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Impact of Music-Mediated Intervention (MMI) on the Language Ability of Learners with Dyslexia in Regular Primary Schools in Fako Division, Cameroon

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Abstract

Purpose: This study set out to investigate the impact of music mediated intervention on the language ability of learners with dyslexia in primary schools in Fako division of the Southwest region of Cameroon. Dyslexia is a condition characterised by difficulties in reading, writing, and language processing, and it presents significant challenges to affected students.

Materials and Methods: The study employed a quasi-experimental design with a pre-test and post-test approach, involving two groups an experimental and a control (10 in each group) of primary school learners 8-12 years diagnosed of dyslexia using two diagnostic tools the Clinical Evaluation of language fundamentals (CELF) and the Ihenacho Culture Free test for language development. The experimental group received the music mediated intervention that is musical exercises designed to enhance phonological awareness, auditory discrimination, vocabulary, articulation pronunciation retention and language processing skills. Over a period of eight weeks participants in the experimental group engaged in music sessions twice a week with each session ranging between 45-50 minutes. Quantitative data was collected using the pre-and post test tool, and qualitative data was collected using interview guide and session observation guide, analysed descriptively, inferentially and thematically.

Findings: Statistically, results showed that music mediated intervention significantly impact the language ability of learners with dyslexia (t test value=6.198, p-value < 0.001 far less than 0.05) for learners in the experimental group having a mean score of 44.65 two times higher than the mean score of learners in the control group who were not exposed to music mediated intervention at the post test level with a mean score of 22.30 and the mean difference between both groups is 22.35. Qualitatively the teachers and therapist attested to the improvement in phonological awareness, vocabulary acquisition, retention, pronunciation and articulation of abilities for learners who took the intervention.

Implications to Theory, Practice and Policy: The study therefore concludes that music mediated intervention can greatly improve the language ability of learners with dyslexia in primary schools and recommends that music-based activities and strategies be incorporated into regular classroom instruction to support language development for learners with dyslexia.

Keywords: *Dyslexia, Language Ability, Music-Mediated Intervention*

1.0 INTRODUCTION

Dyslexia is a neurological condition that affects approximately 5-10% of the population characterise by difficulties in reading, spelling, and writing, despite adequate intelligence and educational opportunities. The condition primarily stems from deficit to detect, segment, and blend sounds in words. As traditional language intervention often focuses on direct phonics instructions, alternative approaches dwell on the integration of multisensory modalities such as music and have gained attention for their potential benefits in language development for dyslexia learners (Snowling, 2000).

Music which involves rhythm, melody and auditory processing shares several cognitive pathways with language. Studies (Jancke, (2012), Politimou, Dalla Bella, Farrugia, Franco, (2019), Kaus, & Slater, (2015)) have shown that music-based interventions can improve phonological awareness, memory, and attention, areas where dyslexic learners typically struggle (Hutchinson, 2013). This paper aims to examine the potency of music mediated intervention on the language ability of learners with dyslexia in primary schools exploring its effectiveness and practical applications in the classrooms. This study fosters the language skills of learners with dyslexia in Fako because music can enhance phonological awareness by improving auditory discrimination which are crucial skills for reading. Melody and rhythm help in encoding information in ways that are easier to recall it enables learners practice speech sounds, syllable pattern and intonation retention and recall implicitly reducing anxiety, stress, improve self-esteem and socialization.

Language Development

Language development is a complex process that unfolds over the course of a child's early life evolving in terms of skills understanding and application. This process varies not only by age but also according to individual differences such as environment, culture, and cognitive abilities. In the first few months (0-6months) of life infants communicate primarily by crying, cooing and babbling. These vocalisations are early forms of communication which enable infants to express their needs or emotions. From 6-12 months most infants produce their first real word such as "mama" and serve as labels for objects or people important to them, which marks the beginning of symbolic thought, understanding that words can represent objects or actions. From 12-18 months toddlers rapidly expand their vocabulary, with limited words in number, they start using language meaningfully such as pointing objects and saying their names. They also begin to develop joint attention by following the gaze of adult for instance sharing focus on an object, imitating the sounds, gestures, and facial expressions of caregivers which is fundamental to language learning, speech and social skills communication development (Shaywitz 2003).

