

## *Original Paper*

# Teacher Support and Its Effect on the Development of Motor Abilities by Pupils with Dyspraxia in Primary Schools in Fako Division of the South West Region of Cameroon

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### ***Abstract***

*The present study examined the effect of teacher support on the development of motor abilities by pupils with dyspraxia. Two specific objectives that centred on tutoring sessions and supplemental training were formulated to guide the study. The sample of the study was made up of twelve pupils in class three and twelve in class four selected from Catholic School (CS) Mutengene in Tiko Sub Division and Cameroon Baptist Convention (CBC) School Great Soppo in Buea Sub Division, Fako Division of the South West Region of Cameroon. Two teachers from each school also took part in this study. A motor ability test was administered to the intervention as well as the control group in order to measure the pupil's abilities in relation to gross and fine motor skills. Based on comparative pre-test and post-test design with non-randomized experimental and control groups, the results of the study revealed that teacher support had a significant effect on the development of motor abilities by children with dyspraxia. Inadequate teacher support for pupils with dyspraxia was seen to have negative effects on the development of motor skills by children with dyspraxia; hence teachers should use more of enactive instructional strategies when dealing with dyspraxic learners. The schools should also have an all enriching environment for pupils to explore and fully develop their motor skills.*

### ***Keywords***

*teacher support, development, motor abilities, dyspraxia*

## 1. Introduction

Children with dyspraxia have a marked impairment in the performance of functional motor skills required to succeed at school. Dyspraxic children are more likely to fall or trip up, or bump into things. They may be messy eaters, find it hard to use a knife and fork together, spill drinks and be slower at dressing than their other brothers and sisters. Outside of clinical situations, there are two types of approaches that can be employed by teachers to address these children's difficulties. The first concentrates on processes underlying motor skills and aims to improve sensory motor areas. The second focuses on teaching functional tasks aimed at intervening specifically in the deficient areas (Kruntz, 2003). Most individuals with dyspraxia manifest a combination of both ideational or planning dyspraxia and ideomotor or executive dyspraxia. Ideational or planning dyspraxia affects planning and coordination meanwhile ideomotor or executive dyspraxia affects the fluency and speed of motor activities. However, with appropriate help and understanding by teachers, a child with this condition can improve a great deal, developing coping strategies to help reach his potential. Early intervention and treatment can help to reduce the emotional, physical and social consequences that are often associated with this disorder.

## 2. Dyspraxia or Developmental Coordination Disorder (DCD)

Dyspraxia or Developmental Coordination Disorder (DCD) is a neurodevelopmental condition marked by impairments in the development of motor coordination. The uncoordinated movements of children with dyspraxia lead to performance difficulties in daily life activities and academic settings (American Psychiatric Association, 2013). The movements of children with dyspraxia are often described as "clumsy" and "uncoordinated," and frequently lead to performance difficulties that most Typically Developing (TD) children can perform easily (Caçola, 2014). Currently, dyspraxia is a vibrant and dynamic area of study, and much has been discovered in the last few decades about the mechanisms, interventions, and consequences of this condition.

Dyspraxia or DCD may be defined in different ways. In general, it is generally understood as poor motor proficiency that significantly interferes with daily living activities (it is important to note that the low motor proficiency here needs to be low to the point of interfering with performance in daily living activities). Dyspraxia can be explained as difficulties or impairments in the performance of "age-appropriate" activities, and has also been described as problems in motor coordination despite appropriate levels of intelligence. Most people refer to dyspraxia as a general "clumsiness", or children that appear to be "clumsy" or "awkward" in how they move, without any apparent reason. In this paper, the definition that was considered appropriate is that of the CanChild Centre for Childhood Disability Research:

*"Dyspraxia or DCD is a motor skill disorder that occurs when a delay in the development of motor skills, or difficulty coordinating movements, results in a child being unable to perform common, everyday tasks. By definition, children with dyspraxia do not have an identifiable*

*medical or neurological condition that explains their coordination problems” (CanChild, 2018, p. 1).*

This definition was selected because it seems to encompass several important aspects of dyspraxia—their broad motor skill difficulties, the disruption of everyday activities, and the lack of another clear condition that explains these difficulties.

Despite the visible differences in the motor behavior of children with dyspraxia (when compared to typically developing children), often times their difficulties are dismissed as behavioral problems, especially if they are accompanied by a child’s frustration and anger. One of the characteristics of dyspraxia is that the motor impairment exists despite the absence of intellectual deficits—which is not to say that children with dyspraxia do not have difficulties associated with cognitive mechanisms, such as executive functioning and working memory (Leonard & Hill, 2015). This leads us to the notion that children with dyspraxia are highly aware of their motor difficulties and the fact that they are different from their peers—obviously, they may not understand why they have such difficulties, and why their best attempts to perform a task are often clumsy. Because of that, it is not unreasonable to respond with anger and frustration, which can many times be labeled as behavioral issues.

