



The Influence of Functional Behavioral Assessment on the Social Interaction of Learners with Autistic Spectrum Disorders

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Abstract: Autism Spectrum Disorder (ASD) is a neurodevelopmental condition marked by deficits in social communication and adaptive behavior, which limits school participation. Although Functional Behavioral Assessment (FBA) is a globally recognized evidence-based intervention, learners with ASD in Kakamega Central Sub-County, Kenya, continue to experience social isolation, stigmatization and poor integration due to limited specialized resources, inadequate teacher training in function-based interventions, and misconceptions about challenging behaviors. The article established the influence of FBA on social performance of learners with ASD in special primary schools and units in Kakamega Central Sub-County. Grounded on Albert Bandura's Social Learning Theory. Descriptive cross-sectional design was used. 190 learners were sampled through stratified proportionate sampling based on school type and unit size using the Krejcie and Morgan table. Data were collected using a structured teacher questionnaire, checklists and semi-structured interviews with headteachers. Instruments were piloted with 20 teachers outside Kakamega County. Results showed FBA was implemented for 62.6% of learners. The null hypothesis (H_0) that FBA has no significant influence on social interaction was rejected. Learners who received FBA had significantly higher social interaction scores ($M=24.32$ vs. 17.69 ; $t=-9.477$, $p<0.001$), with regression analysis confirming a strong independent effect ($\beta=0.47$, $p<0.001$). The study demonstrates that systematic FBA promotes social inclusion, autonomy and peer acceptance even in resource-constrained Kenyan schools, improving classroom functioning and reducing problem behaviors. It is significant for teachers, families and policymakers. Recommendations include mandatory FBA training for special needs teachers and adoption of low-cost documentation systems in schools into pre-service teacher curricula in Kenyan universities.

Keywords: Functional behavioral assessment, Social interaction, Autistic spectrum disorders, Kakamega, Primary Schools

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1. Introduction

Autism spectrum disorder (ASD) is a complex neurodevelopmental disorder that affects social communication and social interaction with repetitive behavioral aspects or a restricted range of interests (DSM-5, 2022). It is a spectrum disorder, meaning that it affects individuals differently and to varying degrees. Some

learners with ASD may have difficulty with social interactions, such as making friends or relating to others, while others may have a challenge in communicating with other people or exhibiting repetitive behaviors. They may also have very narrow, intense interests and unusual reactions to sights, sounds, smells, and touch.

ASD symptoms usually appear pronounced in early childhood, and diagnosis is based on a thorough evaluation

of the individual's behavior and development. ASD has no cure, but early intervention and treatment can help salvage the situation, hence may lead to fulfilling lives (Daniels & Mendel, 2014). According to Daniels & Mendel (2014), treatment may include behavioral therapy, medication, and educational interventions. It is important to note that individuals with ASD have unique strengths and abilities, and with the right support, they can achieve their full potential.

Prevalence of ASD varies across genders, with more boys having a greater likelihood of having the condition than girls (Shaw *et al*, 2020). In the USA, many states have reported that 32.3 percent of 1000 boys aged 4 years have ASD, which was 3.1 times as high as that of girls in the same state. The 2020 (during the peak of COVID-19) report shows the male-to-female ratio among children aged 4 years with ASD is similar across all the states, but the ratio was lower among children aged 8 years. This depicts that age is a significant factor in the development of autism among children. Younger children are more vulnerable to ASD, and as age increases, the chances of diagnosing the condition are lower.

Proper management of ASD requires a thorough understanding of an individual's problem behavior, identifying events that predict and maintain it, and using this information to design behavior support plans that minimize the problem behavior and maximize functional, prosocial behavior (Recce *et al*, 1997). It is an evidence-based approach used in applied behavior analysis (ABA) to determine why a child exhibits and treats challenging behaviors in individuals with autism spectrum disorder.

The support from governments in supporting learners with special needs is paramount through proper financing of the Ministry of Education and hiring of teachers who understand the needs of the learners. Lainy (2022) asserts a complete lack of interest in understanding the ASD phenomenon in Haiti. Few scholars have come up to speak of genetic predisposition, metabolic imbalances, immune dysfunction, or environmental factors being the origin of ASD. However, professionals are unanimous in recognizing the need to apply a consistent protocol by mobilizing various specialists to point out the challenge, which mainly affects children. Many clinical and psycho-educational versions of the understanding exist. However, while these diagnoses are made early elsewhere – from the age of three and even earlier – this seems of little concern for Haitian educational officials (Lainy, 2022).

FBA is the process of gathering data to help identify the purpose/maintaining variables of the student's behavior by investigating how the events in the environment are related to the challenging behavior. FBA involves identifying the function of the behavior, or the reason why the behavior is occurring, and developing a treatment plan that addresses the underlying cause of the behavior. FBA is typically conducted by a trained professional, such as a behavior

analyst, and involves a comprehensive evaluation of the individual's behavior and environment.

The assessment may include: Direct observation of the behavior, Interviews with caregivers and other individuals who interact with the child, and Analysis of data collected over time.

In many developed countries, such as Canada, FBA has been in practice by clinicians, consultants, and school personnel under the varied names of functional assessment, functional analysis, functional analysis assessment, or as a general technique used by applied behavior analysts. According to Kennedy *et al* (2000), the underlying assumptions observed during FBA practice are that behavior is predictable, occasioned by environmental events, and serves a purpose, or function.

More recent uses of FBA have focused on a broader range of individuals with problem behavior, including those with mild or moderate disabilities or those at risk for such disabilities. The use has been hastened by amendments to the United States Individuals with Disabilities Education Act (1997), which mandated the use of FBA in determining appropriate placements for students with significant problem behavior (Nolan, 2004). At times, all children and youth can struggle with challenging behavior. If a challenging behavior interferes with the learner's ability to learn, then a functional behavior assessment is needed. FBA can be used when the intensity, duration, or type of interfering behavior creates safety concerns or impacts a child's development.