Between 18 and 24 months, toddlers experience a vocabulary spurt, sometimes referred to as the "word explosion." A child's vocabulary may increase from around 50 words to over 200 in just a few months. They begin using simple two-word combinations like "want cookie" or "big truck." At around 2 years old, children begin to use telegraphic speech, consisting of short, simple sentences that contain only essential content words (e.g., "go car," "want cookie"). By 3 years, they start to form more complex sentences and use pronouns and plurals. By 3 to 4 years, children begin to use more grammatically complete sentences, with the introduction of more varied sentence structures (for example "I want to play with that toy" or "She's going to the park"). This stage marks an important development in syntactic awareness.

Children between the ages of 4-5 start to tell simple stories or recount events. Their narratives may not always be fully coherent or chronological, but they begin to understand that stories

have a beginning, middle, and end. They also start to grasp the distinction between past, present, and future tense. Children rapidly learn the meanings of new words with minimal exposure, a process called fast mapping. They make connections between words and concepts through contextual clues and use this knowledge to expand their vocabulary. they start to develop a better understanding of others' perspectives, which aids in conversational skills and the use of language for social purposes.

Generally, at middle Childhood (6-12 years) is characterised by a more adept use of language for social purposes. They learn to adjust their tone, vocabulary, and formality based on their audience, whether talking to a teacher, peer, or family member. They also become better at understanding humour, sarcasm, and social cues in conversation. At this stage, they understand more complex concepts, abstract words, and figurative language (e.g., metaphors and idioms). They learn to use language in more sophisticated ways. As children progress in school, they refine their use of more complex grammatical structures. They begin using relative clauses, conjunctions (e.g., “because” “although”), and other advanced sentence structures. Their language becomes more fluent and sophisticated, though some may continue to struggle with grammar rules. By age 7, children can produce more detailed and organized stories. They start to develop writing skills, understanding the mechanics of writing and composing sentences and paragraphs. Writing tasks evolve from simple narrative descriptions to reports and explanations, often requiring formal language structures. Around age 8, children begin to understand that language itself can be the subject of discussion. This metalinguistic awareness allows them to think about language as a tool, enabling them to reflect on grammar, sentence structure, and word choices consciously Politimou, Dalla Bella, Farrugia, Franco, (2019),.

Thus, it could be said that language development is a dynamic, multifaceted process that evolves from infancy through adulthood. Each age group experiences distinct milestones that reflect the growing complexity of language skills, ranging from the first cooing sounds in infancy to the sophisticated use of language in adulthood. Environmental factors, cognitive abilities, and social interactions all play a critical role in shaping language acquisition and mastery. Understanding these stages is crucial for educators, parents, and clinicians to support language development effectively at each stage of life.

Dyslexia is a neurobiological condition that primarily affects a person’s ability to read and write. While dyslexia is most evident in the realm of literacy, it also impacts various aspects of language development (Politimou, Dalla Bella, Farrugia, Franco, (2019), Kaus, & Slater, (2015)). Understanding language deficits experienced by learners with dyslexia is essential for developing effective intervention strategies, thus the following are some specific language deficits seen in learners with dyslexia.

Phonological Processing Deficits: Phonological processing refers to the ability to recognize and manipulate the sounds of spoken language, including phoneme segmentation (breaking words into sounds), phoneme blending (combining sounds to form words), and phoneme manipulation (altering sounds within words). This ability is crucial for reading, writing, and spelling, as it allows individuals to decode and encode words. Learners with dyslexia often exhibit significant difficulties with phonological processing. Phoneme Segmentation and Blending is one major challenge for learners with dyslexia. They often struggle to break words into individual sounds (e.g., "cat" becomes /k/-/a/-/t/) and blend sounds together to form words. This makes decoding words during reading and spelling them as well as writing extremely challenging. Phonological awareness which is the ability to recognize and manipulate sound structures in language is also an uphill task for learners with dyslexia. They exhibit delays in their ability to rhyme, count syllables, and recognize initial or final sounds in words. Rhyming

words, such as “cat” and “hat,” is a grieve challenge to them. This deficit can interfere with the development of reading fluency and early literacy skills.

