic

Media use in teaching and learning processes in Mumias West Schools do not effectively aid in improving social interaction of the learners. The researcher concluded that little efforts have been made in using electronic media to improve social interaction of children with autistic spectrum disorders in public primary schools in Mumias West Sub-County.

5.3 Recommendations

This part presents the recommendations of the summarized result interpretations based on the effect of Restructured Environment on Social Interaction of children with autistic spectrum disorders in public primary schools in Mumias West Sub-County, the effect of Picture Exchange Communication System on Social Interaction of children with autism, the effect of Sign Language on Social Interaction of children with autism and the effect of Electronic Media on Social Interaction of children with autism.

- i. Restructuring of learning Environment has not been effectively modified to facilitate social interaction of children with autism. This study recommends that more resources should be sourced to modify learning Environment so as to facilitate social interaction of children with ASDs in Public Primary Schools in Mumias West Sub-County.
- ii. Since the study concluded that not much has been done in using picture exchange communication system to improve social interaction of children with autistic spectrum disorders in public primary schools in Mumias West Sub-County, This study recommends that school administrators in conjunction with the ministry of education should find ways of improving Picture Exchange Communication

Systems within the schools so as to facilitate Social Interaction of Children with Autism in Public Primary Schools in Mumias West Sub-County.

- iii. Participants noted that Sign Language was not being effectively used to enhance Social Interaction of children with autistic spectrum disorders in public primary schools in Mumias West Sub-County. This study recommended that concerted efforts should be made to use Sign Language to improve social interaction of children with Autistic Spectrum Disorders in public primary schools in Mumias West Sub-County.
- iv. A minority of the participants observed that Electronic Media has not improved Social Interaction of children with autism. The researcher recommends that more efforts should be made in using Electronic Media to improve social interaction of children with Autistic Spectrum Disorders in public primary schools in Mumias West Sub-County.
- v. There is need for offering more support services to teachers working with learners with ASDs such as counseling and motivation to enable them develop positive attitudes towards learners and manage their behavior challenges.
- vi. Teachers need more training on Autistic Spectrum Disorders to acquire suitable skills and knowledge on intervention measures for the learners.
- vii. The Government to increase incentives for teachers teaching children with Autistic Spectrum Disorders.

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APPENDICES

Appendix I: Research Tools

Questionnaire for Teachers

Dear Teacher,

This Questionnaire has been prepared to investigate the “**Effect of Early Intervention Measures on Social Interaction of Children with Autism Spectrum Disorders in Public Primary Schools in Mumias West Sub-County, Kenya**”. Kindly fill in the questionnaire to the best of your knowledge. The information was treated with confidentiality. Do not include your name in the questionnaire. Thank you.

PART 1: GENERAL INFORMATION

1. Gender

Male

Female

2. Age Bracket (Years)

Tick (√) where appropriate

20-30 years	<input type="checkbox"/>
31-40 years	<input type="checkbox"/>
41-50 years	<input type="checkbox"/>
51 and above	<input type="checkbox"/>

3. Professional Qualification

Trained in Special Needs Education

Untrained in Special Needs Education

4. Highest Level of Education

Tick (√) where appropriate

Primary	<input type="checkbox"/>
Secondary	<input type="checkbox"/>
College	<input type="checkbox"/>
University	<input type="checkbox"/>
Others (Specify)	<input type="checkbox"/>

5. Teaching Experience

1-5 years	
6-10 years	
11-15 years	
16-20 years	
Above 20 years	

PART 2: OBJECTIVE ANALYSIS

Objective 1:

To determine the effect of Restructured Environment on Social Interaction of children with autistic spectrum disorders in public primary schools in Mumias West Sub-County.

Please tick (✓) the most appropriate response for each of the questions below.

Key: SA - Strongly Agree A - Agree D - Disagree SD -Strongly Disagree

STATEMENT:	SA	A	N	D	SD	Total
Adequate space for free movement in classrooms improve communication and behavior relations of children with autism						
Permanent sitting arrangement in classrooms improves behavior relations of children with autism.						
Decongesting of learning aids in the classroom environment improve communication and behavior relations of children with autism						
Painting of classroom walls/ceiling boards with cool colors improves behavior relations of children with autism.						
Use of sound proof materials/noise suppressors in classrooms improve communication and behavior relations of children with autism						
Moderate lighting in classrooms improve communication and behavior relations of children with autism						

Objective 2:

To establish the effect of Picture Exchange Communication System on Social Interaction of children with autistic spectrum disorders in public primary schools in Mumias West Sub County.