An FBA assists the IEP team in understanding the function or purpose of a specific interfering behavior. The focus when conducting FBA is on identifying student-specific social, affective, cognitive, and/or environmental factors associated with the occurrence (and non-occurrence) of specific behaviors. This broader perspective offers a better understanding of the function or purpose behind student behavior. Behavioral intervention plans based on an understanding of "why" a learner misbehaves are extremely useful in addressing a wide range of problem behaviors.

Based upon the recent review, functional behavior assessment meets the evidence-based practice criteria set by NPDC with 10 single-case design studies. The practice has been effective with learners in early intervention (0-2 years) to high school (15-22 years). Evidence-based practices (EBP) and studies included in the 2014 EBP report detailed how FBA can be used effectively to address: academic, adaptive, behavior, communication, and school readiness outcomes.

FBA targets skills in the domains of behavior and communication, usually with a focus of decreasing inappropriate behavior and teaching or increasing appropriate communicative alternatives. It is a process used in schools to identify the function of a student's problem behavior and develop individualized interventions aimed at reducing problem behaviors and increasing positive

behaviors. The use of FBA in schools has increased in the past decade, and recent research has demonstrated its effectiveness in general education settings. However, outcomes of teaching FBA procedures to school personnel have been mixed, with some researchers reporting positive results of training on skills. FBA is an individualized problem-solving process for addressing student problem behavior.

An assessment is conducted to identify the purpose or function of a student's problem behavior. This assessment process involves collecting information about the environmental conditions that precede the problem behavior and the subsequent rewards that reinforce the behavior. The information gathered is then used to identify and implement individualized interventions aimed at reducing problem behaviors and increasing positive behaviors.

Nationally, about 4% of the population in Kenya, equivalent to approximately 2.2 million individuals, is affected by autism, ranking the country 46th globally in terms of autism rates (Kenya National Bureau of Statistics, 2021). The frequency involves children and adults; however, males are reported to have a higher frequency. The problem is worsened by the lack of access to appropriate educational and therapeutic services, mainly due to financial constraints. The lack of appropriate interventions and policies for those with ASD increases their problems and makes their economic and social integration even more challenging (Asige, 2024).

According to one survey conducted in Kenya, about 0.63% of adolescents and young people in Kenya had high autism traits, while 14.9% had borderline traits (Mamah et al., 2022). In the survey, it was found that high autistic traits were more common among males with less education and low socio-economic backgrounds. According to Kakamega Central Sub-County Education Office, the sub-county had a relatively higher number of special schools or primary schools with special units.

1.1 Statement of the Problem

The high prevalence of ASD among learners in Kakamega County, especially Kakamega central sub-county creates challenges in their social performance in school. The prevalence of autistic children in Kenya has been estimated at some 4% of the country's population but there is limited information on the prevalence of autism in Kakamega County, Kenya, with many of the learners having a hard time adapting to their social environment (Asige, 2024). Limited access to specialized educational resources and supportive therapies often create significant challenges for ASD learners in Kakamega with regards to social interaction, communication and adjustment to the mainstream education environment.

The lack of awareness and understanding of ASD among educators and peers is also a major contributor to the problems faced by students with ASD, which include social

isolation and stigmatization. Limited skilled personnel and suitable intervention programmes in Kakamega Central Sub-County pose great challenges for the integration and social performance of the ASD learners in the school. This highlights the critical importance of having specific educational policies and funding allocation for ASD learners, and creating a school setting that is inclusive and supports their social and academic growth (Mamah et al., 2022).

Learners with ASD spend more of their time in special schools and are faced with challenges when trying to adjust socially, academically, and morally to the school environment. It is the school that helps in molding the children with autism to adopt good behavior and accept their status which in turn, helps them to improve the social participation of their learners at school and society. Despite the existence of functional behavioral assessments, learners still suffer the wrath of some teachers.

For example, if a child is constantly trying to leave the classroom or engaging in inappropriate behaviors during lessons, teachers without knowledge of FBA might label the child as disobedient, defiant, or disrespectful. This indicates that learners with behavioral disorders are still not taken care of. Therefore, this urgently calls for the establishment of how school personnel apply the use of functional behavioral assessment to enhance the social performance of learners with autism spectrum disorders in schools.

1.1 Statement of the Problem

Despite an estimated 4% prevalence of autistic children in Kenya, learners with Autism Spectrum Disorder (ASD) in Kakamega Central Sub-County continue to exhibit poor social performance, characterized by social isolation, stigmatization, and difficulty in social interaction, communication and adjustment to the mainstream education environment (Asiga, 2024; Mamah et al., 2022). This is exacerbated by limited specialized educational resources, limited access to supportive therapies, low awareness among educators and peers, and a shortage of skilled personnel trained in evidence-based interventions. While the school is expected to mold learners with ASD to adopt appropriate behavior and improve social participation, teachers without knowledge of Functional Behavioral Assessment (FBA) often mislabel challenging behaviors as disobedience, defiance or disrespect, leading to punitive rather than supportive responses. Therefore, there is limited empirical evidence on whether and how school personnel apply FBA to enhance the social performance of learners with ASD in special units and primary schools in Kakamega Central Sub-County, necessitating this study.

1.2 Objectives of the Study

The following objective guided this study:

- i) To evaluate the influence of Functional Behavioral Assessment on the social interaction of learners with Autistic Spectrum Disorders.

2. Literature Review

2.1 Theoretical Review

2.1.1 Social Learning Theory (SLT)

The theory was developed by Albert Bandura (1977) under his four important ideas: observational learning, modeling, and imitation. The use of Social Learning Theory to explore the influence of Functional Behavioral Assessment on the social interaction of learners with autism spectrum disorders is justified in the sense that the theory emphasizes the importance of observational learning, whereby individuals acquire new behaviors by observing others. In the context of learners with ASD, who may struggle with social interaction skills, understanding how FBA influences their social behaviors through observation is crucial.

