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Effectiveness of Multisensory Learning Approach in Teaching Reading to Pupils with Dyslexia in Ordinary Primary Schools in Bamenda III Sub Division, Mezam Division, of the North West Region of Cameroon

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ABSTRACT

The purpose of this study is to investigate the effectiveness of the Multisensory Learning Approach in teaching reading to pupils with dyslexia in ordinary primary schools in Bamenda III Sub Division, Mezam Division of the North West Region of Cameroon. To achieve the purpose of the study, the quasi-experimental research design was employed. A pre/post-test was constructed to measure pupils' performances in Phonological Awareness skills. The test consisted of twenty items. The population of the study comprised of all the pupils with dyslexia in Bamenda III Sub Division. The sample of the study comprised of 24 class five pupils with dyslexia selected from two schools: Educare Bilingual Nursery and Primary school Nkwen Bamenda and All Saints Bilingual Nursery and Primary Bayelle Nwen, and distributed into four groups, (two experimental groups and two control groups, each with 6 pupils), purposefully selected using documentary analysis and confirmed using an assessment instrument. The experimental groups were taught using the multisensory learning approach while the control groups were taught using the traditional teaching approach. Those in the experimental groups were given instructional interventions captured on a master plan of activities, by the researcher using the multisensory learning approach for 4 weeks, 2 periods daily, each 40 minutes long and those in the control groups received traditional instruction by their teachers within the same period. They were issued the same pretest and posttest and their results were compared at the end. The statistical package used was SPSS version 25, and the study used descriptive and inferential tools with particular focus on means, standard deviations, the one sample t test, the independent sample t test and the Cohen d test to verify the hypotheses. The findings of the study indicated that there were statistically significant differences in the posttest between the control and the experimental groups in favor of the experimental group. It was concluded that the multisensory learning approach greatly enhanced the phonological awareness skills of learners with dyslexia, thereby boasting their overall performance in reading. Based on this, the researcher proposed some recommendations to enhance the use of the multisensory learning approach for teaching reading by all stakeholders in education.

KEYWORDS: *Multisensory Learning Approach, Reading, Dyslexia, Ordinary Primary Schools*

INTRODUCTION

Reading is a skill that serves us throughout life but it's not enshrined in our genome (Troeva, 2016: 366). When compared to speaking that may come automatically, most children acquire reading effortlessly within their school years and this serves as the primary mechanism of acquiring knowledge throughout their lives (Giess, 2005:1). Yet for others, it is quite a challenging task, referred to as dyslexia. Reading is one of the most important components for continued education, acquisition of new knowledge and skills, gaining information through media, especially newspapers, books, television, radio and computers. It's an essential tool for lifelong learning. A good reading habit is necessary for healthy intellectual growth. Children normally use sensory perceptions to know their immediate surroundings, and widen their vision, through reading. Reading therefore, improves one's vocabulary, gives us glimpses into other cultures and places, improves concentration and focus, builds self-esteem, improves memory, creativity, reasoning skills and reduces stress.

However, pupils with dyslexia experience significant difficulties in reading accurately, fluently and with comprehension. Hulme and Snowling, (2013), posit that at the base of these are gabs in letter-sound knowledge, phonemic awareness and rapid autotomized naming skills all of which require good phonological processing skills. Goswami, (2014) with Snowling and Hulme (2005) earlier claimed that 'the vast majority of cases of dyslexia are

attributable to a phonological deficit that may vary in severity' (Snowling and Hulme, 2005: 400). Goswani, (2010:1) claims dyslexia is common in most languages, although its manifestation differs with orthography.

Konstantina (2014:2) suggests that dyslexia causes frustration and anxiety in the individuals involved and being a 'hidden' disability, there are no obvious external signs for people to recognize it. So, people get confused and assume different reasons for children's poor performance in reading in school. That is why children with dyslexia are often described as 'stupid', 'thick', and 'lazy' just because they cannot find any other explanation for them not doing well at school. Furthermore, lack of assessment, help and support may result in low self-esteem in learners with dyslexia causing long-term effects for such people when they reach adulthood (Konstantina 2014:2). Individuals with dyslexia may have other related disorders such as Dysgraphia, Dyscalculia, Attention-Deficit/Hyperactivity Disorder, Dyspraxia and Executive Function (International Dyslexia Association, 2014:5).

Conceptualizing Dyslexia and its related reading challenges

The concept of dyslexia has evolved over time. Konstantina, (2014:1) presents the word dyslexia is derived from the Greek prefix 'dys' and the root-word 'lexis' simply translated as 'difficulty with words'. The first case of loss of reading ability was described in 1676 by the physician John Schmidt and the term 'dyslexia' was first used in 1872 by Rudolf Berlin, while Dr. A. Kussmaul (1877) suggested the term "word blindness" to describe dyslexia. Pringle Morgan, recognized as the father of developmental dyslexia, introduced the first case of an intelligent fourteen-years-old boy, Percy, who could not learn to read, although he had received extensive and persistent classroom instruction (Guardiola, 2001:9).