Caçola and Lage (2019) point out that, children with dyspraxia seem to experience a broad number of difficulties. That is not surprising; given the fact that the motor system underlies everything (every task) we do—walking, reaching for objects, getting dressed, writing, typing, driving—all daily living skills that require a significant amount of motor proficiency. The motor system also serves as a platform of how we interact with the world. That is the very reason why children with dyspraxia have difficulties that go beyond playing sports and participating in physical education classes. They tend to move awkwardly and have poor postural control, being more prone to trip, bump into things, fall, and also appear to move slower and have “delayed” actions and responses. As previously mentioned, they have difficulties with daily living skills and academic tasks. They also put more effort in order to accomplish skills, and have difficulties creating solutions for movements and adjusting/adapting to different demands of the environment. Consequently, they often withdraw from participating in physical activities, especially those that require a minimum level of proficiency in motor skills.

### **3. Development of Motor Abilities**

Motor skill development refers to the progressive change in motor behaviour throughout the life span with the change being sequential and age-related. Motor development requires complex brain networking. The window of opportunity begins before children are even born as these growing infants engage in movements while in the womb. At 5-6 weeks after conception, a fetal movement appears shortly after nerves from the spinal cord establish functional synapses with muscle fibers (de Vries, Visser, & Prechtel, 1982). Fetuses in the first trimester while still resembling a doll with foreshortened limbs and a disproportionately large head exhibit a variety of movements and postures (de Vries & Hopkins, 2005).

Generalized movements occur that ripple through the entire body such as sideways bending of head and trunk, startles, hiccups, twitches, limb, finger movements, breathing movements, skipping movements, somersaults, and facial movements such as mouth openings, tongue protrusions, and yawns. The young child brings hand to face, suck fingers and thumb, touch the umbilical cord and uterine wall and move freely through the amniotic fluid (Sparling, Van, & Chescheir, 1999). By the second trimester, fetuses produce smiles and other facial movements that comprise adult-like expressions of laughter, crying, and pain (Azumendi & Kurjak, 2003; Reissland, Francis, & Mason, 2013). Hand-to-face contacts, kicks, hiccups and other movements also occur.

Body and limb movements generally increase over development. Up to 30% of each day is spent actively moving until the fetus growing body becomes cramped by lack of space then movements decrease until birth (de Vries & Hopkins, 2005). Moessinger (1983) adds that, fetal activity has other consequences for development. For example, moving before birth is necessary for proper physical development. Fetal movement exercises muscles, flexes joints, stretches skin, and circulates amniotic fluid. Without these movements, physical development does not proceed normally. As a consequence, the child will not develop normal facial features, skin, muscles, bones, connective tissue, mouth, gut, lungs and other movements that involve motor abilities.

Due to the immaturity of the human nervous system at the time of birth, children grow continually throughout their childhood years. Many factors contribute to the ability and the rate at which children develop their motor skills. Example of uncontrollable factors include: genetics or inherited traits for children with learning disorders. A child born to short and overweight parents is much less likely to be an athlete than a child born to two athletically built parents. Controllable factors include: the environment/society and culture they are born into. A child born in the city is less likely to have the same opportunities to explore hike or trek the outdoors than one born in the rural area (Buschner, 1994). For a child to successfully develop motor skills, he or she must receive many opportunities to physically explore the surroundings/environment (Beamers, Higgins, & Nicol, 2012). Motor skills in this light can be group under gross and fine motor skills:

### *3.1 Gross Motor Skills*

Gross motor skills refer to movements of the whole body using the larger muscles to complete everyday activities. Gross motor skills are important for everyday activities including dressing, sport, jumping, playground play and running. In the classroom gross motor strength is important for good posture, travelling between classes and play. Gross motor difficulties can impact a child's balance, coordination, endurance and participation in sporting activities. Children that have difficulty with gross motor skills may also experience fatigue and decreased motivation to perform related activities. Gross motor skills can be categorized into locomotor, non-locomotor and manipulative skills (Dale, 2000). Locomotor skills involve movement of the body in a horizontal or vertical direction from one place to another in a fluid coordinated way. Examples of locomotor skills include walking, running, galloping, hopping, leaping, skipping, jumping and crawling. Non-locomotor skills involve movement of the body

in the same place. Examples are balancing, bending, twisting, stretching, rocking, swaying, turning, pushing, pulling, rising and sinking. Meanwhile, manipulative skills involve for example, controlling the hands, feet and other parts of the body in managing objects such as bouncing a ball, tossing with a bat, throwing and catching beanbags.