FBA interventions also include modeling, in line with the tenets of Social Learning Theory, appropriate social behaviours for learners with ASD to observe and imitate. Through the theory, people are taught through the example of others and particularly others who are seen as competent and/or authoritative. FBA interventions can include introducing models or peers who demonstrate appropriate social interactions to provide opportunities for learners with ASD to model and practice these interactions (Kangas et al, 2011). If the techniques of modeling are applied, as described in Social Learning Theory, FBA has the potential to increase the social interaction skills of learners with ASD.

According to Social Learning Theory, behaviors are influenced by their consequences such as reinforcement and punishment. The goal of FBA is to uncover the purpose of the challenging behavior(s) in students with ASD and design interventions through the use of reinforcement strategies. Researchers can use the Social Learning Theory to consider the effect of FBA interventions on social interaction skills of learners with ASD based on the extent to which the interventions support positive social interactions or reduce challenging behavior. The central theme of the theory is the importance of social reinforcement in the development of behavior. Social reinforcement strategies can be used in FBA interventions to reinforce and encourage appropriate social interactions with learners who have ASD. By studying the social reinforcement mechanism used within FBA interventions, researchers can determine the effectiveness of using these mechanisms to encourage positive social interaction behaviors among learners with ASD in accordance with the principles of SLLT.

The application of Social Learning Theory for analysis of the influence of Functional Behavioral Assessment (FBA) on the self-management in learning with autism spectrum

disorders (ASD) can be justified. A key tenet of Social Learning Theory is the importance of observing and modeling behavior in the acquisition of new behaviors. In the FBA setting, learners with ASD can watch and practice ways of self managing that have been modeled by the teacher, peers or others. Researchers can investigate the role of observational learning as part of FBA interventions when modeling self-management strategies by understanding the role of observational learning in the development of self-management skills of learners with ASD. The theory also proposes that people are reinforced, positively or negatively. Reinforcement is often a part of an FBA intervention to promote self-management skills for the learner with ASD. By exploring social reinforcement mechanisms that are part of the FBA process, researchers can determine whether or not social rewards and consequences contribute to the development and maintenance of self-management skills among the learners with ASD.

Social Learning Theory emphasizes the significance of social environment and peer interaction in influencing behavior. FBA intervention might include giving the individuals with ASD chances to practice self-management skills in a social setting with peers. By considering the social dynamics within FBA interventions, researchers can explore how peer influence and social contexts impact the acquisition and utilization of self-management techniques among learners with ASD. Theory suggests that individuals are more likely to model behaviors demonstrated by authority figures. Within educational settings implementing FBA, teachers and educators serve as authority figures who model and reinforce self-management skills for learners with ASD (Schulze, 2016). Through examining the influence of modeling by authority figures within FBA interventions, researchers can assess how teacher demonstrations and guidance facilitate the development of self-management abilities among learners with ASD.

Using Social Learning Theory to explore the influence of FBA on the social adaptability and acceptance of learners with ASD provides a comprehensive framework for understanding how behavioral interventions can impact social behaviors in this population. The Social Learning Theory posits that individuals, including those with ASD, can learn behaviors through observation of others. In the context of FBA, educators, and therapists can model appropriate social behaviors during intervention sessions, providing learners with ASD with concrete examples to observe and imitate.

Social Learning Theory emphasizes the importance of reward and punishment in influencing behaviour. Educators, by implementing FBA based interventions, can identify specific behaviours that will support the social adaptability and acceptance of learners with ASD. Interventions can use FBA to reinforce appropriate behaviors and to give consequences for inappropriate behaviors, which can help to build socially adaptive behaviors. The theory emphasizes on the importance of

social context and environment in shaping the behavior. For learners with ASD, interventions through FBA should take into account the social dynamics of the classroom or therapeutic setting and the social environment to foster social inclusion and acceptance. Working cooperatively, giving opportunities for socialization and support can be beneficial for social adaptability and acceptance of students with ASD (Conway, 2005).

To conclude, the four Social Learning Theory aspects discussed are important factors in the analysis of the effect of FBA on the social performance of children with ASD as follows:

Attention: For learners with ASD, it is important to capture and hold their attention during the first steps of the social learning process. Learners' interests, the complexity of the behavior to be observed, and environmental distractions all play a role in determining attention. Carefully designed FBA can be used to assess the behaviors and stimuli that appeal to the ASD learner. When educators and therapists know what they can expect to hold their attention, they can set up activities that will increase focus and help them learn appropriate social skills (Bandura, 1986).

Retention: When learners observe a behavior and can remember it later. Some of these may be difficult for learners with ASD because they may have memory and cognitive processing deficits. Using FBA, visual supports and repetition to support retention of social behaviors. Social stories, video modeling, and other strategies can help the student with ASD encode and store social cues and interactions that are necessary for enhancing his/her social performance across different settings (Hodges, 2017).

Reproduction: Physical/Cognitive capability to reproduce the observed behaviour. Motor planning and/or execution may be challenging for ASD learners. FBA can help determine what each and every social behavior comprises of, which can be broken down into small steps and learned/practiced over time. Role play and guided practice can be used to ease the transfer of behaviors so that learners can observe and replicate the social skills that they have seen (Bandura, 1986).

Motivation: Motivation determines whether the observed and retained behavior will be performed. Motivational factors include external reinforcement, internal satisfaction, and observed consequences of the behavior. FBA helps identify what motivates ASD learners and uses this information to reinforce positive social behaviors. By providing consistent and meaningful rewards, such as praise or tangible incentives, educators can increase the likelihood that ASD learners will engage in and sustain appropriate social interactions (Koegel & Koegel, 2019).