Orthographic Processing Deficits: Orthographic processing is the ability to recognize and remember the visual form of words, including letter patterns, spelling, and word recognition. It involves associating the sounds of words with their written symbols (graphemes). Learners with dyslexia often have difficulty recognizing letter patterns and spelling words correctly. Dyslexic learners frequently misspell words despite knowing the sounds. For example, they might spell "school" as "skool" or "there" as "thare." They struggle to recognize words by sight, even after they have encountered it multiple times. When faced with unfamiliar or even familiar words, dyslexic learners may take long to retrieve the correct spelling or pronunciation from memory. Orthographic processing deficits complicate the process of reading fluently, as these learners must rely heavily on phonetic decoding rather than recognizing familiar word patterns automatically. This increases cognitive load during reading and slows the pace, making it difficult to achieve reading fluency.

Working Memory Deficits: Working memory refers to the cognitive system that temporarily holds and manipulates information. It is essential for holding onto information long enough to use it for tasks like reasoning, problem-solving, and learning new concepts. Learners with dyslexia often have deficits in both verbal and visual-spatial, working memory: Dyslexic learners may struggle to retain and manipulate verbal information, such as remembering instructions or recalling sequences of words. When given complex or multistep tasks, students with dyslexia may have trouble organizing the steps or remembering all the components. These working memory deficits are particularly problematic during reading, as students may struggle to retain and process the information they are reading, which interferes with comprehension and decoding. Difficulties with working memory can cause problems when learners need to hold onto phoneme information, remember sight words, or decode long words with multiple syllables.

Syntax and Grammar Deficits: Syntax refers to the rules governing sentence structure, while grammar includes the rules for word formation, agreement, and tense. Both are essential for producing and understanding coherent spoken and written language. Although dyslexia is primarily a phonological and orthographic issue, some learners also exhibit difficulties with syntax and grammar such as avoidance of complex sentence structures in favour of simpler constructions (e.g., “The dog ran” instead of “The dog ran quickly through the park”). Some learners with dyslexia have difficulty using correct tense (e.g., “He go to school” instead of “He goes to school”) and subject-verb agreement (e.g., “They is here” instead of “They are here”). Dyslexic learners may also struggle with organizing words within a sentence to convey clear meaning, sometimes producing fragmented or incomplete sentences.

Poor syntax and grammar can hinder writing and verbal expression. These learners may produce less sophisticated writing and have difficulty explaining or elaborating on their ideas, leading to frustration and decreased academic performance.

Reading Comprehension Deficits: Reading comprehension is the ability to understand, interpret, and analyze the meaning of written text. This skill relies on both decoding and the ability to make connections between the text and prior knowledge. Learners with dyslexia often experience reading comprehension difficulties, despite having the cognitive ability to understand the material. Since learners with dyslexia take longer to decode words, they may forget the meaning of earlier parts of a sentence or paragraph before reaching the end, they find it difficult to make inferences based on text as they may focus on individual words rather than the overall meaning of the passage. Texts with complex vocabulary, syntax, or abstract concepts

are particularly challenging, as they demand a higher level of cognitive processing that may be hindered by their phonological and working memory deficits. The combination of slow reading speed and comprehension difficulties often results in poor performance on reading comprehension tests. These students may excel in other academic areas but face ongoing struggles in subjects that require reading for understanding, such as history and science.

Expressive and Receptive Language Deficits: Many learners with dyslexia also experience difficulties in both receptive and expressive language. While they may understand spoken language when it is clear and simple, they might have trouble understanding complex verbal instructions or following multi-step directions. They also struggle to organize their thoughts coherently when speaking or writing and demonstrate difficulty finding the right words, using proper sentence structures, or articulating their ideas effectively.