The International Dyslexia Association (IDA) (2014:2) defines dyslexia as, "a specific learning disability that is neurological in origin and characterized by difficulties with accurate and/or fluent word recognition and by poor spelling and decoding abilities. These difficulties typically result from a deficit in the phonological component of language that is often unexpected in relation to other cognitive abilities and the provision of effective classroom instruction. Secondary consequences may include problems in reading comprehension and reduced reading experiences that can impede the growth of vocabulary and background knowledge". IDA further states that individuals with dyslexia may also have trouble with reading, writing, spelling and/or math even though they have the ability and opportunities to learn. Persons with dyslexia can learn, but they often need specialized instruction to overcome the problem. Often these individuals, who have talented and productive minds, are said to have a language-based learning difference (IDA, 2014:2). A person with dyslexia usually has several of the characteristics below that persist over time and interfere with his or her learning. Most people may have one or two of these characteristics but that is not conclusive of dyslexia (IDA, 2014:3).

In oral language: They experience late learning to talk, difficulty pronouncing words, difficulty acquiring vocabulary or using age-appropriate grammar, difficulty following directions, confusion with 'before/after', 'right/left', difficulty learning the alphabet, nursery rhymes, or songs, difficulty understanding concepts and relationships and difficulty with word retrieval or naming problems.

In the area of reading: Persons with dyslexia experience difficulty learning to read, difficulty identifying or generating rhyming words, or counting syllables in words, difficulty hearing and manipulating sounds in words, difficulty distinguishing different sounds in words, difficulty in learning the sounds of letters, difficulty remembering names and shapes of letters, or naming letters rapidly, transposing the order of letters when reading or spelling e.g. 'felt' is perceived as 'left", misreading or omitting common short words, "stumbles" through longer words, poor reading comprehension during oral or silent reading, often because words are not accurately read, and slow, laborious oral reading (IDA, 2014:3).

In the area of written language: Persons with dyslexia experience: difficulty putting ideas on paper, many spelling mistakes, may do well on weekly spelling tests but may have spelling mistakes in daily work and difficulty proofreading. Other common symptoms that may occur include: difficulty naming colors, objects, and letters rapidly, in a sequence (Rapid Automatized Naming), weak memory for lists, directions, or facts, needs to see or hear concepts many times to learn them, distracted by visual or auditory stimuli, downward trend in achievement test scores or school performance and inconsistent school work (IDA, 2014:4).

THEORETICAL FRAMEWORKS

The Phonological Deficit Theory (Caylak, 2010)

The most unifying hypothesis about the core deficit of dyslexia is that these individuals have specific impairments in the representation, storage and/or retrieval of speech sounds (Ramus, 2003). Reading acquisition requires a child to learn the mapping between written letters (orthography) and their corresponding sounds (phonology) (Share, 1995). According to (Caylak, 2010) converging lines of evidence suggests that dyslexia can be characterized by one of several phenotypic manifestations of a phonological deficit such as Phonological Awareness, Phonological Short-term Memory, and Rapid Automatized Naming (Cyalak 2010:2). These factors implicate phonological representations, but each in its own way.

Poor phonological awareness: This is the conscious ability to access, pay attention to and manipulate the phonemic level of speech (Ramus & Szenkovits, 2008:131). Cyalak (2010:2) explains that children with dyslexia perform poorly on rhyming tasks, syllabication, word-onset awareness and also impairment on a variety of phonemic awareness skills such as blending, deletion, segmentation and substitution of sounds in words. He also indicated that poor phonological awareness may be associated with deficits in speech perception.

Poor phonological short-term memory (PSM): This is assumed as forming sound-based representations of written symbols stored transiently in the left posterior parietal cortex of the brain. Ramus and Szenkovits, (2008:131) adds that the storage is for a short period of time, either briefly copied in phonological buffers and/or actively recycling them between input and output sub-lexical representations. Efficient phonetic recoding in Broca's area of the brain appears is an important tool for the early reader.

Learners with dyslexia lack the awareness that spoken words can be decomposed into the phonologic constituents that the alphabetic characters represent. They typically have weak memories for linguistic material such as syllables, words and sentences. As a result, they have difficulty in rhyme judgments, detecting rhyme compared to the reading age-matched controls. Poor PSM makes reading, writing and spelling hard for learners with dyslexia.

Poor/Slow phonological re/de-coding: Phonological re/de-coding can be conceived as the ability to access (retrieve) the lexicon by utilizing sound-based representations. It involves the retrieval of lexical phonological representations from long term memory (Rapid Automatized Naming task). Hence, dyslexic children performed more slowly on a series of digits, letters, colors and objects compared to both age controls (Wolf *et al*., 2000).

The Phonological Deficit Theory used in this study gives a dominant explanatory framework for dyslexia and provides a reliable account for the difficulties experienced by individuals with dyslexia in reading tasks. It is hoped that using the multisensory learning approaches develops the reading competences in learners with dyslexia as phonological skills, memory skills and rapid naming skills are improved when learners do hands-on learning using all the senses concurrently, to help them to be able to read well.

Lev Vygotsky (1896-1934) Sociocultural Theory

Lev Vygotsky (1896-1934) a Russian and author of the sociocultural theory believed that the socio-cultural environment is critical for cognitive development. Vygotsky emphasized the roles of social interaction and instruction. "He proposed that development does not precede socialization, but rather social structures and social relations lead to the development of mental functions" (Huitt, 2000, slide 22). Vygotsky developed the concepts of cognitive learning zones.

The Zone of Actual Development (ZAD) occurs when students can complete tasks on their own and the Zone of Proximal Development (ZPD) requires teachers, adults or peers to provide assistance (scaffolding) to students, who cannot complete tasks without help. Instruction and learning occur in the ZPD. Vygotsky emphasized the importance of 'mediated activity' (1977:71) in the development of higher psychological functions.