2.2 Empirical Review

2.2.1 Prevalence of Autistic Spectrum Disorder

The phenomenon of autism spectrum disorder remains one of the areas of intense concern and research. Autism is a complicated neurodevelopmental disorder which manifests itself in different ways, causing problems with communication, social interaction, and behavior. In recent years, the number of people suffering from ASD has become higher, and the condition is viewed as one of the most widespread neurodevelopmental disorders. The causes of this growing trend are not yet fully explored, although it may be attributed to the growing awareness of the problem and changes in the diagnosis criteria (Lord et al, 2018).

In a study performed using surveillance of some states of the United States concerning the prevalence of ASD among children below 8 years old, the following findings have been determined (Baio et al, 2018). For children with ASD for whom information regarding their intellectual/cognitive functioning was available, 33% were found to have intellectual disability (intelligence quotient [IQ] ≤ 70); with the former figure being higher among girls at 40% than in boys at 32%, and among blacks (47%) and Hispanics (36%) compared to whites (27%). Amongst children with ASD, fewer blacks had received their first diagnosis before the age of 36 months compared to whites at 40% versus 45%.

Another separate cross-sectional study was conducted in the United States between 2019-2020 to establish the prevalence of ASD among children. Of the 12 554 children aged 3-17 years surveyed, the following findings were established. According to Li *et al* (2022) an estimated 3.14% of children in United States were prevalent to ASD between 2019 and 2020. This finding was higher compared to similar study conducted between 2014 and 2016 (2.30%). This suggests that the prevalence of ASD is on the rise in United States. In fact, its projected that the prevalence might hit 6% in 2025. What is worrying is the upward trajectory in which the prevalence of ASD is shaping.

These establishments indicate that the prevalence of ASD is dependent on several factors such as age, gender, and child's native origin. Younger children have higher chances of developing ASD. Girls are more prone to ASD development than boys, despite prevalence being high in both. For intervention purposes, functional behavioral assessment (FBA) is very key. Teachers, parents, and other immediate caregivers need to be extra vigilant to observe and assess any development that may lead to ASD. This study sought to fill this knowledge gap by the extent to which FBA can influence social interaction among children living with ASD.

Knowledge about autism spectrum disorder (ASD) held by young parents is among the most determining factors influencing prevalence of cases. There exists a positive correlation between parental knowledge and prevalence of ASD. In the survey that reviewed knowledge about the phenomenon of ASD held by young parents in United Kingdom (Dublin, Cambridge, and Scotland), the following

results were obtained: 16 young adult participants agreed to take part in the study. 6% of the participants were above 22 years of age, 6% were below 18 years of age, and the remaining 88% equally distributed in the two groups of "18-19 years old" and "20-22 years old". 63% of the participants were females; 44% knew of a family member with ASD, and 38% knew of a friend with ASD. 38% knew of ASD; 38% of the young adults surveyed had a friend with ASD, and 44% had a family member with ASD (Viehweger et al, 2019). The results suggested that prevalence of the ASD among members of a community is approximately equal to level of awareness of the condition.

The results by Viehweger *et al* (2019) are expected in the current study. However, the current study used a significantly larger sample of adults particularly teachers and parents who interact with the learners with ASD. This provided adequate insight into how functional behavioral assessment should be enhanced, to improve proportionate measures for social performance among children with ASD.

3. Methodology

3.1 Research Design and Approach

This study employed a cross-sectional survey design. Cross-sectional studies are well-suited for capturing a snapshot of a population at a specific point in time (Prince & Das-Munshi, 2003). In this study, the researcher is interested in understanding the influence of functional behavioral assessment on the social performance of learners with autism spectrum disorder in schools in Kakamega Central. Conducting a cross-sectional study allows researchers to assess the social performance of these learners at a particular moment, providing valuable insights into their status.

According to Prince & Das-Munshi (2003), cross-sectional studies also enable the researchers to examine associations between variables at a single point in time. In this study, the researcher explored the association between the implementation of functional behavioral assessment and the social performance of learners with ASD. By collecting data on both variables simultaneously, the study analyzed the relationship between the two factors.

3.2 Study Area

The study was conducted in Kakamega Central Sub-County, located in Kakamega County in the Western region of Kenya. Kakamega Central Sub-County serves as the administrative and commercial headquarters of Kakamega County and hosts the county capital, Kakamega town. Geographically, Kakamega County lies approximately 30 km north of the equator, between longitudes 34° and 35° East and latitudes 0° and 1° North. The county borders Vihiga County to the south, Siaya and Busia Counties to the west, Bungoma and Trans Nzoia Counties to the north, and Nandi and Uasin Gishu Counties to the east. Kakamega Central Sub-County itself covers an approximate area of

161.7–161.8 km² and is one of the most densely populated sub-counties in the county, with a population of 188,212 persons according to the 2019 Kenya Population and Housing Census (92,774 males, 95,432 females and 6 intersex), yielding a density of approximately 1,164 persons per square kilometre.

The sub-county experiences a tropical climate influenced by the nearby Kakamega Forest, Kenya's only remaining tropical rainforest. Annual rainfall ranges from about 1,280 mm to 2,214 mm, distributed fairly evenly throughout the year, with peaks typically in March–May and around July–August. Temperatures typically vary from 18°C to 29°C, with the average being about 24.5°C; the warmest period is between January to March, whereas the coolest period occurs between June to August. Elevation in the region is between 1,240 m and 2,000 m above sea level, thus making the region have a mild highland climate.