Studies (Kraus, & Slater, (2015); Politimou, Dalla Bella, Farrugia, & Franco, F. (2019)) have shown that learners with dyslexia often exhibit abnormalities in the processing of sound, which is critical for language processing. This affects their ability to distinguish between speech sounds, contributing to phonological processing deficits. They also have difficulties with visual processing, which affects their ability to recognize words and letters efficiently, leading to orthographic processing deficits. They often show deficits in working memory, particularly in tasks that require phonological processing, which is essential for reading and spelling.

Learners with dyslexia experience a range of language deficits that significantly impact their ability to read, write, and express themselves. Phonological processing deficits, orthographic processing issues, difficulties with syntax and grammar, and challenges in reading comprehension and working memory all contribute to the language struggles seen in dyslexic students. While dyslexia is a lifelong condition, early identification and targeted interventions such as phonics-based reading instruction, multisensory approaches, and accommodations in the classroom can help learners with dyslexia overcome these challenges and develop their language skills. Understanding the nature of these deficits is crucial for educators, parents, and clinicians in providing appropriate support and fostering an environment conducive to the academic success of learners with dyslexia.

Summarily learners with dyslexia struggle to recognise and manipulate sounds resulting in decoding problems and slow or inaccurate reading. They have problems distinguishing similar sounding words, and recognise rhythming patterns, word recognition problem. They also reverse letters or words while reading, difficulty with sight word recognition, poor reading comprehension, poor handwriting, difficulty with word retrieval and thereby resulting in delayed speech development such as frustration with verbal expression (Bidelman, Wei, & Krishnan; 2014).

The Link between Music and Language

Music and language share several cognitive and neural processes, particularly in areas of the brain involved in auditory processing, rhythm perception, and memory. Both involve intricate systems of timing, pitch discrimination, and sequencing, which are crucial for recognizing patterns in sound. Politimou, Dalla, Farrugia, & Franco. (2019) holds that, music and language both involve complex auditory processing, requiring the brain to interpret sounds, rhythm, and pitch patterns. Several brain areas involved in music processing, such as the auditory cortex, the superior temporal gyrus, and the frontal cortex, are also engaged in language processing. This overlap in neural networks suggests that experiences with music can influence cognitive functions that support language development. Music and language are two hierarchical systems in which smaller and separate units (e.g., phonemes and notes) are combined into higher-order structures by specific rules (e.g., words, sentences, and musical compositions). Both systems

are characterized by sequences of melodic and rhythmic patterns, relying on melody and rhythm in music and prosody in language.

According to François & Schön (2014) both systems are based on different perceptual and cognitive processes such as sound identification and categorization, and memory storage and retrieval. Both systems represent the most powerful forms of human communication, with the same stimuli being perceived as either language or music, depending on the listener's interpretation the brain's ability to decode and segment sounds in music may enhance phonological awareness, which is the ability to recognize and manipulate sounds in spoken language. Both music and language rely on the temporal processing of sounds, with rhythm in music aligning with prosodic features of speech such as stress, intonation, and timing.

The acquisition of both language and music has been argued to lie in a general principle where learners extract statistical patterns and regularities in the sound via an implicit perceptual mechanism responsible for the incidental acquisition of structure in one's environment. This ability is present before birth and throughout life and has a crucial role in the development of many abilities, including learning the sound structure of the language and the music of a culture (Brandt, Gebrian, & Slevc; 2012).

Music enhances the acquisition of phonological awareness (Hoonhorst, 2015). Phonological awareness is the ability to distinguish and manipulate the sounds of language (such as identifying syllables, rhymes, or phonemes), is crucial for early literacy and language development. Musical activities that emphasize rhythm, such as clapping to the beat or chanting rhythmic patterns, can help children develop better auditory discrimination skills. Research has shown that rhythm-based music interventions can enhance children's ability to perceive and manipulate phonological units, which is especially important for children with language delays or disorders like dyslexia. A study by Overy (2003) demonstrated that children with dyslexia who participated in rhythm-based music activities showed significant improvement in phonological awareness. This improvement in sound processing likely helps with reading development as well.