Vygotsky identified both physical tools and psychological tools as mediational means. However, for Vygotsky, psychological tools, particularly language, were of primary concern (John-Steiner & Mahn, 1996:191). The relevance of this theory to this study is that it emphasizes on the importance of the interaction of learners with dyslexia with the environment, including the teaching/learning materials, his/her peers, classmates, teachers, parents and other more knowledgeable individuals, using all sensory modalities to bring about the deserved learning outcomes.

The Medical And Social Models Of Dyslexia

Onyenachi (2011:14) clarifies the medical and social models of dyslexia: The Medical Model considered negative, sees dyslexia as a neurological problem of genetic origin; caused by disease, trauma or other health condition; requiring curing and rehabilitation; causes learners to exhibit very negative perceptions of themselves as they believe dyslexia is not curable; hate to be addressed as 'dyslexia', 'stupid'; 'made fun of'; seen as abnormal and having a 'faulty brain'. Statements such as 'he can't read, write or spell' because he's living with dyslexia' are made by people being influenced by the medical model.

The Social model considered positive, (Onyenachi, 2011:15) does not see dyslexia a disease but as a "difference" and neuro-diversity; helps them to identify and accept themselves as living with dyslexia, emphasising that their difficulties are not the problem but rather consequences of being dyslexic in a non-dyslexic world; accepts they process information holistically and visually and like the way they do so; perceive dyslexia as an experience that arises out of natural human diversity on the one hand and a world on the other where the early learning of literacy and good personal organization and working memory is mistakenly used as a marker of 'intelligence'. Citing (Cooper, 2006) the problem then is seeing 'difference' incorrectly as 'deficit'. So, impairment is not a disability, rather people with impairments are disabled by a society that expects them to be able to use resources that are not suited to their needs. The social model therefore advocates the need for social or educational settings to make reasonable adjustments about their attitudes and beliefs towards people with dyslexia as a means to ensure full participation of all individuals with reading difficulties in the teaching-learning process.

Phonological Awareness (PA) and the Development of Reading Skills

Mclean (2017:11) defines phonological awareness as the ability to understand and use the sound system of a language. It is the conceptual understanding and explicit awareness that spoken words consist of individual speech sounds (phonemes) and combinations of speech sounds syllables, onset-rime units and is a precursor to understanding the relationship between sounds and symbols. It is very essential to learning phonics, the systematic instruction of reading and spelling based on grapheme-phoneme and phoneme-grapheme relationships in language.

Phonological awareness instruction begins by helping learners to identify rhymes, separate syllables, and separate onset and rimes. Eventually, students are expected to segment and blend sounds as well as add and delete sounds, to aid effective reading. Elwer (2014:21) supports phonological awareness as an important predictor of early reading performance by citing Scarborough (1998), who reports meaning correlations of r = .45 between preschool/kindergarten performance of phonological awareness and early decoding skills.

Mclean (2017:12) posits, phonemic awareness is a subset of phonological awareness and helps learners to manipulate individual phonemes, and lends understanding that words are created simply as we add, delete, blend, segment, or substitute individual sounds (phonemes) within a word. Phonemic awareness is the most advanced skill under the phonological awareness umbrella and is typically not fully developed until a student is five or six years old.

Effective Practices of Phonological Awareness For Learners With Dyslexia

Pullen (2005:1) avers that phonological awareness instruction is implemented at four levels: word, syllable, intra-syllabic (or onset/rime), and phoneme. Effective Phonological awareness practices are:

A. **Using letters of the alphabet for phoneme manipulation activities rather than using phonemes alone:** She recommends activities that combine PA with letters. For example, use letter tiles, magnetic letters, or other manipulative letters to practice blending and segmenting with the learners.
B. **Providing phonological awareness instruction in small groups:** Small group PA instruction is more beneficial than instruction in either one-to-one or whole-class instruction.
C. **Emphasizing blending and segmenting skills at the phoneme level:** The alphabetic principle helps pupils to blend and segment phonemes, a skill most needed for the acquisition of decoding.
D. **Implementing explicit instruction on phonological tasks*:*** Modeling helps the children perform the task and finally they can perform alone.
E. **Using sound boxes to promote phonemic segmentation:** Elkonin boxes have clips in which each sound in a word is pushed into chips, into each box as teachers produce each sound.
F. **Scaffold children's development of PA by moving progressively through the four levels:** This should start from word level to, syllable, onset-rime to phoneme level as stated above. Phonological awareness skills are the bedrock for reading and spelling skills. Using the multisensory learning approach, it is hoped that learners with dyslexia will be helped through all the above pedagogic progression steps to develop their literacy skills.

DYSLEXIA: THE KIND OF INSTRUCTION NEEDED

Wines (n.d.) states that dyslexia cannot be cured but with proper instruction while promoting reading success, many difficulties associated with dyslexia can be alleviated. Instruction for individuals with reading and related learning disabilities should be:

A. Intensive, given every day or very frequently for sufficient times,
B. Explicit component skills for reading, spelling, and writing are explained, directly taught, and modeled by the teacher. Children are discouraged from guessing at words,
C. Systematic and cumulative has a definite, logical sequence of concept introduction; concepts are ordered from simple to more complex; each new concept builds upon previously introduced concepts, with built-in review to aid memory and retrieval.
D. Structured and has step-by-step procedures for introducing, reviewing, and practicing concepts.
E. Multisensory and links listening, speaking, reading, and writing together; involving movement and "hands-on" learning.