Please tick (√) the most appropriate response for each of the questions below.

Key: SA - Strongly Agree A - Agree D - Disagree SD -Strongly Disagree

STATEMENT:	SA	A	N	D	SD	Total
Selecting a picture for a word improves communication and behavior relations in children with autism.						
Pointing to a picture for a word improves communication and behavior relations in children with autism.						
Using pictures for words increase communication and behavior relations in children with autism.						
Uses of pictures alongside words facilitate development of speech that improves communication and behavior relations of learners with autism						
Using pictures for words motivates learners with autism to communicate and create interest in staying in school						

Objective 3:

To determine the effect of Sign Language on Social Interaction of children with autistic spectrum disorders in public primary schools in Mumias West Sub County.

Please tick (√) the most appropriate response for each of the questions below.

Key: SA - Strongly Agree A - Agree D - Disagree SD -Strongly Disagree

STATEMENT:	SA	A	N	D	SD	Total
i. Sign Language has made it possible to teach non-verbal children with autism who fail to develop communication and language skills.						
ii. Using Sign language motivates learners with autism to communicate and interact with each other						
iii. Use of Sign Language in learners with autism promotes behavior relations in children with autism.						
iv. Use of Sign Language alongside words promotes communication and social interaction among learners with autism						

Objective 4:

To establish the effect of Electronic Media on Social Interaction of children with autistic spectrum disorders in public primary schools in Mumias West Sub County

Please tick (√) the most appropriate response for each of the questions below.

Key: SA - Strongly Agree A - Agree D - Disagree SD -Strongly Disagree

STATEMENT:	SA	A	N	D	SD	Total
i. Use of Electronic media such as video, television or projector modify social behaviors in children with autism						
ii. Use of video modeling stimulates children with autism to develop socializing skills such as socializing and meeting new people.						
ii. Use of Computer Assisted Instruction (CAI) facilitates effective development of reading skills, vocabulary, language and listening skills in learners with autism						
v. A combination of interactive books with visual supports and music in a classroom setting with a group of students with autism promotes effective social interaction in learners with autism						

*****THANK YOU*****

Interview Guide

- i. Scholars have alleged that Restructured Environment promote Social Interaction in children with autism. To what extent do you agree or disagree with this statement?
Probe further.
- ii. It is also documented that Picture Exchange System has a positive effect on Social Interaction of children with autism disorders. What is your observation on this statement? Probe further.
- iii. Sign Language can be used to improve Social Interaction of children with autism. Please comment on the extent to which you agree with this statement. Probe further
- iv. The effect of Electronic Media on Social Interaction of children with Autism can be positive or negative. To what level do you support this statement? Probe further.

Observation Check List

An observation of communication and Behavior Relations

Is the child able to interact with his peers?

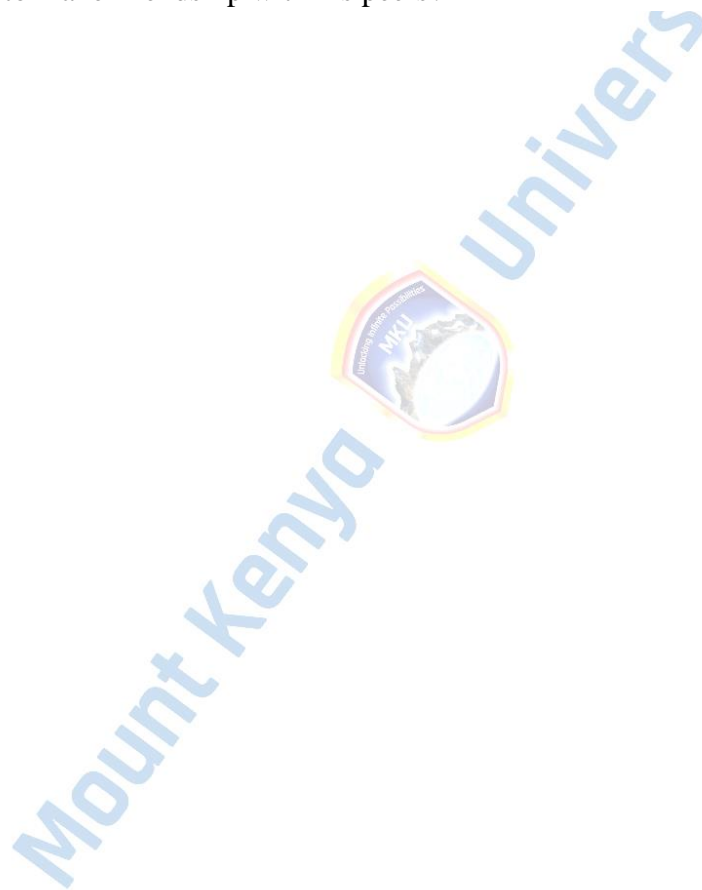
Is the child able to respond to calls from his peers and teachers?