### *3.2 Fine Motor Skills*

Fine motor skills are the collective skills and activities that involve using the hands and fingers (Amundson & Weil, 2001; Case-Smith, 2000). In other words, fine motor skills are those skills that require the small muscles of the hand to work together to perform precise and refined movements. Fine motor skills are important for everyday activities including handwriting, cutting, using cutely, tying shoelaces and opening containers. As a child develops they are expected to complete these activities with greater speed and precision therefore the activities become more complex. Activities may include; board games, construction activities, crafts, cooking and speed writing. Some children who have difficulty with fine motor activities may avoid tasks due to fear of failure, frustration and fatigue.

## **4. Teacher Support for Children with Dyspraxia**

Teacher support as used in this study refers to a wide variety of instructional methods, educational services or school resources provided to learners by teachers in an effort to help them accelerate their learning progress, catch up with their peers, meet living standards or generally succeed in school. In practice, teacher support encompasses a broad array of educational strategies including tutoring sessions, supplemental courses, after school programmes, teaching advisors and volunteer mentors as well as alternative ways of grouping, counseling and instructing learners. Teacher support can be provided to individual students, specific student populations (for instance students with disabilities especially those with dyspraxia) or all students in a school (Murray & Greenberg, 2000).

Planning for motor skills development for children with dyspraxia requires as much time as any other learning area (Kutz, 2008). Teachers should plan a range of different activities to develop the different aspects of the children's physical abilities. Activities should be progressive and built upon the skills that the children are able to do, from simple to complex. Each activity should be designed purposefully with specific learning objectives and allow children to have a fun and enjoyable experience. Therefore, teachers can provide support to pupils by using strategies such as tutoring sessions, after-school programmes, peer tutoring and supplemental teaching to boost academic achievements as well as social development of children with dyspraxia (Department of Education, 2017). Only two (tutoring session and supplemental teaching) out of the four strategies mentioned above were considered for this study.

### *4.1 Tutoring Sessions*

Lovaas (2002) explain that, tutoring sessions are teacher centered methods where the teacher makes all the decisions concerning what, how and when the student is to perform. The lesson format of warm-up, skill demonstration, skill practice, feedback followed by a class game is typical of a direct teaching style

approach. This teaching strategy is efficient and focused; it is easy to implement with large groups and provide for the learning of basic skills efficiently.

Tutoring sessions takes account of students' individual abilities, learning styles, and intellectual development. This type of teaching approach requires a high level of teacher's guidance. A lower level of teacher support and increased student involvement occurs where the teacher works closely with the students, guiding the learning as they begin to apply the skills, knowledge and understandings being taught. During independent class work, the student is practicing, consolidating and applying skills, knowledge and understandings being taught, so there is a high level of student involvement with the teacher acting as the facilitator. Varying the way teachers present the curriculum content during class can provide the learner with greater responsibility by becoming more involved in the learning process, having opportunities to explore and experiment with movement in a variety of ways. This in turn increases student motivation and improves skill mastery levels. Learning how to learn and learning through movement are important objectives of student centered teaching approaches. Furthermore, they allow individuals to respond at their own level of ability and provide more opportunities for a degree of success.

#### *4.2 Supplemental Teaching*

Supplemental courses encompass broad range of focus area including academic support, mentoring, youth development, arts, sports and recreation. These activities in which children engage in while outside of school hours are critical to their development. Supplemental learning programmes generate positive outcomes for children including improved academic performance, classroom behavior and health. Kyle, Barbara and Gordon (1999) opine that, children involved in supplemental teaching activities have higher self-esteem, improved social competences and higher aspiration compared to student's who do not. Children have fun as they engage in such activities and increase self-awareness, self-confidence and self-esteem in the process. In addition, their physical, cognitive and emotional well-being is improved and social abilities are reinforced. Through such programmes, children are helped to expand beyond their perceived limitations.

Barnett, Beurden, Morgan, Philip, Brooks, Lyndon and John (2009) are of the opinion that supplemental teaching activities for children with motor difficulties builds self-esteem, skills, friendships, sense of belonging and increase academic performance. Children can be engaged in fun filled activities out of school to build their motor skills. These activities can be carried out in relaxing environments when children are at ease and under the supervision of a teacher or an instructor. Sherril (2006) opines that children should be encouraged to carry out the following fun activities for their motor skill development;

Arts: Arts classes benefits children in that it boosts self-confidence, enhances the development of fine motor skills as well as builds neural connections. Children through this means try out hands-on-activities that builds their motor skills. Children who face difficulties with abstract concepts grasp new ideas and

improve fine motor skills when they work with their hands. They have the opportunity to be loud and pound, drill or mold with clay in a supervised setting. These activities increase motor efficiency.