Reflections on Multisensory Learning Approach

Dalecki (2007) posits that multisensory instruction was developed by educators such as Montessori (1912), John Dewey (1966) Fernald and Keller (1921) who were challenged by children with special needs. It employs the four modalities of learning styles summarized by the acronym VAKT for Visual: Auditory and tactile/kinesthetic: It is a teaching method that involves the use of most of the pupil's-all senses as this gives the student's brain tactile and kinesthetic memories to hang on to, as well as the visual and auditory ones.

John Dewey's philosophy postulated that the educator must remain a facilitator or motivator, who stimulates children to find and develop their own resources and the teacher's techniques and tools should be designed to encourage children to be active participants in their own education. Montessori also believed that the key to learning is the student and that the teacher should act as a stimulator (Dalecki, 2007:6); "The child has a mind to absorb knowledge. He has the power to teach himself'" (Montessori 1946:172). Therefore, Montessori developed a kinesthetic method for teaching writing and reading in which she prescribed a sequence of activities applied thus: a) the tracing of geometric figures, b) the filling in of double outlined tracing by the child and c) the use of sandpaper letters.

Grace Fernald proposed a VAKT instructional procedure which emphasized syllables and word parts. Fernald developed a multisensory approach in which the distinguishing feature is tracing, and observed that children sometimes could not learn through normal reading methods using visual and auditory channels. She believed that the addition of kinesthetic and tactile methods would assist their learning (Preston, 1998).

Goals of Multi-sensory instruction

Aja et al (2017:15113) presents the goals of the Multi-sensory instruction as being to:

- Achieve the efficient realization of teaching-learning objectives in the classroom.
- Helping teachers plan and organize their teaching activities as efficiently as possible.
- Organize learning activities in such a way that students learn mostly through self-effort and active participation and involvement in the learning activities.
- Organize teaching-learning activities in such a way that helps the teacher in making the total unit of learning quite clear to his students. It should also help students in acquiring all the learning experiences broadly through independent efforts and cooperative planning.
- Select media for teaching activities about a particular teaching-learning situation resulting in the practical realization of the set objectives.

Types of learners in our classrooms

Cameroonian classrooms are classified with diverse learners who are the recipient of a given concept, skill, knowledge or information and vary in their academic strengths and weaknesses, and also differ in their learning styles which make them unique. This might be attributed mostly to their sense organs. Aja, S.N. et al (2017). Citing Adam (2003) identified three types of learners based on the senses. They are as follows: visual learners, auditory learners and tactile/kinesthetic learners.

Visual learners: Visual means sight. Every human being is unique in so many ways. In the teaching-learning situation, some learners are more active and enjoy using their eyes to learn and remember pieces of information. They always watch events as seeing sensitize, them most. They are very visually-oriented individuals. Visual learners make use of what they know more as in colors, shapes, pictures. As a result, they visualize and make use of imaginations (visual thinking) to think about and recall what they are learning. The auditory challenged learners prefer optical media as they cannot hear or hear well.

Auditory Learners: Auditory refers to sound. Learners under this category are those who use their ears more to learn and remember pieces of information presented to them. They are more sensitized through sound. Based on this, they are listening-oriented individuals who think in sounds music and tones. They enjoy listening to items with sounds (audio) and make use of their voice to recall the concept(s) they are learning. The visually challenged learners are under this group as they cannot see.

Tactile/kinesthetic learners: In teaching-learning situations, some learners learn and recall what is presented to them more using their feelings and involving them. These types of learners are physically-oriented individuals. They link their thinking to shades of emotion, physical movement and involvement. They engage themselves in debating, discussion, role-playing, demonstration, and contemplating the concepts they are learning to understand and retain learned material. These activities also will help the learner to zoom of all outside distraction and focus on the stuff under study. Therefore, teachers should then endeavor to plan their lesson content to incorporate discussion, role-playing, demonstration etc. to carry physical/kinetic learners along.

Benefits of multi-sensory instruction

Aja et al (2017:15115) averred that we are living in a multi-sensory environment and the benefits of multisensory learning to enhance and improve teaching and learning are many such as:

A. Multi-sensory instruction increases students' active participation as the lesson is going on.
B. It increases students' understanding of necessary skills as a variety of media and methods are incorporated while presenting the lesson.
C. Multi-sensory instruction promotes both group and individualized learning: the multisensory instructional approach promotes the use of demonstrations, storytelling, discussion, television, pictures, texts and computer-assisted
D. It appeals to most senses: The senses for hearing, sight, taste, touch, smell as most media are incorporated in presenting the learning appeals to most of the senses.
E. It makes the process of learning lively and exciting: The instructional process is energetic and exciting as it arouses interest/attention of learners and makes learning lively.
F. Multi-sensory instruction meets the learning ability of the learners: Multisensory instructional approach used in lesson delivery meets learner's needs intellectually, emotionally and psychologically.
G. Above all, cognitive, affective and psychomotor domains of educational goals are best realized by the use of the multi-sensory approach. The multisensory approach is the only way to satisfy the different needs of a child.

Multisensory Learning Approach for Teaching Learners with Dyslexia

Hoisington (2015:6) states that humans have a multisensory brain so everyone benefits because learning is with the whole body as a pupil with dyslexia benefit most. Also people with sensory integration challenges benefit for they sense information normally but have difficulty perceiving and processing that information because it is analyzed in their brains in a different way.