Is the child able to identify pictures and use them for communication?


Is the child able to communicate using sign language?

Is the child able to develop reading skills, vocabulary, language and listening skills?

Is the child able to make friendship with his peers?



Appendix II: Ethics Research Certificate (ERC)


Mount Kenya University

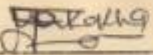
APRIL 4, 2019

Ref. No. MKU/ERC/1181


CERTIFICATE OF ETHICAL CLEARANCE

This is to certify that the proposal titled “**THE EFFECT OF EARLY INTERVENTION MEASURES ON SOCIAL INTERACTION OF CHILDREN WITH AUTISM SPECTRUM DISORDERS IN PUBLIC PRIMARY SCHOOLS IN MUMIAS WEST SUB-COUNTY, KENYA**” whose Principal Investigator is Esther Inyuma Khamala (MEDSE/46842/2016) has been reviewed by Mount Kenya University Ethics Review Committee (ERC), and found to adequately address all ethical concerns.

Dr Francis W. Makokha
Secretary, Mount Kenya University ERC

Sign:  Date: 4/4/2019

Prof. Francis W. Muregi
Chairman, Mount Kenya University ERC

Sign:  Date: 4/4/2019

The Chairman
Mount Kenya University
Ethics Review Committee

Main Campus, General Kago Road, P.O. Box 342-01000 Thika. Tel: +254 67 2820 000.
Cell: +254 720 790 796, 0709 153 000
Email: info@mku.ac.ke, Web: www.mku.ac.ke
Chartered and ISO 9001 : 2015 Certified Institution.
Unlocking Infinite Possibilities

Appendix III: Introduction Letter

Dear Respondent,

I am a graduate student at Mount Kenya University. The purpose of this Letter is to request you to provide information required in the study. The study aims at investigating the **“Effect of Early Intervention Measures on Social Interaction of Children with Autism Spectrum Disorders in Public Primary Schools in Mumias West Sub-County, Kenya”**. As a respondent you have been selected to participate in the research. Participation was by completing the questionnaire as per the instructions given at the beginning of the session. You are kindly requested to fill in the questionnaire freely. The responses was kept confidential and are purely for academic purposes. Please fill the questionnaire within a week and return it to the researcher.

Thank You.

Yours Sincerely,

ESTHER INYUMA KHAMALA
RESEARCHER

Consent Form

My name is **Esther Inyuma Khamala** I am a post graduate student at **Mount Kenya University** and carrying out a study on **the effect of early intervention measures on social interaction of children with autism spectrum disorders in public primary schools in Mumias West Sub-county, Kenya**. Being one of the respondents; you have been selected to participate in this study. If you consent to answering the questionnaire or giving an interview, your information was treated with utmost confidentiality and was used for academic purposes only. The study will not cause any disadvantage to **the school** or to you as **a teacher**. If you agree to participate in the study you was doing so professionally and voluntary and there was no any monetary returns. Any benefits of the research will largely be to contribute knowledge and evidence in order to improve policy and practice in **Ministry of education** in Kenya. Teachers will acquire knowledge on how early intervention measures can be used to develop social interaction skills of children with autism spectrum disorders. County education office will provide the ministry of education with information on how early intervention measures can be used to formulate policies in development of social interaction skills for children with autism spectrum disorders. Learners will develop social interaction skills. You are free to ask any question before, during and after filling the questionnaire or interview. You are also at liberty not to respond to questions you do not feel comfortable answering. The filling of the questionnaire/ interview will take approximately 30 minutes. Kindly note that if you have any queries as far as ethical issues are concerned do not hesitate to contact The Chairman, MKU ERC, P.O Box 342-0100 Thika.

