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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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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. They also have difficulties in communication process and are limited in non-verbal communication. They lack skills for interaction with their peers. 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 programmes 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. The study determined the influence of Restructured Environment on Social Interaction of children with autism in public primary schools in Mumias West Sub County. It 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 programmes in Mumias West Sub-County. Purposive sampling technique was used to sample out 91 teachers teaching learners with autism. The study was guided by the Social cultural Learning Theory and Theory of Mind. Research instruments were questionnaires, interview schedule and observation checklists. Validity of Instruments was done by experts in the school of education. Test retest method was used to test for reliability of the instruments. Qualitative data was analyzed thematically. The researcher found out that there was limited
early intervention measures to improve social interaction of children with autistic spectrum disorders in public primary schools in Mumias West Sub-County. it recommended that stakeholders should source for more resources to be used to modify learning environment to improve social interaction for learners with autistic spectrum disorders.

Keywords: *Early Intervention Measures, Social Interaction, Autistism Spectrum Disorders*

1. Introduction
Autism Spectrum disorders 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) [7]. Autism Spectrum disorder imposes an enormous burden on the society including lifelong disability, high medical care, and increased mental health problems in caregivers (Colombi and Constanza, 2017) [7]. 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) [21]. 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, 2010) [12]. 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 relations (Hartup, 2010) [12].

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 (Garguilo, 2006) [11]. 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, 2006) [11]. Early intervention measures include restructured environment, picture exchange communication system and sign language among others, (Khare and Mullik, 2008) [16].

Restructured environment affect children with autism positively (Schople, 2014) [26]. 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 (Hwaga, Khasakala, Safa, Kavuli, (2012) [14]. 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 (Nunes, 2008). 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 (Nelson, Soli, and Seltz, 2002) [22].

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 (Schople, 2014) [26]. 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, 2003). 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) [19]. 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) [19]. Matasio (2011) [19], 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 influence of restructured environment on social interaction of children with autism in public primary schools in Mumias West Sub-County.

Picture exchange communication system 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 (Massaro, and Bosseler, 2006) [18]. Children with ASDs are provided with a variety of pre-schools provisions for supporting them, parents and staffs. Most practiced in schools is electic 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 (Mazurek and Wagner, 2011) [20]. PECs enables children who have little or no verbal communication ability to communicate with other people using pictures. PECs can be used at in the classroom, at home as well as in other settings. Amaoko, Avemega (2016) [2] 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. The researcher sought to establish the influence of picture exchange of communication system on social interaction of children with Autism in public primary schools in Mumias West Subcounty.

early intervention measures are vital for children with autism spectrum disorder as they promote social interaction and development of the children through interaction. It is 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 autism in public primary schools in Mumias West Sub-County but also ensured that these children do not drop out of school due to fear of exclusion from other peers in classrooms.

2. Statement of the Problem

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 interaction skills which are vital for inclusion. This can be done through early intervention programmes which are limited in Mumias West Sub- County. The purpose of the study was to establish the effect of Restructured Environment on Social Interaction of children with autism in public primary schools in Mumias West Sub County.

3. Literature Review

This study employed the 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.

Structured environment refers to organization of the surrounding learning area to suit the needs of the child or 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 Bellini, Peters, Benner & Hopf, (2007) [5], 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) [19]. 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).

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) [19]. 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. 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, 2004a: 2001).

Similarly, this study also seeks to establish the influence of Restructured Environment on Social Interaction of Children with Autism in Public Primary Schools in Mumias West Sub-county, Kakamega County.

A study carried out in Tanzania (UNESCO, 2004) that investigated classroom environment influence 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 Influence of Restructured Environment on social interaction Influence of Picture Exchange Communication System on Social Interaction, Relationship of Sign Language on Social Interaction and Influence of Electronic Media on Social Interaction of children with Autism. For students with autism in particular, factors such as both auditory and visual distractions, blockage from the line of sight, poor lighting as well as distractions and noise from vehicular traffic classroom characteristics that can influence concentration and academic involvement (Dye and Bavelier, 2010) [8].

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 (Antia Sabers, 2007) [3]. 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 control for maximum benefits to be harnessed (Trussell, 2008) [27].

Physical environment in the classroom can influence learning through changing of student-teacher interaction patterns and further reducing both "downtime" and distractions (Trussell, 2008) [27]. There are various forms of seating arrangements can encourage interactions between the teacher and the student but can cause distractions to the student while undertaking individual tasks (Trussell, 2008) [27]. 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, 2008) [27]. 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, 2008) [27]. Physical environment in a classroom can influence the mobility of teachers in a classroom and direct contact with students. This also affects the academic involvement of students in various classroom activities.

Amanda, (2011) [1] note that various physical modifications that have been studied to modify learning environments include:- seating arrangement of students in the classroom¸ spaces for personal supplies for students, positioning of the teacher's desk, organization and use of various classroom materials, provision of lighting in the classroom and regulation of classroom acoustic 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, 2001) [30]. An early research by Zifferblatt (2002) [33] 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 (2003) [13] 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. Frost and Bondy, (2012) [9] 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 in the classroom, Guardino and Fullerton (2010) noted that there was a 42% increase 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.

A study by Khasakhala and Hwaga (2012) [14] 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 (2001) [30] studied students in a classroom of learners with emotional behavior disorders and established that as previous researchers (Robinshaw *et al*., (2007) [25] 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 Behavioural 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, 2002).

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) [25]. Research shows that for learners with disabilities, it is common for them to experience difficulties in understanding in a noisy environment (Bradlow, 2003) [6] 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, 2009) [32]. 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, 2002) [22]. Various acoustic modifications that can be fused into the physical environment include installing sound-absorbent materials in the classroom (Robinshaw, 2007) [25]. 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.

Khare and Mullik (2008) [16] study on effect of environment on learners with autism established the relationship between the environment and the needs of learners with Autism Spectrum Disorders. Teachers in both the USA and India recommended that the environment is important for learners with Autism. Arika (2015) [4] 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) [15] state that the learners' environment must be conducive to cater for their needs. None of these studies has been done in Mumias Sub County.

4. Materials and Methods

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 programmes in Mumias West Sub-County. Purposive sampling technique was used to sample out 91 teachers teaching learners with autism.

5. Results and Discussions

The objective of this study was to determine the influence of Restructured Environment on Social Interaction of children with autism in Public Primary Schools in Mumias West Sub County. To achieve this objective, the researcher sought the opinions of teachers. She recorded and analyzed these opinions thematically as shown in table 1

Table 1: The influence 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. A 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 a 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 influence 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. 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".

6. Conclusions and Recommendations

From the results, it was concluded that restructuring of learning environment had not been adequately modified to facilitate social interaction of children with autism. This study recommended that more resources should be sourced to modify learning Environment so as to facilitate social interaction of children with autism in Public Primary Schools in Mumias West Sub-County.

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