Learning Types and Activities

Hoisington (2015:8) sheds more lights on learning types and activities as follows:

A. Visual-spatial: Visual learners learn best by using their eyes to see the information. They learn by seeing words in printed form or by using graphics and pictures, observing real life, and other visual aid. The following activities focused on visual learning:

- **Printable books:** Students read short books emphasizing sight words, word families, and short/long vowels. Students underline with markers, they focus words such as all the short "a" words, etc. With the printable books students can also color, draw, write and underline in them. So, reading becomes more of an active activity for the learners.
- **Hidden sight word coloring:** Learners visualize sight words with color. They also make squiggles, lines and shapes. Sight words are written in between the shapes and this makes fun.
- **Flashcards with identifying pictures:** These help Children to learn by providing repetition. They also helped to create or form mental pictures while reading, as they memorize the words they see. Flashcards with pictures associated with letters provide a visual cue. Also, there are alphabet flashcards with pictures that start with the letter, e.g. "F for fox".
- **Letter sorts:** Learners sort letters by categories. This can be done on paper or with manipulatives (letters with tails vs. no tails, circles vs. no circles, dots vs. no dots.

B. Auditory Learners: An auditory learner learns best by listening and talking. They learn reading by listening to someone present information orally and by being allowed to discuss and ask questions. The following activities focused on auditory learning**:**

- **Rhyming/making up words with word families**: Using a whiteboard or a word building kit students take a word family sound such as "at" and make a list of real and silly words (cat, bat, dat, jat). Students like to make silly words and they still learn the same concepts.
- **Read aloud**: "Literacy does not depend upon reading the text in books. Teachers read aloud chapter books to children every day. They talk about books. Learners listen and comprehend very well. For many students, read aloud is a great way to teach comprehension and even vocabulary, especially, for students who do not read written words well?
- **Phonemic Awareness**: Phonemic awareness is segmenting/blending sounds in many ways, e.g. learners bounce or throw a ball for each letter sound, jump or clap. Also the teacher cause learners to make exaggerated sounds to blend sounds together, the sillier the sounds, the better.
- **Chanting**: Children chant words several times after they have learned them. It always seems to reinforce the new words just a little bit more.
- **Shared reading:** In this activity, students join in or share the reading of a book with a teacher. They may follow along as the teacher reads aloud or while they listen to an audio version of the book. They can interact with the text by underlining sight words or circling short or long vowels.

C. **Tactile Learners:** Tactile learners learn best through their sense of touches, such as using their hands and fingers. They learn best by writing, tracing, drawing, and using hands-on-manipulatives. The following activities focused on Tactile Learning

- **Sand trays/Playdough**: Students create sight words or letters with sand trays or play dough. Teachers could use the most difficult sight words and write them on a white board. Students make the word with playdough and others guess the word. This works well with word families or blending letters as teachers can manipulate and change one letter. Teachers can also physically manipulate play dough to "squish sounds together, separate them or take away a silent latter.
- **Word building kits**: This can either be with magnetic letters, letter tiles or scrabble pieces. When using the word building kit for compound words and simple three-letter blends, teachers can use the compartments.
- **Read it, Write it, Build it**: Teachers use this technique with learners with dyslexia. Using a word mat, they read a word, write it and build it using magnetic letter tiles. This good multisensory technique works well with sight words.
- **Sandpaper letters**: These are tracing letters made of sandpaper. Students use their finger to trace the letters. The students retain a tactile memory of the feel of the letters. This is a well-established Montessori technique.
- **Learners are granted opportunities for writing letters and sight words in the:** Sand, Shaving cream, Air and Salt.
- **Hidden sight word painting:** Prior to meeting with students, the teacher writes sight words in white crayon on white paper. Students paint over words with watercolor. As they paint the sight words appear. Also, have a contest to see who could paint over all the sight words and read them all first.

D. **Kinesthetic learners:** Kinesthetic learners learn best through the movement of their large or gross motor muscles. They take in information best while moving and doing, being involved in projects, role-playing, learning while standing up and engaging in real-life activities. Activities involving Kinesthetic Learning include:

- **Sight word jump:** Write sight words on post-it notes and put them up high on the wall. Students jump for the word when it is called out.
- **Race Car blending:** Phonemic awareness activity using a toy car to drive across the letters written spaced across a racetrack to make a word. Students sound out the letters as they drive across it. When students drive slowly, they sound out the letters very slowly and segment them. When they zoom by they say the word clearly, loudly and quickly.
- **Sight word towers:** Teacher writes sight words on red solo cups; Asks students to read the words on the cup. If they read it correctly, they can add it to their tower. If they miss the word, they have to put the cup to the side. This is a favorite of students. After they built their towers, they liked to run a car into them and watch them crash down.
- **Letter sound blending puzzles:** These are three-letter word segmented puzzles students put together. Each piece is a separate letter sound. When putting together, it makes the word and corresponding picture.

STATEMENT OF THE PROBLEM

Reading is such an important aspect of formal education, that it becomes practically difficult to ascend the rungs of academics without it. However, it has been heard on the lips of most stakeholders of education that many Cameroonian children go through primary schools without being able to read and write properly, as some of them live with dyslexia. The ministry of Basic Education having realized the importance of reading enshrined a specific day to encourage reading called, "The International Literacy Day", celebrated on the 8th September every year, though with limited success. The rationale by UNESCO amongst many issues points to the fact that due to lack of reading skills in the world, about 60.7 million children are out of school and many more are attending irregularly and risk dropping out.