Research (Brandt, Gebrian, & Slevc, (2012); Hoonhorst, S., et al. (2015); Kraus, & Slater, (2015); Politimou, Dalla Bella, Farrugia, & Franco, F. (2019)) also has it that music significantly foster vocabulary acquisition. The repetitive and melodic structure of songs makes them effective tools for vocabulary learning. Music-based interventions that incorporate songs, rhymes, and chants help reinforce new words by connecting them to melodies, which can improve memory retention. The predictable patterns in music allow children to internalize language structures in a more engaging and memorable way. Additionally, singing or chanting can promote articulation and phonetic precision, further reinforcing vocabulary learning. Children with language delays or impairments have been shown to benefit from musical training that encourages vocabulary development, as it creates an enjoyable and interactive context for language use.

Also, Schellenberg, (2005), postulated that musical training has been linked to improvements in sentence comprehension and grammatical skills. Music, especially melody and intonation, shares prosodic features with spoken language, such as pitch variation, stress patterns, and rhythm. These elements are crucial for interpreting meaning in language, as prosody influences how sentences are understood and processed. He further proved that children who receive music training perform better in tasks involving sentence comprehension, particularly when dealing with complex sentence structures. The rhythmic and melodic components of music may support the cognitive functions involved in parsing syntactic structures, helping children to better understand the organization of language.

Children with learning disabilities (LD), such as dyslexia and specific language impairment (SLI), often struggle with language acquisition due to deficits in phonological processing, auditory discrimination, and working memory. These challenges can hinder the development of basic language skills, including speech production, comprehension, and reading ability. Recent research such as (Kraus, & Slater, (2015); Politimou, Dalla Bella, Farrugia, & Franco, (2019); Papadimitriou, Smyth, Politimou, Franco, & Stewart, (2021) Pino, Giancola, D'Amico, (2023)), has indicated that music, with its complex auditory, cognitive, and emotional components, may provide a beneficial framework for enhancing language skills in children with LD. Given the shared neural mechanisms between music and language processing, interventions that incorporate music have shown promise in fostering language development.

Generally, music mediated intervention can address the following specific language problem exhibited by learners with dyslexia sounds manipulation, distinguishing similar sounding words, and recognise rhythming patterns, word recognition. It can address letters or words reversal sight word recognition challenge, reading comprehension, difficulty with word retrieval and thereby resulting in adequate speech development and fluency in verbal expression (Bidelman, Wei, & Krishnan; 2014).

Music-Based Interventions for Language Delays and Disabilities

Music-based interventions are increasingly being used in educational and therapeutic settings to support language development in children with conditions such as dyslexia, specific language impairment (SLI), or autism spectrum disorder (ASD. Pino, Giancola, D'Amico, (2023) identified the following music therapeutic approaches that can facilitate language development:

Melodic Intonation Therapy (MIT) is one such music-based intervention used to help children with speech delays. It involves using melody and rhythm to facilitate speech production. The rhythmic patterns in MIT help children engage with the language in a non-verbal, musical context, aiding both speech and language comprehension.

Song-based interventions or Song-based learning is another intervention where songs with repetitive phrases, rhymes, and simple melodies are used to reinforce language skills. This approach can help children with language impairments retain and recall new words and concepts more easily.

Rhythm-based interventions: These include activities like tapping, clapping, and drumming to reinforce phonological awareness, word segmentation, and syllable counting. Teachers and therapists often integrate music into existing educational frameworks, using it to support language development alongside traditional academic instruction. For example, incorporating musical games into language lessons can increase student engagement and motivation, which is particularly helpful for children with LD who may struggle with more conventional forms of learning.

The cognitive resources theory by Aniruddh D Patel (2003) explains the relationship between cognitive processes involved in music and language. The theory holds that music and language although distinct rely on some overlapping cognitive mechanisms. The theory suggests that cognitive resources such as memory, attention, and auditory processing are engaged similarly in both music and language, supporting the idea that musical training could improve language skills. He believes that both music and language are complex systems that involve processing sounds, sequences, and structures as such they share common resources in different in different ways like auditory processing (which is the ability of ones brain to interpret sounds, rhythms and patterns), memory (this is the capacity to remember and recognise patters or sequence),