Thank you.

ESTHER INYUMA KHAMALA

SIGN.....

Phone No.: 0720727873

Email: estherkhamala@yahoo.com

ESTHER INTUMBA KHAMALA
MEASE/46842/2016

Mount Kenya University

OFFICE OF THE DEAN, SCHOOL OF POSTGRADUATE STUDIES INTERNAL MEMO

TO: DIRECTOR, KAKAMEGA CAMPUS

FROM: DEAN, SCHOOL OF
POSTGRADUATE STUDIES

REF: MKU00/PG/027/2019/273

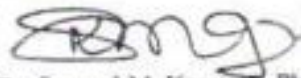
DATE: 14TH NOVEMBER, 2019

SUBJECT: EXAMINATION OF THESES/PROJECTS

Following your request dated October 1 2019 and the recommendations of the 94th Board of Postgraduate Studies, the following 16 students out of 28 documents can be examined. It is however noted that the last two (2) were not on the originally submitted list.

Attached is the list of students.

Thank you.



Dr. Samuel M. Karenga, Ph.D
Dean, School of Postgraduate Studies
SK/umk

Mount Kenya University
Dean, School of Postgraduate Studies
P.O. Box 342 - 01000
THIKA

Copy to

- ✓ Deputy Vice-Chancellor, Academic and Research Affairs
- ✓ Registrar, Academic Administration
- ✓ Deputy Director, Academic and Research Affairs - Kakamega Campus
- ✓ Principal, College of Graduate Studies & Research
- ✓ Postgraduate Coordinators

Introductory Letters - Kakamega Campus

Sn.	Student Name	Reg. No.	ERC	Introduction Letter	NACOSTI Permit
1.	Margaret Lievu Ambale	MECS/2014/63167	√	x	√
2.	Aggripinah Akweyu	KAK/E/MELIN/411/02006	√	x	√
3.	Christine Ludenyi Luvayi	MEDSE/46738/2016	√	x	√
4.	Odila Khavayi Nataala	MECS/2014/64674	√	x	√
5.	Linet Atieno Hongo	MEDSE/33248/2015	√	x	√
6.	Caroline Ochami	MEDSE/2015/33679	√	x	√
7.	Esther Khamala	MEDSE/46842/2016	√	x	√
8.	Everlyne Vomogi	MECS/2013/46496	√	x	√
9.	Joseph Khalawe	MECS/2013/47334	√	x	√
10.	Modesta Imbuka	KAK/MEC/54940/2013/2014	√	x	√
11.	Nixon Teka Nakuku	MCP/49881/2016	√	x	√
12.	Jackton S.O. Wabwire	MCP/50093/2016	√	x	√
13.	Stephen Amisi Ngoda	MED/2013/26102	√	x	√
14.	Violet Isheminye Vulimu	MECS/2013/46500	√	x	√
15.	Emmy Kalechi Muyega	MEDSE/2014/97435		x	
16.	Roselyne Dembeke	MELIN/2014/63551		x	
17.	Hylean Katie Okoth	MELIN/2014/69904		x	
18.	Purity Bagada Sayo	MAH/2014/72687		x	
19.	Rose Ombugeh	KAK/M-HIST/411/01936		x	
20.	Juliet Warsha Afandi	MAHS/2014/54955		x	
21.	Collins Muhadia	MARS/2014/71412		x	
22.	Edwin Muchera Miheso	MED/20415/26352		x	
23.	Betty Manyasa Orony	MEDSNE/52767/2016		x	
24.	Thomas Were Amuyeka	MEDSE/2015/33483		x	
25.	Doreen Muchalwa	MEDSNE/51859/2016		x	
26.	Keneth Mulochi Buchichi	MED/2014/64991		x	

Additional Students who were not in the previous list

Sn.	Student Name	Reg. No.	ERC	Introduction Letter	NACOSTI Permit
1.	Mwaya Aggrey Siva		√	x	√
2.	Atsango Victor	MED/2013/46094	√	x	√