The consequences of the lack of reading skills are enormous ranging from discouragement, shame, stress, depression, disruptive behaviors, truancy, failure or dropping out, delinquency and increased crime wave in society. This leads to inefficiency and wastage in our educational system. Although many factors account for this, the most important consideration is needed modification to the classroom instructional approaches in our ordinary schools.

Although every classroom has learners with dyslexia, they are taught using the traditional classroom instructional approach, using mostly the visual and auditory modes, whereas these pupils are most of the time kinaesthetic and very 'active'. They are forced to sit for long hours may be watching and listening without due consideration to their special needs.

Also, they are no scientifically tested and approved remediation procedures put in place in our ordinary primary schools on reading as of policy for these learners. A learner copes of fails. Given their conditions, a multisensory learning approach which employs most or all the learners senses-visual, auditory, tactile and kinaesthetic senses concurrently, indulging all learners by shifting activity to them, maybe very effective in enhancing their reading skills. Thus, the study intends to investigate the effectiveness of the multisensory learning approach in teaching reading to pupils with dyslexia in ordinary primary schools in Bamenda III Sub Division.

Findings from this study will encourage the use of the multisensory learning approach in teaching reading by informing the provision of required instructional materials, fill in existing gaps in the literature and a new paradigm shift for intervention for learners with dyslexia in Cameroon. Thus, this study raised the question: "How effective is the multisensory learning approach in teaching reading to pupils with dyslexia in ordinary primary school?" Are there any statistically significant differences ($\alpha \leq 0.05$) in performance in reading skills of pupils with dyslexia due to the teaching strategy they are exposed to?

The Purpose of the Study

The main purpose of this study was to investigate the effectiveness of the multisensory learning approach in teaching reading to learners with dyslexia in Bamenda III Sub Division

Specific Research Question

How does the use of the multisensory learning approach in teaching reading influence the development of Phonological

awareness skills of learners with dyslexia in ordinary primary schools?

Specific Hypotheses

There is no significant difference in performance on the phonological awareness skills of learners with dyslexia, taught using the multisensory learning approach, as compared to those taught using a non-multisensory learning approach.

RESEARCH METHODOLOGY

Research Design, Sample and Sampling Techniques

The quasi-experimental design was used in this study to enable the research personally carry on the intervention, daily, using the multisensory learning approach with a master plan of activities for a period of one month. Meanwhile the class teachers taught reading to the control classes using the traditional classroom instruction. The sample of this study consisted of twenty-four (24) primary five pupils drawn from All Saints Bilingual Primary and Nursery School Bayelle Nkwen and Educare Bilingual Nursery and Primary School, all in Bamenda 111 Sub Division. The Multi-stage sampling approach was used to select schools for the study. The purposive homogenous sampling was used to select children with dyslexia who took part in the study.

Method of data processing and analysis

The Statistical Package for Social Sciences (SPSS) version 25 was employed to analyze the data. The study employed the descriptive analysis which uses tables, means and standard deviation to examine the performance of the pupils before and after intervention for both the control and experimental groups. The inferential statistics were the one-sample t-test, the independent t-test and the Cohen d effect size test. The comparison of means performance was done using the one-sample t-test for pretest and posttest performance. Furthermore, the Cohen d test was used to examine the effect size for better appreciation of the effect on intervention, that is, the use of the multisensory teaching approach on the acquisition of phonological awareness skills in pupils with dyslexia in ordinary primary schools.

FINDINGS

Effectiveness of Teaching Reading skills, using the Multisensory Learning Approach in Developing the Phonological Awareness Skills

In order to examine the effectiveness of the multisensory learning approach in teaching reading by developing the phonological awareness skills of pupils with dyslexia in ordinary primary schools, the researcher utilized the control group and the experimental group to verify if there was improvement in the experimental group as a result of participating in the multisensory learning approach than the control group. Thus the study anticipated an increase or improvement in the study outcome as a result of multisensory learning approach, as seen in Table 1 below.

Table 1: Pre-and post-test Phonological Awareness scores for Control and Experimental Groups

	Group	N	Mean	Standard Deviation	Min	Max
Pre test	Control	12	7.00	3.19	3.00	12.00
	Experimental	12	6.50	3.80	2.00	12.00
Post test	Control	12	13.50	2.19	10.00	17.00
	Experimental	12	17.58	2.23	12.00	20.00

Source: Field Survey, 2019

Findings in Table 1 above is a tabular presentation of the above information for phonological awareness scores in pre- and post-tests of both experimental and control groups for the class five pupils of the two primary schools. The pre-test results showed that class five pupils in the control and experimental groups have very close means in the phonological awareness pre-test (7/20 and 6.5/20 respectively) but with a slide difference of 0.5 scores in favor of the control group. This means that in the control group the average score was 7 out of 20 while those of the experimental group was 6.5 indicating a slide difference of 0.5. Also, the closeness in results is reflected in the minimum pre-test scores of 3.00/20 and 2.00/20 and a maximum of 12.00/20 for both. By implication, in the pre-test, the dyslexic pupils in both the control and experimental groups scored a maximum mark of 12/20 and a minimum mark of about 3/20 for control and 2/20 for the experimental group.