From a socio-economic point of view, the region is mostly occupied by the Luhya community and is mainly an agriculture-based region. The main economic activities in the region involve small-scale farming of maize, beans, sugarcane, tea, horticultural crops, and dairying, in addition to trade and public administration that take place in Kakamega town. The existence of Masinde Muliro University of Science and Technology, Kakamega County General Teaching and Referral Hospital, many primary and secondary schools, special needs institutions, markets, and government departments makes the sub-county an important educational, health, and administrative center. These facilities, combined with the high concentration of special schools and primary schools with special units (as documented by the Kenya National Special Needs Education Survey, 2013), provided a suitable setting for the study. Kakamega County ranks among the leading counties in Kenya for the number of special needs education institutions, alongside Murang'a and Mombasa, resulting in a proportionately high number of learners with special needs, including those with Autism Spectrum Disorder. The researcher therefore selected Kakamega Central Sub-County because of its high distribution of special school units and the accessibility of respondents within a relatively urbanized yet resource-constrained educational environment.

3.3 Target Population

The study focused on schools located within the Kakamega Central Sub-County. This included public primary schools, which have a special unit, as well as special education institutions, where learners with ASD receive educational services and support. The study also focused on the teachers who interact with the learners on a day-to-day basis.

Sekaran and Bougie (2010) define the target population in research as a definite set of services, events, elements, people, and households under a research-based investigation or collection of items. The target population for the study primarily consisted of learners diagnosed with

autism spectrum disorder who are enrolled in public primary schools within the Kakamega Central Sub-County. To this end, all the learners with autism spectrum disorders and their teachers in Kakamega Central Sub-County were targeted for study. These learners formed the focus, hence provided the unit for analysis.

ASD children refer to individuals who have received a clinical diagnosis of autism spectrum disorder. ASD is a neurodevelopmental disorder characterized by persistent deficits in social communication and interaction, as well as restricted, repetitive patterns of behavior, interests, or activities. The target population included learners across the spectrum of ASD, including those with varying levels of severity and functional abilities.

3.4 Sampling Procedure and Sample Size

A purposive sampling strategy was employed to obtain participants having autism spectrum disorder. Purposeful selection of sample schools was done. Subsequently, simple random sampling was employed to select teachers. The determination of the sample size was very important to achieve an accurate answer. In research, the term “sample” is defined as the selection of individuals or elements taken from a population to carry out the research. The sample represents the entire population of interest whereby the researchers can draw conclusions about the population based on what is experienced in the sample. (Singh & Masuku, 2014). The population and the sample size are shown in table 1 below.

Table 1: Sample Frame

Nature of Population	Population (N)	Sample (n)	% sample
Schools	28	28	100
SNE-trained teachers	112	92	82.1
Learners with ASD	460	210	45.7
Total	572	302	52.8

Table 1 shows the number of schools to be selected for study, the Special Needs Education (SNE) teachers who attend to the learners, and the learners with ASD enrolled in the schools. Data from the Ministry of Education (Kakamega Central Sub-County) shows that there are 28 special schools and primary schools with special units. The data also shows that the teachers deployed to the schools are 112, while the estimated number of ASD learners in the schools is 460.

The central limit theorem requires that when the population is less than 30, all the participants (schools) are selected to obtain the sample. To this end, all the 28 schools (100%) will be selected. Using the Krejcie & Morgan (1970) sample determination table (see Appendix IV), a population of 112 teachers gives a sample of 92 teachers (82.1%) while a population of 572 learners gives a sample of 210 learners (52.8%).

3.5 Data Collection instruments

The instruments of data collection were : questionnaires, Document analysis guides and interview schedules. A questionnaire was used to collect data from teachers on the influence of Functional Behavioral Assessment on the social interaction of learners with Autistic Spectrum Disorders in kakamega county ,Kenya. In addition, an Interview Guide for Headteacher in Charge of Schools with ASD Centres

3.6 Data Analysis

The descriptive statistics which include means, frequencies and percentages were analyzed and reported in tables. They gave an indication of the status of social performance levels before and after the implementation of FBA. This facilitated the identification of the central tendencies and variations of data.

Statistical Package for Social Sciences (SPSS) was used to conduct inferential statistics so as to facilitate testing of the hypotheses. This was carried out according to the objectives.

In evaluating the influence of Functional Behavioral Assessment (FBA) on the social interaction of learners with autism spectrum disorder (ASD), means, standard deviation and range constituted the descriptives. The bivariate analysis will be done using independent t-test because FBA is categorical (e.g. "Implemented", "Not Implemented"). Since the level of social interaction has been quantified through a score, it can now be subjected to t-test so as to see whether the mean level of interaction in learners receiving consistent FBA is different from those without it. The multivariate analysis was conducted through multiple linear regression.

3.7 Ethical Considerations

Respondents' data was kept private and confidential during the study, and their right to privacy and protection from physical and psychological harm was upheld. The respondents were given enough information about the study's goal in a clear and understandable manner, and that enabled them to decide whether or not to participate.

4. Results and Discussion

4.1 Findings on Functional Behavioral Assessment and the Social Interaction of Learners with ASD

4.1.1 Descriptive Statistics of Variables

This section describes descriptive statistics of the important variables associated with objective one. First, the distribution of FBA implementation is discussed. Second, the descriptive statistics of individual items of the seven social interaction variables (rated on a five-point Likert scale from Never to Always) are presented, together with the total social interaction score.

Table 2: Distribution of FBA Implementation Status

FBA Implementation Status	Frequency (n)	Percentage (%)
Not Implemented	71	37.4
Implemented	119	62.6
Total	190	100.0

FBA had been implemented for the majority of learners (62.6%), indicating moderate to high adoption of the practice among the sampled schools and units.