Appendix IV: NACOSTI Research License



**NATIONAL COMMISSION FOR SCIENCE,
TECHNOLOGY AND INNOVATION**

Telephone: +254-20-2213471,
2241349, 3310571, 2219420
Fax: +254-20-318245, 318249
Email: dj@nacosti.go.ke
Website: www.nacosti.go.ke
When replying please quote

NACOSTI, Upper Kabete
Off Waiyaki Way
P.O. Box 30623-00100
NAIROBI-KENYA

Ref. No. **NACOSTI/P/19/38757/30373**

Date: **27th May, 2019**

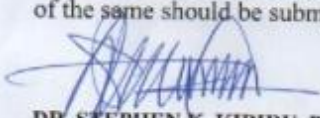
Esther Inyuma Khamala
Mount Kenya University
P.O. Box 342-01000
THIKA.

RE: RESEARCH AUTHORIZATION

Following your application for authority to carry out research on "*Thesis on the effects of early intervention measures on social interaction of children with autism spectrum disorders in Public Primary Schools in Mumias West Sub-County, Kenya*" I am pleased to inform you that you have been authorized to undertake research in **Kakamega County** for the period ending **23rd May, 2020**.

You are advised to report to **the County Commissioner and the County Director of Education, Kakamega County** before embarking on the research project.

Kindly note that, as an applicant who has been licensed under the Science, Technology and Innovation Act, 2013 to conduct research in Kenya, you shall deposit a **copy** of the final research report to the Commission within **one year** of completion. The soft copy of the same should be submitted through the Online Research Information System.


DR. STEPHEN K. KIBIRU, PhD.
FOR: DIRECTOR-GENERAL/CEO

Copy to:

The County Commissioner
Kakamega County

The County Director of Education
Kakamega County.



REPUBLIC OF KENYA
MINISTRY OF EDUCATION
STATE DEPARTMENT OF EARLY LEARNING AND BASIC EDUCATION

Telephone

**SUB-COUNTY DIRECTOR OF
EDUCATION**

Fax.....
When replying please quote
Email: deomumias@gmail.com

MUMIAS WEST
P.O. BOX 352 - 50102
MUMIAS
19th JUNE, 2019

Esther Inyuma Khamala
Mount Kenya University

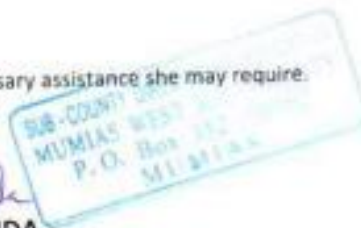
RE: RESEARCAUTHORIZATION

The above has been granted permission by national commission for science, technology and innovation vide their letter Ref no. NACOSTI/P/19/38757/30373 dated 27th may, 2019 to carry out research on "Thesis on the effects of early intervention measures on social interaction of children with autism spectrum disorders in public primary schools in Mumias west sub-county, Kenya", for a period ending 23rd MAY, 2020.

Please accord her any necessary assistance she may require.


REV. FRANCIS SHIKANDA

SUB-COUNTY DIRECTOR OF EDUCATION
MUMIAS WEST SUB-COUNTY



Appendix V: Field Entry/Research Authorization



**MINISTRY OF EDUCATION
STATE DEPARTMENT OF EARLY LEARNING AND BASIC EDUCATION**

Telephone: 056 - 30411
Fax : 056 - 31307
E-mail : wespropde@yahoo.com
When replying please quote

COUNTY DIRECTOR OF EDUCATION
KAKAMEGA COUNTY
P. O. BOX 137 - 50100
KAKAMEGA

REF: KAK/C/GA/29/17-IV/16

11TH JUNE, 2019

Esther Inyuma Khamala
Mount Kenya University
P.O Box 342-01000
THIKA

RE: RESEARCH AUTHORIZATION

The above has been granted permission by National Commission for Science, Technology and Innovation vide their letter Ref No. NACOSTI/P/19/38757/30373 dated 27th May, 2019 to carry out research on "Thesis on the effects of early intervention measures on social interaction of children with autism spectrum disorders in Public Primary Schools in Mumias West Sub-County, Kenya", for a period ending 23rd May, 2020.

Please accord her any necessary assistance she may require.