**Drama:** Drama activities enable children with motor difficulties to model actions and movements, learn social skills and examine new ideas in a controlled, predictable setting. Put in another way, drama sessions help children to read social cues, work collaboratively, have meaningful conversations and make friends. Children are able to work individually as well as work with others and as such creativity is encouraged. As a result, both gross and fine motor movements are enhanced in the process.

**Sports:** kids with motor difficulties use sports as a medium to bypass motor problems and strengthen their relationship with other peers. Children get the opportunity to play together with a common goal of winning or succeeding. These sport activities in turn builds gross motor skills in the children as they run around making throw and passes during play.

**Photography:** For students with motor difficulties, learning to take pictures can be an opportunity to develop fine motor skills. From the skill of handling the camera to computing imaging or physical film processing and photo printing, a young child gains confidence, attentive skills and the chance to share what they see with their other peers.

**Club activities:** In club settings, children work cooperatively and have the chance to share information on various games. They play individually without the stress of competing and still have the companionship of fellow gamers. Engaging in club activities like dance, drawing, ballet and football greatly improves children's motor abilities.

**Cooking classes:** Task involving simple menus and group dining facilitates social skills and can be assigned based on ability levels. They help children engage their fine motor in hand movements, learn new skills, vocabulary, describe sequence and interact with others. Trying a variety of activities gives children a chance to learn what they like, adds to their skills and increases the likelihood of finding activities for lifetime participation. Children who participate in expanded learning opportunities therefore, are less likely to drop out of school, have higher rates of school-day attendance and engage in less risky behavior.

## **5. Method**

### *5.1 Design*

The research design adopted for this study was the quasi-experimental and the type of quasi-experimental design used was the comparative pre-test and post-test design with non-randomized experimental and control groups. This design was used to identify a control (comparison) group that was as similar as possible to the experimental (treatment) group in terms of baseline or pre-intervention characteristics.

### *5.2 Participants*

The intervention was carried out in two schools in Fako Division of the South West Region of Cameroon. The schools were Catholic School (CS) Mutentegene in Tiko Sub Division and Cameroon Baptist Convention (CBC) School Great Soppo in Buea Sub Division. The schools were selected based on the teachers' knowledge and experience in teaching children with disabilities. In these schools teachers with at least a first degree in special needs education and having children with dyspraxia in their classes were invited to take part in the study. All teachers in the two schools selected who meet the above criteria consented to take part in the study. The sample of the study therefore comprised twenty-four pupils with dyspraxia in both schools ranging between ages 8-10. Twelve of the pupils were non-randomly assigned to the experimental group and 12 others to the control group. Four classes three and four teachers across the two participating schools were also invited to take part in the study.

### *5.3 Procedure*

The researcher decided to use classes three and four which are the middle classes between classes one to six. Usually by class three and four, pupils are expected to perform task that involves the use of their motor skills and any delay may lead to motor problems. The researcher employed the teacher nomination method in class, using classroom performance records as well as scores from the researcher made test for pupils to determine children with motor difficulties. "Information obtained from group intelligent test and teacher nominations can be used to select students...Teacher nomination has been an integral part of many screening approaches" (Herdman, Drew, & Egan, 2014, p. 417). Teachers were then asked to contribute their unique perspectives regarding various aspects of motor abilities exhibited by pupils earlier identified through their records. The results from the discussions revealed that all the teachers confirmed the information obtained by the researcher from the pupils' academic records and the researcher made test.

### *5.4 Measures*

After the non-randomised assignment of the pupils in the experimental and control groups in the respective schools, a motor ability test (Pre-test) was administered to both groups of pupils in order to measure pupil's abilities in relation to strength, balance, coordination and fine motor control skills. The test consisted of hands on activities and practical exercises that enabled the researcher to register scores on how pupils performed in the above motor skills. The gross motor (strength, balance, coordination) and fine skills were tested on two separate days. Each test took a period of one hour thirty minutes in both schools.

For a period of 5 weeks, training sessions were organised with the experimental group. Each planned activity lasted for a period of one hour daily involving three days in a week. The training was based on the framework that the use of teacher support strategies (tutoring sessions and supplemental training) for pupils with dyspraxia will help improve their strength, balance, coordination and fine motor control (Cole, 2008). The training therefore composed of exposing pupils to tutoring sessions (Action Based Instructional Strategy that dealt with the direct manipulation of materials and objects by pupils were used

to teach pupils of the experimental group) and supplemental training (the experimental group was taken to a playground where they were exposed to different supplemental play activities).

A first formative evaluation (mid-text) was given to the pupils after a period of two weeks to determine their level of improvement. This was followed by further training and a second formative evaluation was administered at the end of the fourth week. At the end of the training period, the same motor ability test that was used during the pre-test was administered to both the control and the experimental groups of the study. Comparisons were then made between the results of the two groups in relation to the Pre-test and Post-test.