In the post-test, both control and experimental groups showed an increase in the mean scores of 13.5/20 and 17.58/20 respectively as compared to 7/20 and 6.5/20 respectively. This indicates an increment in mean scores by 6.5 and 11.08 correspondingly. As such, the increase in the means of experimental group is greater than that of the control group. This means that on average, more pupils with dyslexia performed better in the phonological awareness test after the intervention with the multisensory teaching approach. Also, the minimum and maximum score for the post-test was 10/20 and 12/20 and 17/20 and 20/20 correspondingly. This equally confirmed that after the test, a maximum test score of 20/20 was recorded among the pupils in the experimental group with a corresponding minimum test score of 12/20, meanwhile, those who were not taught using the multisensory learning approach had minimum scores of 12 and an equivalent maximum score of 17/20 in the control group.

Verification of Research Hypothesis

This research objective was guided by the following research question and hypothesis.

Research Question: How does the use of the multisensory learning approach in teaching reading, influence the development of phonological awareness skills of learners with dyslexia in ordinary primary schools?

Ho: There is no significant difference in performance on the phonological awareness skills of learners with dyslexia, taught using the multisensory learning approach, as compared to those taught using a non-multisensory learning approach.

Here the sample t-test was used to examine the Pre-test/post-test for multisensory learning approach of teaching literacy skills to pupils with dyslexia in ordinary primary (Table 2).

Table 2: The Sample t-test of Pre-test/post-test for Multisensory Learning Approach of teaching reading skills to pupils with dyslexia in ordinary primary schools is not very significant than a non-multisensory learning approach for the experimental group.

Experimental Group	N	Mean	SD	Mean Difference	Df	T	Sig	Cohen *d*
Pre-test	12	6.5	3.80	10.83	11	16.79	.000	4.96
Post-test	12	17.58	2.23					

Source: Computed by Author, 2019

From Table 2 above, the analysis done regarding the effectiveness of the multisensory learning approach in acquiring phonological awareness skills by pupils with dyslexia in ordinary primary schools, has shown that at pre-test the pupils had a mean score of 6.5 (SD = 3.80), and at post-test phase they had a mean of 17.58 (SD = 2.23). This resulted in a mean difference of 10.83, which indicates that the multisensory learning approach significantly contributed to developing the phonological awareness skills among pupils with dyslexia in these schools. Thus, the teaching of reading using the multisensory teaching approach improved on these pupils average performance on phonological awareness skills.

A further examination of the results by subjecting to a one-sample test analysis, at-value of 16.79 was obtained at 11 degrees of freedom and a p-value of 0.00 ($P < 0.05$). Thus, the study rejected the null hypothesis and concluded that multisensory learning approach of teaching phonological awareness skills to pupils with dyslexia in ordinary primary schools is more effective than a non-multisensory learning method in developing the phonological awareness skills of pupils with dyslexia in ordinary primary schools. This further confirms the descriptive results above which obtained a meaningful increase in the mean of the pupils' performance in phonological awareness.

In order to examine the size of this effect, the result was furthermore exposed to the Cohen *d* test which is a size effect test. The Cohen's *d* value obtained was 4.96 which showed a large effect size since the value was greater than one. These results, therefore, showed that multisensory learning approach of teaching literacy skills to pupils with dyslexia in ordinary primary schools is more effective than a non-multisensory learning method in acquiring phonological awareness skills in ordinary primary schools as it leads to a statistically significant improvement in the phonological awareness skills of pupils living with dyslexia.

Also, the study compared the effects of the multisensory learning approach of teaching reading without groups; that is, using the control group and the experimental group that was subjected to multisensory teaching and learning. The results are presented in Table 3 below and the hypothesis test using Independent samples t-test.

Table 3: Independent sample t-test to compare the performance of pupils in phonological awareness skills, taught using the multisensory learning approach as against a non-multisensory approach for post-test.

Group	N	Mean	SD	Mean Difference	df	T	Sig
Experimental Group	12	17.58	2.23	4.08	22	4.51	.00
Control Group	12	13.50	2.19				

Source: Computed by Author, 2019

Table 3 shows the mean and standard deviation of pupils in the experimental and control groups. From the data shown in Table 11, pupils in the experimental group had a mean score of 17.58 (SD = 2.23) while those in the control group who did not go through the multisensory learning approach had a mean value of 13.50 (SD = 2.19), which yielded a mean difference of 4.08. This result showed that those who received multisensory learning approach in the experimental group had an improvement in their phonological awareness skills that was 4.08 times greater than those in the control groups who did not receive the same treatment. When these values were subjected to an independent sample t-test analysis, at-value of 4.51 was obtained at 22 degrees of freedom and a p-value of 0.000 which is lesser than the chosen 0.05 level of significance.

This result, therefore, postulates that there was a significant increase in the phonological awareness skills of pupils with dyslexia who were taught using the multisensory learning approach as compared to those taught not using the multisensory learning approach. The null hypothesis was therefore rejected and the study concluded that pupils with dyslexia in ordinary primary schools, taught through a multisensory learning approach, performed better in phonological skills than their counterparts taught through a non-multisensory approach.

Discussion

The assumption under this objective was that there is no significant difference in performance on the phonological awareness skills of learners with dyslexia, taught using the multisensory learning approach, as compared to those taught using a non-multisensory learning approach.