FCR
COUNTY DIRECTOR OF EDUCATION
KAKAMEGA COUNTY

DICKSON O. OGONYA
CDE/CEB - SECRETARY
KAKAMEGA COUNTY

REPUBLIC OF KENYA



THE PRESIDENCY
MINISTRY OF INTERIOR & CO-ORDINATION OF
NATIONAL GOVERNMENT

Office Mobile No: 0707 085260
Email-cckakamega12@yahoo.com

When replying please quote

Ref No: ED/12/1/VOL.IV/158

COUNTY COMMISSIONER
KAKAMEGA COUNTY
P O BOX 43-50100
KAKAMEGA.

Date: 20th June, 2019

Esther Inyuma Khamala
Mount Kenya University
P O Box 342-01000
THIKA

RE: RESEARCH AUTHORIZATION

Following your authorization vide letter Ref: NACOSTI/P/19/38757/30373 dated 27th May, 2019 by NACOSTI to undertake research on "*Thesis on the effects of early intervention measures on social interaction of children with autism spectrum disorders in Public Primary Schools in Mumias West Sub county , Kenya .*" I am pleased to inform you that you have been authorized to carry out the research on the same.

A handwritten signature in blue ink, appearing to read 'V. Cheron'.

V. CHERONO
FOR: COUNTY COMMISSIONER
KAKAMEGA COUNTY

COUNTY COMMISSIONER
KAKAMEGA COUNTY

Appendix VI: Turnitin Report

**EFFECT OF EARLY
INTERVENTION MEASURES ON
SOCIAL INTERACTION OF
CHILDREN WITH AUTISTIC
SPECTRUM DISORDERS FOR
ELEMENTARY INSTITUTIONS**

by Khamala ESTHER

Submission date: 27-Apr-2024 01:18PM (UTC+0300)

Submission ID: 2320184987

File name: ESTHER_KHAMALA_INYUMA_THESIS_2024_final_copy_2.doc (1.65M)

Word count: 23750

Character count: 144441

EFFECT OF EARLY INTERVENTION MEASURES ON SOCIAL INTERACTION OF CHILDREN WITH AUTISTIC SPECTRUM DISORDERS FOR ELEMENTARY INSTITUTIONS