### *5.5 Analytic Approach*

Data range and validation checks were performed in SPSS version 21.0 to identify invalid codes. Data were made up of continuous variables and were explored using case summaries and notably the Explore statistics to identify outliers supported with Boxplot. Descriptive statistics were analysed using measures of central tendencies (Mean, Median) and measures of dispersion (Minimum, Maximum, Standard Error of Mean and Standard Deviation). Data were then screened for normality using Kolmogorov-Smirnov and Shapiro-Wilk test for normality. These two tests were based on the assumption that the true distribution of the data does not depart from the theoretical normal distribution. We expect a non-significant P-value ( $P > 0.05$ ) for this assumption to be accepted. In the context of this study, P-values were  $< 0.05$  for all the indicators.

Qualitative data were made essentially from the interviews with teachers. They were analysed using the thematic approach whereby ideas or viewpoints were grouped under umbrella terms. The qualitative output was first of all grouped under code-grounding-quotation table but the interpretation was dominantly qualitative supported by quotations from the interviewees, as priority was given to the existence and the pertinence of concepts than their weights.

## **6. Results**

Results were summarized on tables displaying statistical analysis and content analysis. Statistics were discussed at the 95% Confidence Level (CL), that is  $\text{Alpha} = 0.05$ . Each hypothesis was to be retained or rejected if the P-Value was greater or less than Alpha. For instance, for the difference between the control and the experimental groups to be significant, the calculated P-Value was  $< 0.05$ .

## 6.1 Effect of Tutoring Sessions on Gross Motor Abilities of Pupils with Dyspraxia

**Table 1. Comparing the Effect of Tutoring Sessions on Gross Motor Abilities of Pupils with Dyspraxia within Test Levels and between Groups**

Scale	Stats	Pre-test		KS test* (P-Value)	Post-test		KS test* (P-Value)	WSR test** (P-value)	WSR test (P-value)
		Experimental	Control	Comparing between experimental and control group	Experimental	Control	Comparing between experimental and control group	Comparing within experimental group (Pre-test Vs Post-test)	Comparing within control group (Pre-test Vs Post-test)
Gross motor task at tutoring session	N	6	6	0.937	6	6	0.002	0.027	0.832
	Mean	11.3	11.3		25.5	11.2			
	SEM	0.2	0.7		0.3	0.6			
	Median	11.0	11.5		25.0	11.5			
	SD	0.5	1.6		0.8	1.5			

\* Kolmogorov-Smirnov Z test

\*\* Wilcoxon Signed Rank test

Table 1 above shows that, as far as gross motor tasks were concerned, at pre-test, the experimental and the control groups had almost the same score although the average was slightly higher in the control group with 11.4 points as compared to 11.3 points in the experimental group, this difference was not statistically significant ( $P > 0.05$ ). However at the post test, the experimental group improved to 25.5 points while the control group dropped to 11.2. This difference at the post-test between the control and the experimental group was significant ( $P < 0.05$ ). This therefore confirms that tutoring session significantly improved pupils' gross motor skills.

## 6.2 Effect of Tutoring Sessions on Fine Motor Abilities of Pupils with Dyspraxia

**Table 2. Comparing the Effect of Tutoring Sessions on Fine Motor Abilities of Pupils with Dyspraxia within Test Levels and between Groups**

Scale	Stats	Pre-test		KS test* (P-Value)	Post-test		KS test* (P-Value)	WSR test** (P-value)	WSR test (P-value)
		Experimental	Control	Comparing between experimental and control group	Experimental	Control	Comparing between experimental and control group	Comparing within experimental group (Pre-test Vs Post-test)	Comparing within control group (Pre-test Vs Post-test)
Fine motor task at tutoring session	N	6	6	0.937	6	6	0.003	0.023	0.194
	Mean	9.8	9.7		22.2	10.3			
	SEM	0.2	0.4		0.3	0.2			
	Median	10.0	10.0		22.0	10.0			
	SD	0.4	1.0		0.8	0.5			

\* Kolmogorov-Smirnov Z test

\*\* Wilcoxon Signed Rank test

In relation to fine motor skills, Table 2 indicates that at pre-test, the experimental and the control groups had almost the same scores with an average of 9.8 points for the experimental group and 9.7 points obtained for the control group. The difference between the two groups was not significant ( $P > 0.05$ ). However, at post-test, the experimental group performed significantly higher ( $P < 0.05$ ) than the control group, with an average score of 22.2 points for the experimental group as against 10.3 points for the control group. This progression in score observed in the experimental group was significant ( $P < 0.05$ ). This therefore proves that tutoring session significantly improved pupils' fine motor skills.