The results on this objective recorded a great increment in post-test mean scores for the experimental group, indicating better performance in the phonological awareness skills after the intervention with the multisensory learning approach. Results of the independent sample t-test showed significant differences between groups at posttest. When they were controlled for pretest scores, participants in the experimental group consistently made greater gains than participants in the control group, although posttest scores equally improved for the control group. A t-test for non-independent matched samples were significant (p, 0.000 <

.05) for treatment participants' posttest scores for phonological awareness skills. It was concluded that the multisensory learning approach of teaching reading skills to pupils with dyslexia in ordinary primary schools is more significant than a non-multisensory learning method in developing phonological awareness skills in ordinary primary schools. It was equally found out that learners were able to listen to words and sentences and wrote them down during dictation sessions.

These results go to confirm research by Torgesen & Wagner, (1998) which shows convergent evidence from both correlational and training studies that phonological awareness is critical to the acquisition of early decoding skills. Also, Elwer (2014:21), while citing Scarborough (1998) reported mean correlations of r = .45 between preschool/kindergarten performance of Phonological Awareness and early decoding skills. This study led to the resolution that the use of multisensory learning approach greatly enhanced the development of phonological awareness skills among learners with dyslexia.

To confirm this, Dalecki (2007) carried out a study titled, "Improving Letter and Word Recognition Using a Multisensory Approach". He found that students instructed through the multisensory activities not only improved their number of sight words and letters but also expressed more pleasurable recounts of the lessons taught to them. They used their phonological awareness skills taught via the visual, auditory, kinesthetic and tactile modalities to identify and read letters and sight words very well.

These findings also go in line with Vygotsky's Social learning theory (1978) who proposed that children's learning is based on their relationships with other peers, parents, and teachers to close the zone of proximal development. The study also goes in line with Gardner's multiple intelligence theory (2010) who emphasizes the importance of the culture and environment and how they nurture a child's predisposed way of learning. This also goes in line with Dale's (1969) Cone of experience which averred that learners retain more information by what they "do" as opposed to what they "heard", "read" or "observed".

Results from the Cohen's *d* test of effect size obtained a value of 4.9604. This showed a large effect size; indicating that the multisensory learning approach of teaching reading to pupils with dyslexia in ordinary primary schools is very significant as compared to a non-multisensory learning method of developing phonological awareness skills in ordinary primary schools. Off course this led to statistically significant improvements in the phonological awareness skills of pupils living with dyslexia, meaning growth in reading skills.

From the foregoing discussion, it was therefore settled that the assumption that there is no significant difference in performance on the phonological awareness skills of learners with dyslexia, taught using the multisensory learning approach, as compared to those taught using a non-multisensory learning approach was rejected. This was because analysis of findings pointed to the fact that, multisensory learning approach of teaching reading to pupils with dyslexia in ordinary primary schools is more effective in developing the Phonological Awareness Skills than non-multisensory learning.

Recommendations

On the basis of the findings of this study, it was recommended that one way to develop the reading skills of learners with dyslexia is to use the multisensory learning approach through which all their senses of visual, auditory and tactile/kinaesthetic senses will be employed in learning. For it helps learners to use all their senses: seeing, listening, speaking, feeling, touching etc to learn. Their stronger senses will augment the weaker ones as channels for learning and retention.

There is a need for training of personnel on how to use the multisensory learning approach as an instructional intervention for the development of the reading skills for all learners with special needs, especially those with dyslexia in our ordinary primary schools in Cameroon.

Based on the fact that not all teachers can use the multisensory learning approach for the education of learners with dyslexia, a special program to hire the services or recruit teachers with these capacities be implement to co-teach with their colleagues in ordinary primary school.

Knowledge of teaching and learning materials must be upgraded from time to time. Hence teachers need to improve their teaching skills by planning and choosing educational materials and activities more creatively in order to stimulate the growth, talents, abilities, and to spark the interest of learners with dyslexia in their learning.

The multisensory learning approach could be applied in the education of learners with other learning challenges like autism, Attention Deficits/Hyperactivity Disorders, Intellectual Disabilities to name a few.

Concluding Remarks

From the findings, it was concluded that the multisensory learning approach contributed to acquiring phonological awareness skills among pupils with dyslexia in ordinary primary schools. Thus teaching pupils reading, using the multisensory learning approach improves the average performance on phonological awareness skills. The effect size was large insinuating that the use of multisensory learning approach is apt for pupils with dyslexia in acquiring proficient skills in phonological awareness as compared to those taught using the traditional reading approach.

Generally, the study drew the conclusion that most pupils living with dyslexia showed evidence of weak performances in phonological awareness skills. When they were taught using the multisensory approach, their performance significantly improved. Consequently, pupils living with dyslexia may continue to struggle with these skills if taught using traditional teaching methods without making the most use of their various senses. The differences in the mean scores within and between the groups showed that the experimental groups who received the multisensory learning approach significantly improved more than those in the control groups who did not receive the multisensory learning approach. From the above, there are many reasons why teachers should use multisensory learning approaches in their classrooms but I will cite some key reasons below:

Firstly, all pupils learn differently and require different stimuli. Secondly, cognitive development happens faster

when using the multisensory learning approach, because it enhances brain action. Lastly, students will be more involved in learning. It is very easy for a student to zone out since the school day is long and has about seven to eight hours and it's difficult for students to pay attention to every piece of information when it comes to them in the same way, class after class, day after day.

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