ORIGINALITY REPORT

18%

SIMILARITY INDEX

17%

INTERNET SOURCES

8%

PUBLICATIONS

9%

STUDENT PAPERS

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mmust.ac.ke

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www.pecsusa.com

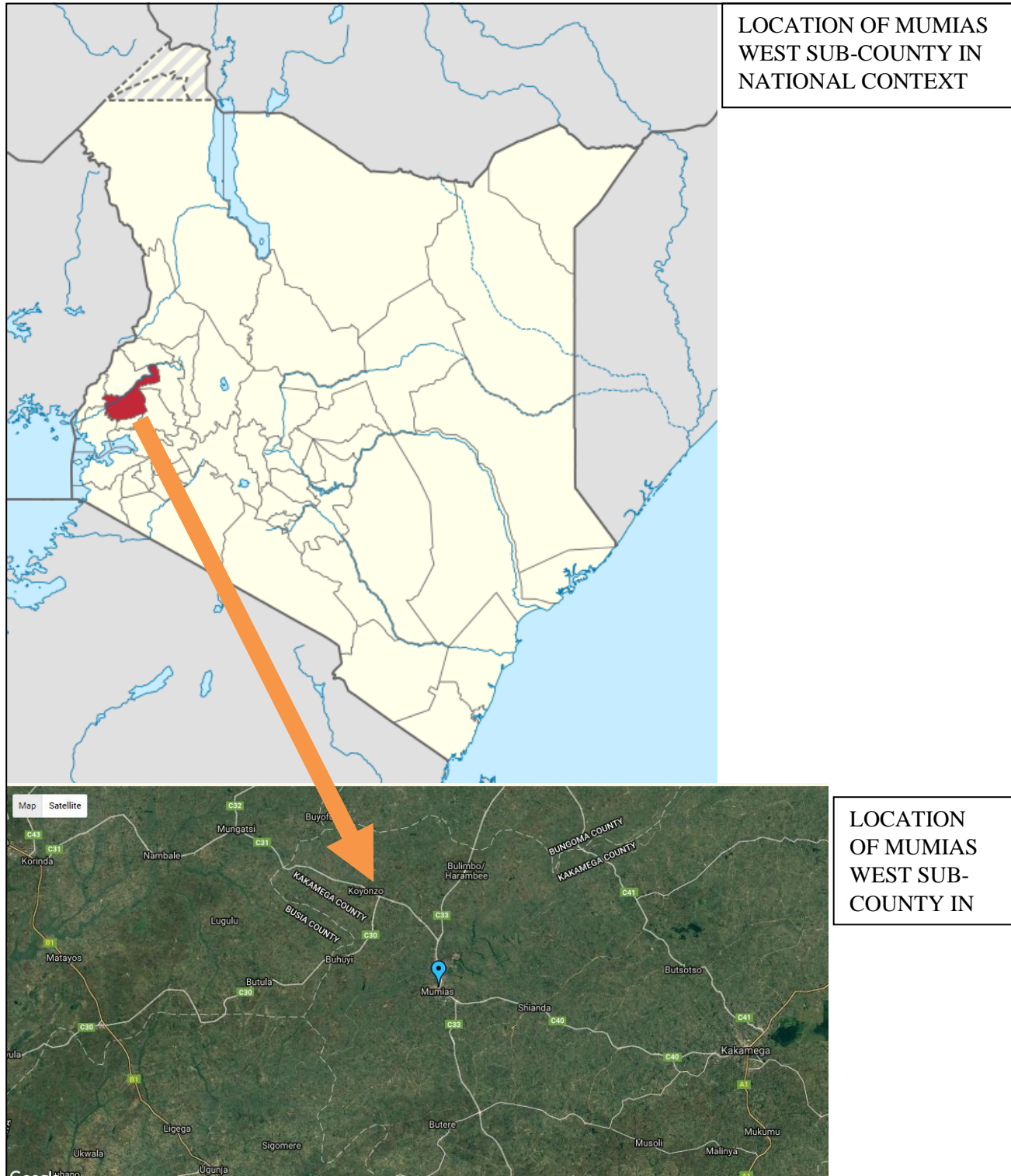
Internet Source

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vdoc.pub

Appendix VII: Research Site Map

Map of Mumias West Sub-County



Source: Google Images

Appendix VIII: Research Permit

THE SCIENCE, TECHNOLOGY AND INNOVATION ACT, 2013

The Grant of Research Licenses is guided by the Science, Technology and Innovation (Research Licensing) Regulations, 2014.

CONDITIONS

1. **The License is valid for the proposed research, location and specified period.**
2. **The License and any rights thereunder are non-transferable.**
3. **The Licensee shall inform the County Governor before commencement of the research.**
4. **Excavation, filming and collection of specimens are subject to further necessary clearance from relevant Government Agencies.**
5. **The License does not give authority to transfer research materials.**
6. **NACOSTI may monitor and evaluate the licensed research project.**
7. **The Licensee shall submit one hard copy and upload a soft copy of their final report within one year of completion of the research.**
8. **NACOSTI reserves the right to modify the conditions of the License including cancellation without prior notice.**

National Commission for Science, Technology and Innovation
P.O. Box 30623 - 00100, Nairobi, Kenya
TEL: 020 400 7000, 0713 788787, 0735 404245
Email: dg@nacosti.go.ke, registry@nacosti.go.ke
Website: www.nacosti.go.ke

REPUBLIC OF KENYA

NACOSTI
National Commission for Science, Technology and Innovation

RESEARCH LICENSE

Serial No.A 24907

CONDITIONS: see back page

THIS IS TO CERTIFY THAT:


MISS. ESTHER INYUMA KHAMALA
of MOUNT KENYA UNIVERSITY,
237-50102 MUMIAS, has been permitted
to conduct research in Kakamega
County


on the topic: THESIS ON THE EFFECTS
OF EARLY INTERVENTION MEASURES ON
SOCIAL INTERACTION OF CHILDREN
WITH AUTISM SPECTRUM DISORDERS IN
PUBLIC PRIMARY SCHOOLS IN MUMIAS
WEST SUB-COUNTY, KENYA

for the period ending:
23rd May, 2020

Signature
.....
Applicant's
Signature

Permit No : NACOSTI/P/19/38757/30373
Date Of Issue : 27th May, 2019
Fee Received :Ksh 1000




Director General
National Commission for Science,
Technology & Innovation