**Table 3. Comparing Progression Rate on the Development of Motor Abilities by Pupils with Dyspraxia at Tutoring Sessions**

Group	Stats	Progression tutoring session		Total
		Progression	No progression	
Experimental	N	6	0	6
	%	100.0%	0.0%	100.0%
Control	N	3	3	6
	%	50.0%	50.0%	100.0%
Total	N	9	3	12
	%	75.0%	25.0%	100.0%

Cramer's V: V=0.577; P=0.046.

The progression as seen on Table 3 above was 100% in the experimental group and 50.0% in the control group and this gap was significant ( $P < 0.05$ ). Based on the above table, the hypothesis stated (tutoring sessions have no significant relationship on the development of motor abilities of pupils with dyspraxia) was therefore rejected thus implying that tutoring session significantly enhanced the development of motor abilities of pupils with dyspraxia. This assertion was equally supported by the qualitative results from teacher interviews as seen below from the difficulties pupils faced and the proposed solutions from teachers;

### 6.3 Difficulties Faced in Class by Pupils with Motor Deficit

**Poor pencil grip:** Teachers explained that these pupils do not have a firm grip of the pencil or have an inappropriate way of gripping the pencil in-between their fingers. As teacher 3 said, *"pupils do not hold pencils firmly. That is, the way the pencil is gripped in between the fingers does not enable them to do an exercise like writing or drawing well"*.

**Difficulties in drawing:** The teachers were of the opinion that pupils with dyspraxia do not position hands or finger appropriately and thus face difficulties in moving their fingers and arms freely during drawing exercises as explained by teacher 1 *"poor hand and finger positioning as well as poor pencil grip negatively affects drawing as pupils face difficulties to move their arm freely during such exercises. Due to this drawing difficulty, children cannot bring out the form or shapes of a diagram correctly"*.

**Jumbled writing:** Teachers explained that these children have difficulties spacing out or giving gaps to differentiate one word from another. Teacher 3 is quoted *"pupils are unable to space out words in a sentence. They join up words in their sentences which in turn make reading and understanding difficult and this equally affects performance negatively"*.

Based on the above difficulties faced by children with dyspraxia during tutorial sessions, the teachers during the interview sessions gave proposals on what they do in order to meet the learning needs of this category of children in their classrooms.

Use of colourful flashcards: The teachers explained that they use colourful flashcards as a teaching aid to facilitate the teaching and learning process. They went further to state that using teaching aids like colorful flash cards when teaching subjects like drawing with well-drawn and well coloured diagrams in the classroom motivates pupils with motor difficulties and make them take interest in class exercises and this helps them to grasp and retain lessons easily.

Use of coloured crayons: Teachers interviewed were of the opinion that coloured pencils greatly facilitate learning for pupils with dyspraxia. They intimated that when these pencils are used by both the teachers and pupils, the bright colouring attracts pupils attention and captures their interest in the lesson. Teacher 2 said *“Using crayons in the teaching process motivates pupils and makes them take interest in class exercises as well as enables them retain lessons faster. Coloring a shape from side to side involves fine motor movements and participating in such exercises helps to improve pupils fine motor skills and improve finger movements”*.

Use of counting sticks: The teachers also advanced the use of counting sticks as one of the major strategies used in meeting the needs of children with dyspraxia in ordinary classrooms. They insisted that this strategy facilitates teaching and makes lessons easier for pupils to grasp and understand concepts better. Teacher 1 is quoted; *“pupils are encouraged to use local counters (counting sticks) during mathematics classes or lessons. Moving their counters from side to side when working on a class exercise is a practice that helps in improving finger movements and arm flexibility thereby enhancing fine motor developments as well”*.

#### 6.4 Effect of Supplemental Teaching on Gross Motor Abilities of Pupils with Dyspraxia

**Table 4. Comparing the Effect of Supplemental Teaching on Gross Motor Abilities of Pupils with Dyspraxia within Test Levels and between Groups**

Scale	Stats	Pre-test		KS test* (P-Value)	Post-test		KS test* (P-Value)	WSR test (P-value)	WSR test (P-value)
		Experimental	Control	Comparing between experimental and control group	Experimental	Control	Comparing between experimental and control group	Comparing experimental group (Pre-test) Vs control group (Pre-test)	Comparing control group (Pre-test) Vs control group (Pre-test)
Gross motor task at supplemental courses	N	6	6	0.093	6	6	0.003	0.027	1.000
	Mean	11.5	12.7		39.3	12.7			
	SEM	0.4	0.3		0.7	0.5			
	Median	11.5	12.5		40.0	12.5			
	SD	1.0	0.8		1.6	1.2			

\* Kolmogorov-Smirnov Z test

\*\* Wilcoxon Signed Rank test

Table 4 above indicates that at pre-test and in relation to gross motor tasks the control group had a higher average score of 12.7 points as against 11.5 points for the experimental group but this difference was not significant ( $P>0.05$ ). At the post-test however, the experimental group performed significantly higher ( $P>0.05$ ) than the control group, with an average score of 39.3 points as against the stagnated value of 12.7 points for the control group. This progression in score observed in the experimental group was significant ( $P<0.05$ ). This therefore confirms that supplemental teaching significantly improves gross motor skills for pupils with dyspraxia.