Table 3: Descriptive Statistics for Individual Social Interaction Items

Item No.	Social Interaction Item	Mean	Std. Deviation	Minimum	Maximum	Skewness	Kurtosis
1	Initiates conversation with peers	2.95	1.12	1	5	0.18	-0.62
2	Responds appropriately to greetings	3.28	1.05	1	5	-0.04	-0.81
3	Takes turns during games or group work	3.14	1.18	1	5	0.09	-0.95
4	Maintains eye contact during communication	2.81	1.24	1	5	0.32	-0.78
5	Shows empathy or concern for others	2.67	1.09	1	5	0.41	-0.54
6	Participates in peer group activities	3.02	1.16	1	5	0.15	-0.89
7	Understands and follows basic social rules	3.91	0.98	1	5	-0.68	0.22
Total	Social Interaction Score (sum of 7 items)	5.62	7.0	35.0	0.12	-0.41	

The means on the item level were between 2.67 (empathic) and 3.91 (compliance with basic social conventions). This can be interpreted as a relatively easier performance of compliance with social norms and more problems related to empathy and eye contact. The mean of the scores was normally distributed (skewness = 0.12, kurtosis = -0.41) with a mean of 21.78 (SD = 5.62).

4.1.2 Bivariate Analysis: Independent Samples t-test

An independent samples t-test was conducted to determine whether there was a statistically significant difference in social interaction scores between learners with and without FBA implementation.

Table 4: Independent Samples t-test Comparing Social Interaction Scores by FBA Status

Group	n	Mean	Std. Dev	t-value	df	p-value tailed)	(2- Mean Difference	95% CI Lower	95% CI Upper
FBA Not Implemented	71	17.69	4.78	-9.477	138.2	< 0.001	-6.63	-8.01	-5.25
FBA Implemented	119	24.32	4.46						

An independent t-test indicated a significant difference in the social interaction scores of the two groups ($t(138.2) = -9.477$, $p < 0.001$). Participants with FBA had significantly higher social interaction scores (difference mean = 6.63 points), with the confidence interval indicating the true difference to be between 5.25 and 8.01 points. The results have established preliminary evidence of the association between FBA and social interactions among individuals with ASD.

4.1.3 Multivariate Analysis: Multiple Linear Regression

To examine the effect of FBA on social interaction score after controlling the learner's age group, gender and the duration of time the teacher spent with the learner, multiple linear regressions were computed. Model 1 (Unadjusted: FBA only) and Model 2 (Adjusted: FBA + controls) were estimated.

Table 5: Multiple Linear Regression Predicting Social Interaction Score

Variable	Model 1 (Unadjusted)		Model 2 (Adjusted)	
	B (SE)	β	B (SE)	β
Constant	17.69 (0.57)	–	16.12 (1.05)	–
FBA Implemented (1 = yes, 0 = no)	6.63 (0.70) ***	0.52	5.98 (0.68) ***	0.47
Age group (ref: 6–9 years)				
10–12 years	–	–	0.92 (0.78)	0.08
13–15 years	–	–	1.45 (0.91)	0.10
Gender (1 = male, 0 = female)	–	–	-0.62 (0.75)	-0.05
Teacher duration (ref: <1 year)				
1–2 years	–	–	1.18 (0.89)	0.09
>2 years	–	–	1.62 (0.92)	0.12
R ²	0.271		0.328	
Adjusted R ²	0.267		0.305	
F-statistic	69.84***		14.62***	

Note: *** $p < 0.001$, $p < 0.10$; B = unstandardized coefficient, SE = standard error, β = standardized coefficient.

For Model 1, the effect of FBA implementation accounted for about 27.1% of the variation in social interactions ($R^2 = 0.271$, adjusted $R^2 = 0.267$), exhibiting a large positive influence ($\beta = 0.52$, $p < 0.001$). In Model 2, where demographic controls were introduced, the percentage of the variation accounted for was 32.8% ($R^2 = 0.328$, adjusted $R^2 = 0.305$), showing a slight improvement in explanatory power. The influence of FBA was still significant ($B = 5.98$, $\beta = 0.47$, $p < 0.001$), demonstrating that the influence of FBA on social interactions is independent from age, gender, and familiarity between teachers and learners. The controls were of marginal significance with only one of them having a slight positive influence ($p < 0.10$).

Qualitative Insights from Teachers

The data was gathered using interviews of the headteachers as well as class teachers who run ASD units. The interview responses add context to the statistical finding that the application of FBA is related to increased scores in social interactions. The teachers reported the noticeable improvement in social interaction of the learners within peer groups, communication, and participation in group work through the use of FBA. One teachers said that;

Teacher #3: "Since we started using the FBA sheet to track what triggers the boy's hand-flapping and running out, we now redirect him with a visual timer and praise when he stays seated during circle time..." Teacher 1 "14/05/2022

Teacher #9(Headteacher): "For this girl who used to avoid eye contact and push others away, the

FBA showed escape was the function.... We taught her to say 'I need a break' instead. Within two months, she began joining the line-up voluntarily and even waved hello to two classmates in the morning...."headteacher 9:14/05/2022

Teacher #11: "The biggest change is in group play. Before FBA we just told them 'share' and punished grabbing. After identifying attention-seeking, we used peer models and token rewards for waiting turns. Now three of my learners actually invite others to join the puzzle table instead of playing alone...."Teacher11: 14/05/202

Such teachers' explanations support the quantitative results by providing examples of how FBA allows for the implementation of function-based replacement behavior (e.g., teaching functional communication or self-regulation options) instead of giving general directions or punishing such behavior. These literal quotes provide practical examples of specific social initiation, reciprocity, and social inclusion, which are the aspects measured by the social interaction scale. Moreover, they prove that knowing the

Table 6: Variance Inflation Factors for Predictors in Model 2

Variable	VIF
FBA Implemented	1.01
Age 10–12 years	1.02
Age 13–15 years	1.02
Gender (Male)	1.06
Teacher 1–2 years	1.06
Teacher >2 years	1.03

All independent and confounding variables have VIFs very close to 1.0 (values between 1.01–1.06). They fall well below the threshold value of 5, suggesting that there is minimal multicollinearity between the independent variables. The estimates of regression models will be quite reliable, as there will be no effect on the standard errors because of multicollinearity.