attention (this is required to process and interpret sound patterns), and cognitive load. Music and language processing areas in the brain do overlap, both engages the left hemisphere's Broca's area which is involved in syntactic processing. Thus, it could be said that they both shares the same cognitive foundations. Studies (Kraus, & Slater, (2015); Politimou, Dalla Bella, Farrugia, & Franco, F. (2019)) have shows that when processing musical syntax or complex rhythms areas of the brain associated with language processing are activated thus musical training has the potential of revamping the language development area of the brain, thereby improving speech and language in a holistic manner. From the very early age, people learn how to speak and sing at the same time. It is a well-known fact that communication is derived from speech and songs. Speaking and singing are embedded in music, and it might very facilitate verbal expression (Thaut, 2005).

The Evolutionary Theory Mithen, S. (2005), suggests that music and language evolved together from a common communication system in early humans. According to this view, music was a precursor to language, and both rely on shared cognitive mechanisms for communication. Musical elements such as rhythm and melody are thought to have originally served as fundamental communicative tools before the development of complex linguistic structures. The theory posits that the close evolutionary link between music and language explains their shared neural pathways. Young humans possessed a kind of cognitive fluidity that enabled them to process and integrate multiple types of information emotional, social and environmental within a single cognitive system. This fluidity allowed early hominins to develop the ability communicate and coordinate behaviour using both vocalisation and gestures which are precursors to modern language and music. This theory holds that music, and language shares the same evolutionary origin but gradually diverged into distinct systems over time. The theory believe that music promotes group cohesion, social bonding and cooperation. Summarily this theory holds that music and language stems from the same neurological foundation therefore music fosters language skills development.

The Dual-Route Model by Friederici, A. D. (2007), posits that music and language are processed by distinct but interconnected neural pathways. One pathway is responsible for processing the structural and syntactic aspects of both music (melody, harmony) and language (grammar, syntax). The second pathway is involved in processing more emotional or auditory components such as prosody in speech and expression in music. This model suggests that musical and linguistic skills influence each other, with music strengthening language processing abilities. They further hold that music and language are processed through two separate cognitive pathways which are: language route (which involves syntactic and semantic processing). This route engages regions of the left hemisphere of the brain particularly areas like Broca's area (syntax and grammar) Wernicke's area (semantics) and other areas related to verbal memory and motor control of speech.

There is also the musical route which handles musical features such as melody, rhythm, harmony and timbre, often engaging the right hemisphere of the brain. The processing of music tends to involve areas such as the sudatory cortex, prefrontal cortex and motor areas associated with rhythm action. These routes can operate independently of one another for the most part. Music and language are viewed as having evolved to perform different functions and while there may be some overlap in the cognitive resource required the brain has specialised regions dedicated to processing each domain. However, there is a degree of interaction between the two domains, they have shared components such as rhythm, syntax, and prosody. The three theoretical premises of this paper converge on the fact that music and language have a common route, and that music propels the development of language thus encouraging the use of music

to effectively teach language. Thus, music can be use as an intervention therapy for persons with language disabilities.

Primary and secondary schools in Cameroon have seen a gradual decrease in the use of music as a teaching strategy and as a subject as well. Music between 1972 and 2000 was accorded a prominent place in the curriculum (Alemkeng, 2015). It was taught as a worthwhile subject in the school curriculum because it was uplifting, soothing, civilising and strengthening national sentiments and providing some relief from more serious studies. Due to the domination of classical subjects, music has been left out in most school programmes. Each region in Cameroon has its own genre of music in the North west region there is the bottle dance and Njang, in the west region there is Chamasi, Magabeu, Ben-skin, and Makassi, in the Northern region there is the Sahelien sound, in the Centre, there is Bikutsi, in the South West the is the Ngom a vetuli of the Bakweri and the Balondo tribes, the Abanda of the Bangwa people and more. Cameroon has a highly centralised educational system where it is the various ministries of education that decides on what is to be taught in both public and private schools. The resources, curriculum and teaching methods are provided by the state.