#### 6.5 Effect of Supplemental Courses on Fine Motor Abilities of Pupils with Dyspraxia

**Table 5. Comparing the Effect of Supplemental Training on Fine Motor Abilities of Pupils with Dyspraxia within Test Levels and between Groups**

Scale	Stats	Pre-test		KS test*	Post-test		KS test*	WSR test	WSR test
		Experimental	Control	(P-Value)	Experimental	Control	(P-Value)	(P-value)	(P-value)
Fine motor task at supplemental courses	N	6	6	0.699	6	6	0.003	0.026	1.000
	Mean	10.0	9.8		33.0	9.8			
	SEM	0.0	0.2		0.4	0.5			
	Median	10.0	10.0		33.0	9.5			
	SD	0.0	0.4		1.1	1.2			

\* Kolmogorov-Smirnov Z test

\*\* Wilcoxon Signed Rank test

Concerning fine motor task, Table 5 above indicates that, at pre-test, the experimental group had a higher average score of 10.0 points as against 9.8 points for the control group but this difference was not significant ( $P>0.05$ ). However, at post-test, the experimental group further performed higher ( $P>0.05$ ) than the control group, with an average score of 33.0 points as against the 9.8 points for the control group. This progression in score observed in the experimental group was significant ( $P<0.05$ ). This therefore shows that supplemental training significantly improved pupils' fine motor skills.

**Table 6. Comparing Progression Rate on the Development of Motor Abilities by Pupils with Dyspraxia Using Supplemental Training**

Group	Stats	Progression at supplemental courses		Total
		Progression	No progression	
Experimental	N	6	0	6
	%	100.0%	0.0%	100.0%
Control	N	2	4	6
	%	33.3%	66.7%	100.0%
Total	N	8	4	12
	%	66.7%	33.3%	100.0%

Cramer's V:  $V=0.707$ ;  $P=0.014$ .

From Table 6 above, it can be deduce that the progression rate for the experimental group was 100% and that of the control group was 33.3%. The gap between the two groups was very significant ( $P<0.05$ ). The hypothesis (supplemental teaching used by teachers has no effect on the development of motor skills of children with dyspraxia) stated in this case was therefore rejected thus implying that supplemental teaching significantly influenced the development of motor abilities of pupils with dyspraxia. This assertion is further supported by the qualitative findings gotten from teacher interviews as presented below.

#### *6.6 Co-Curricular Activities Used by Teachers in Teaching Pupils with Dyspraxia*

**Jumping and running:** The teachers explained that jumping is mainly a sport activity that involves whole body movements and helps improves pupil's health as well as develop their gross and fine motor skills. Teacher 2 said *"we usually engaged children in sport activities that involve whole body movements like rope jumps to make body movements flexible...children are also engaged in sport activities that involve whole body movements like running to make body movements flexible and enhance gross motor skills."*

**Kicks and throws:** Teachers explained that they usually engage pupils in play activities like football that involve kicks and passes to improve their physical development and gross motor skill development. They also expose pupils to play activities like handball that involve throws to improve finger dexterity and develop their fine motor skills.

**Dance:** According to the teachers, dancing activities are used in teaching because they involve whole body movements. They further explained that dancing helps to improve pupils' body flexibility. When pupils emulate movements through dance steps, it also helps in developing their gross motor abilities.

### 6.7 Challenges Faced by Pupils with Motor Difficulties While Participating in Co-Curricular Activities

Completing games on time: When interviewed, teachers complained that pupils with dyspraxia face difficulties completing or finishing games within the time given. Teacher 4 noted *“Pupils sometimes cannot finish games within the time range set for that particular game and they are usually left behind or disqualified”*. Accordingly, these children are sometimes mocked by their peers and this lead to lack of interest in participation.

Following game rules: Teachers insisted that many pupils with dyspraxia usually do not do exercises exactly as they are instructed to do. They face difficulties keeping and following game rules and are at times sent out of the game as a consequence.

### 6.8 Difficulties Faced by Teachers in Organizing Co-Curricular Activities for Pupils with Dyspraxia

Lack of modern facilities and equipment: The teachers explained that one of the major setbacks they have in organizing co-curricular activities for children with dyspraxia is the lack of modern sport facilities and equipment. They went further to say that with this setback, they sometime feel reluctant to engage students in co-curricular activities and this has greatly affected the development of mother abilities by pupils with dyspraxia.