4.1.6 Discussion of Results

According to the results of the research, the FBA approach shows its significant impact on the social interaction of the learners with ASD in the schools in Kakamega Central Sub-County. The mean score of social interaction was significantly higher ($M = 24.32$) among the learners where the approach had been applied compared to those who did not use it ($M = 17.69$), and the difference remains significant ($B = 5.98$, $\beta = 0.47$, $p < 0.001$) even after

reason for the problem behavior through FBA, teachers are able to provide more reinforcement opportunities, following the principles of Social Learning Theory.

4.1.4 Hypothesis Test

Given that the p-value for the application of FBA is < 0.001 in both models, then it means that we fail to accept the null hypothesis H_{01} at 0.05 significance level since Functional Behavioral Assessment has significant effects on social interactions of ASD students.

4.1.5 Post-Estimation Diagnostic

For detecting whether there exists any multicollinearity among the explanatory variables of Model 2 – the multiple linear regression model, Variance Inflation Factors (VIF) have been estimated. These values reflect the amount of increase in the variance of a regression coefficient because of the correlation among the explanatory variables. VIFs less than 5 (or 10) do not indicate any serious multicollinearity.

controlling for the age, gender, and time of interaction between the teacher and the learner in the multiple regression model.

It should be noted that the results about the increase of the social interaction due to the application of the FBA intervention are supported by many international scientific papers which point out the importance of individual and function-based approach in helping people with ASD. For example, Gage and Lewis (2019) found that in the general education environment the approach helped to reduce the interfering behaviors and increase the prosocial interactions, similarly to the results of the current study.

Likewise, the focus on the importance of finding antecedents and consequences for behavior in FBA is consistent with the assumptions proposed by Kennedy et al. (2000) concerning the functional purpose of behavior and

the possibility of substituting problematic behavior with adaptive one using support interventions. Such similarities indicate that the systematic approach of FBA can be used to obtain measurable progress in social reciprocity and peer interactions even in limited environments like in Kakamega Central Sub-County.

At the same time, there are certain differences between the obtained findings and previous studies, specifically when it comes to the size of the effect and the role of the demographic variables as covariates. In particular, the current research has shown that FBA explained about 27-33% of the variance in social interaction scores, while some previous intervention studies using more comprehensive packages (such as FBA with social stories and/or video modeling) found higher effects or more domain-specific improvements (Golzari et al., 2015; Ip et al., 2018).

Moreover, demographic factors (age, gender, and familiarity of teachers) did not show any significant role in the regression analysis, as there were no statistically significant impacts of gender or age and only marginal

significance in the case of long-term familiarity of teachers. It is different from some Western findings where age and severity of ASD were found to moderate social behavior (Shaw et al., 2023). Perhaps the reason for this may be the more homogenous educational setting (special units/schools) as well as the teachers being familiar with the students (83.7% with work experience of ≥ 1 year).

On the whole, the rejection of null hypothesis H_{01} proves that Social Learning Theory proposed by Bandura (1977) can be considered an adequate theoretical basis for explaining how FBA facilitates social interactions of individuals with ASD. By using modeling, reinforcing proper behaviors, and decreasing problem behaviors that hinder peer interaction, FBA seems to offer structured conditions for observation learning and positive social reinforcement, which are emphasized by Kangas et al. (2011) and Schulze (2016). The research extends international evidence on this issue to a primary school in Kenya where there is a lack of specialized educational resources.

Table 4.10: Ordered Logistic Regression Predicting Self-Management Change

Variable	Model 1 (Unadjusted)	Model 2 (Adjusted)		
	Coef (SE)	OR	Coef (SE)	OR
FBA Implemented (1 = yes)	2.184 (0.312)***	8.88	2.036 (0.328)***	7.66
Age group (ref: 6–9 years)	–	–		
– 10–12 years	–	–	0.214 (0.281)	1.24
– 13–15 years	–	–	0.387 (0.341)	1.47
Gender (1 = male)	–	–	-0.189 (0.289)	0.83
Teacher duration (ref: <1 year)				
– 1–2 years	–	–	0.452 (0.336)	1.57
– >2 years	–	–	0.681 (0.352)†	1.98
Threshold 1 (Sig. Decline)	-4.128 (0.421)	–	-4.305 (0.512)	–
Threshold 2 (Some Decline)	-2.947 (0.312)	–	-3.124 (0.428)	–
Threshold 3 (No Change)	-0.862 (0.248)	–	-1.038 (0.361)	–
Threshold 4 (Some Improvement)	1.214 (0.261)	–	1.089 (0.374)	–
Pseudo R ² (Nagelkerke)	0.314		0.362	
LR χ^2	49.62***		58.41***	

Note: *** $p < 0.001$, † $p < 0.10$; OR = odds ratio (proportional odds ratio >1 indicates higher odds of being in a better category).

The application of FBA contributed greatly to the models in terms of its impact ($OR \approx 7.66-8.88$, $p < 0.001$), which shows that the learners who used FBA were approximately 7.66-8.88 times more likely to be in the self-management improvement category than those who did not use FBA. The introduction of the control variables led to a slight improvement of the models (Nagelkerke R^2 changed from 0.314 to 0.362); however, the effect of FBA prevailed.

Qualitative insights

The voices of head teachers and class teachers from ASD units collected through interviews support the quantitative

findings, indicating a strong positive correlation between the use of FBA and enhanced self-management skills. Teachers often associated the FBA with better regulation of emotions, routine independence, and less dependency on adults for guidance once the reason behind the behavior is known. Below are selected quotes from three teachers that are analyzed separately:

Teacher #1: “This boy used to scream and throw materials every time the timetable changed. FBA showed it was mostly escape from uncertainty. We created a ‘surprise board’ with pictures of what comes next and gave him a five-minute warning

card. Now he checks the board himself, sits quietly during transitions, and even packs his bag without reminders most days....”