Poor maintenance culture: According to information given by the teachers, their play areas are not sports friendly. The existing playgrounds and other outdoor areas that facilitate learning are dilapidated. Teacher 4 stated that *“Nobody cares, we keep on complaining about the state of the infrastructure but no one listens to us. When I say no one I mean the Head teacher and other school administrators. Everybody likes good places. Have you seen our field, is this a field?”*

## 7. Discussion

The aim of the study was to examine how support from teachers can lead to the development of motor abilities by pupils with dyspraxia in the Tiko Sub Division. From the intervention carried out with the experimental group used in the study and with the noticeable high progression rate, it was established that tutoring sessions have a significant effect on the development of motor abilities for pupils with dyspraxia. This is an indication that when pupils with dyspraxia are exposed to action or enactive based instructional strategies that deal with the direct manipulation of materials and objects it leads to an improvement in their motor skills. Teachers' interview responses also supported the assertion above and show that practical exercises like painting, drawing and writing improves flexibility as well as pupils fine motor skill development. Between the ages of 4 to 11 years the child engages in physical activities like walks and runs, jumps, kicks, catches, and skips. Large-muscle skills take over and lay the foundation for even more sophisticated activities, including bicycle riding, roller-skating, wrestling, swinging, swimming, writing and other fine motor skills. It is therefore important that instructional strategies should be tailored in such a way that gives children the ability to actively manipulate objects in order to develop their motor skills. These strategies were supported by Lovaas (2002), who indicated that the lesson format should involve warm-up, skill demonstration and practice, feedback, followed by

a class game. Theoretically, this falls in line with Bruner's (1966) enactive mode of representation for instruction which deals with the direct manipulation of the materials. According to Vygotsky (1978), the role of the teacher is to scaffold children as they go through their zones of proximal development. Niemeisjer, Schoemaker and Smits-Engelsman (2006) found out that providing clues on how to perform a task, asking children about a task and explaining why a movement should be executed in a particular way were related to better movement performance. They concluded that teaching principles or tutoring sessions are associated with success in therapeutic situations for children with dyspraxia. Tsopani, Dallas, Tasika and Tinto (2012) emphasize the fact that tutoring sessions should be organized serially because Serial Organization System had higher scores in the majority of examined skills in post-test, especially with the development of fine motor skills. Whitley (1970) equally found that performance was significantly favoured when children are placed under a distributed practice condition. Tutoring sessions thus are associated with success in motor skill development.

It was equally noticed from the study that the experimental group had a high progression rate when they were exposed to supplemental teaching. It was then deduced from the results that supplemental teaching activities for children with motor difficulties builds self-esteem, skills, friendships, sense of belonging and increases academic performance (Barnett, Van Beurden, Eric, Brooks, Lyndon, & Beard, 2009). The above mentioned facts are also supported by Bruner's (1966) enactive mode of representation which indicates that children can engage in supplemental activities like arts, drama, sports, photography, club activities, cooking classes and other co-curricular activities during and after school hours for their physical development. The response from teacher interviews was in conformity with the above assertion. This equally shows that engaging pupils in co-curricular activities like running, jumping, dance and kicks improves body image as well as helps them develop gross motor skills faster. Consistent with the results of this study, Kyle, Barbara and Gordon (1999) were of the opinion that in addition to the physical gains made by pupils, cognitive and emotional well-being are improved and social abilities are reinforced during supplemental courses. Thus, through such programmes, children are helped to expand beyond their perceived limitations.

Empirical evidence from Lee and Smith (1998) supports the results of the present study as they revealed that nearly all the 60 children on whom they used supplemental teaching on had maintained and in many cases improved upon the scores with their gross motor skill activities, ball skills and short term memory. Other studies like those of Fahimi, Aslankhani, Shojaee, Beni, and Gholhaki, (2013), and Borremans, Rintala, and Kielinen (2010) equally point to the importance of supplemental courses in the development of motor abilities. Supplemental courses or activities are therefore appropriate for development of gross motor and fine motor proficiencies for pupils with dyspraxia.

In conclusion, the results emphasized the benefits of tutoring sessions that takes account of pupils' individual abilities, learning styles, and intellectual development. The results also showed that providing clues on how to perform a task, asking children about a task and explaining why a movement should be executed in a particular way are directly related to better movement performance. During

independent class work, the pupil is practicing, consolidating and applying skills, knowledge and understandings being taught, so there is a high level of student involvement with the teacher acting as the facilitator. The results further showed that after-school programmes can help pupils obtain the additional time needed to learn concepts taught during their regular school day. It is equally seen from the study that, tremendous educational success for pupils with dyspraxia can occur if afterschool programmes work with their day school activities. This helps them to understand difficult concepts taught in school. After-school programmes that are aligned with the school day curriculum will support pupils learning and narrow the achievement gap by offering additional supports to struggling students that complement and reinforce learning that takes place in the classroom in new and exciting ways.

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