Description of Escape Maintained Behavior by Teacher #1 and Proactive Coping Strategy That Has Replaced It (Visual Schedule and Warning Cue)

The change from adult-initiated actions to self-managed behavior exemplifies how functional behavioral analysis helps teach replacement skills which are functionally equivalent. This is reflected in the quantitative data showing that more than 80% of FBA learners exhibit improvement in self-management skills.

Teacher #7: “She would refuse to start any written task and just shut down. The FBA pointed to task avoidance because of sensory overload from noise. We introduced noise-cancelling headphones during seat work and a token system for completing one line at a time. Within weeks, she asks for the headphones herself and finishes half a page independently, huge progress from zero...”

Sensory avoidance in Teacher #7 is characterized by environmental modifications through headphones and gradual reinforcement through tokens. The learner's voluntary request for the accommodation suggests that self-advocacy and self-regulation, which are crucial self-management areas, are developing. This case is consistent with the results of ordinal logistic regression analysis according to which the probability of positive change due to FBA increases significantly ($OR \approx 7.66-8.88$).

Teacher #18: “Before, we only shouted ‘calm down’ when he got agitated during group activities. FBA revealed it was under attention from peers. We taught him a ‘quiet hand’ signal for help and gave class points when he used it instead of shouting. Now he raises his hand calmly, waits for the teacher, and the whole class stays on task longer; he even reminds his friend to do the same...”

Teacher #18 represents the case of a behavioral problem which has been changed through functional communication training and peer reinforcement strategies. Not only does the learner exhibit effective control of his/her own behavior, but he/she starts to model the strategy of self-management for other learners, which shows generalization of the learner's acquired ability to manage himself/herself. This explains the chi-square finding of strong monotonic trend towards improvement due to FBA.

4.1.7 Hypothesis Testing for H_{02}

Null Hypothesis (H_{02}): Functional Behavioral Assessment has no significant influence on the self-management of learners with autism spectrum disorders. The ordered logistic regression coefficient for FBA was highly significant in both models ($p < 0.001$), with substantial odds

ratios. Therefore, we reject H_{02} at the 0.05 significance level and conclude that Functional Behavioral Assessment has a significant positive influence on the self-management of learners with ASD, even after controlling for age, gender, and teacher familiarity.

4.1.8 Discussion of Results

Results indicate that Functional Behavioral Assessment (FBA) plays a major role in improving the self-management competencies of students suffering from ASD within Kakamega Central Sub-county learning institutions. Chi-Square analysis indicates a strong relationship, and Ordered Logistic Regression shows that FBA increases the probability of having better improvement status between 7.66 times and 8.88 times ($OR = 7.66-8.88$, $p < 0.001$) despite controlling for the effect of age, gender, and teacher recognition. It shows that FBA is a strong tool of improving the students' capabilities in self-management and routine adherence.

These results align with the literature on the applied behavior analysis, where FBA is seen as a fundamental technique that helps replace inappropriate behaviors with appropriate and self-directed behaviors (Cooper et al., 2007). The sizeable effect found here reflects international findings that show that function-based interventions considerably improve adaptation and self-management behaviors among students in schools (Gage & Lewis, 2019). The qualitative insights from the teachers demonstrate how it works: by determining particular functions that cause certain problematic behaviors (like escape from uncertainties, sensory overload, or attention seeking), teachers would help students acquire skills of proactive replacement, like visual schedules use, break requests, and help signals. That way, learners gain more independence and self-control of emotions. It reflects Social Learning Theory principles (Bandura, 1977), because FBA provides systematic opportunities for learning self-management behaviors through observation and reinforcement in real-world classroom setting.

In contrast to previous research, FBA, in particular, seems to have an especially strong impact on the current sample, possibly owing to its concentration on self-management areas and high teacher familiarity with the learners (as many as 83.7% of teachers had worked with them for ≥ 1 year). Although there are intervention packages incorporating FBA with other techniques (like token economies and visual aids) which have proved more effective (Schulze, 2016), this study demonstrates that the systematic application of FBA, even without the use of many adjuncts, brings about significant self-management gains in the resource-limited Kenyan special units. The rejection of the null hypothesis H_{02} , therefore, points to the crucial necessity of promoting FBA training among teachers working in such conditions, since it is an economically efficient evidence-based approach to encourage greater independence among ASD learners.

5. Conclusion and Recommendations

5.1 Conclusion

The study findings are that Functional Behavioral Assessment has a significant positive effect on the social performance of learners with autism spectrum disorder in primary schools and special schools in Kakamega Central sub-county. In particular, when FBA is implemented systematically, learners are much more likely to show improved skills in initiating conversations, taking turns, joining groups, and understanding basic social rules, than learners who are not receiving FBA. These gains were maintained after accounting for factors such as age, gender, and teachers' familiarity, indicating that function-based understanding and intervention planning is an active process to enhance peer reciprocity and classroom belonging.

FBA is also a key tool to improve self-management, for example. Learners with function-informed support have significantly greater chances of improvement in emotional self-regulation, independent use of routines, task persistence and proactive coping, and increasingly use self-directed strategies instead of adult prompts when working with tasks. The extremely high odds ratios reported emphasize the importance of determining the function of a behavior and training for functionally similar alternatives so that students can gain some autonomy in everyday school activities, improving their independence.

5.2 Recommendations

Based on the findings the study recommends that the ministry of education must put in place mandatory and practical training in FBA for all teachers deployed to the special units and special schools. Function based intervention planning, FBA data collection, selecting alternative behaviors, and positive reinforcement and modeling should be focused during the training

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