The teaching of music in primary schools in Cameroon aimed at developing the sensory and motor aptitude of the learners and to sharpen their auditive perception, structuring time and space and acquiring rhythm. To this effective the ministry of basic education included music in the national syllabus of English-Speaking Primary schools with a time allocation of 1h 30 mins for one shift systems and one hour for both morning and afternoon shift systems. It was at this level that greater emphasis was laid on music education for the reason stated above. They focused on singing with little effort on learning musical instrument. Learners were taught patriotic songs, colonial songs, the country's national anthem, as well as devotional songs. It could be seen that people who attended primary school between 1972 and 2000 have a better language power than those who did so after the set period. The story changed after the syllabus review of 2005. Music is totally left out and only seen as an extracurricular activity in most primary schools in the English-speaking regions of Cameroon.

Most primary pupils and graduates exhibit poor phonological awareness, phonological processing deficits, orthographic processing deficits, working memory deficits, syntax and grammar deficits, reading comprehension deficits, expressive and receptive language deficits. Many reasons could be advanced for these deficits and the absent of music training cannot be left out

Research Problem

Language development in children with dyslexia is often characterised by significant challenges in decoding words, phonemic awareness, spelling, and reading fluency, which impede their ability to fully engage in educational and social environments. These difficulties extend beyond reading and writing affecting their verbal communication, comprehension and overall cognitive processing of language. Despite their intellectual potentials, learners with dyslexia face barriers that limit their academic success and lower their self esteem. Their challenges are further aggravated by poor teaching and management strategies used in the classroom by some teachers sometimes due to their inability to handle diversity in the classroom. Teachers are not given therapeutic training for specialised intervention making them to rely on traditional language development intervention, which is effective to some extend but fall short in providing lasting improvements for all individuals with dyslexia. There is an increasing need to explore alternative therapeutic approaches that can effectively support language acquisition for these learners.

Music and language have a great connection as recognised in various cognitive and neurological studies. Music most especially rhythm and melody can stimulate areas of the brain that are involved in language processing such as those responsible for auditory discrimination phonological awareness and memory. Music interventions have been proposed to aid in overcoming language deficits by utilising rhythm-based exercises, melodic intonation and other music related techniques to support language development. These techniques may offer a multi-sensory approach engaging learners with dyslexia in ways that traditional language-based intervention may not. Despite its benefits most teachers do not make use of music in their classrooms neither as a teaching strategy nor an intervention mechanism. This paper wishes to establish the effectiveness of music mediated therapeutic interventions in supporting the language development of learners with dyslexia. Music mediated intervention does not only foster the language abilities of learners with dyslexia, it plays a crucial role in addressing their socio-emotional needs also. Music mediated intervention can provide emotional and social benefits such as; boosting self esteem because music offers alternative avenue for achievement, it allows for expression, creativity, and success in a non-judgmental manner which helps to boost the self confidence level for learners with dyslexia. It also result in the reduction of anxiety and stress, facilitate social interaction, improved emotional expression, promotes resilience, This includes exploring how music influences key language processes identifying the most beneficial musical element and determining the optimal integration of music therapy within existing educational frameworks.

2.0 MATERIALS AND METHODS

This study made use of the quasi-experimental design with a pre-test/post test model. The study had an experimental group exposed to music mediated intervention and the control group received no intervention. This design allows for the examination of the effect of music-based intervention on language development without random assignment. A sample of 20 children, diagnosed of language deficit using the Ihenacho's culture free diagnostic test for language, were selected for this study. The sample was divided into two groups: 10 children in the experimental group and 10 children in the control group. The inclusion criteria for this study included: Children between the ages of 8 and 12 years in primary 5 with no significant hearing impairment, or autistic tendencies and with written parental consent. Children with diagnosed developmental disorders, such as autism spectrum disorder (ASD), that may affect language development and children receiving other forms of language or speech therapy during the study period were excluded from the study. The language ability of the participants was tested using two diagnostic tools the Clinical Evaluation of language fundamentals (CELF) and The Ihenacho Culture Free test for language development. The Clinical Evaluation of language fundamentals (CELF) which is a comprehensive tool used in assessing a range of language skills including receptive, and expressive language and is often used to diagnose language disorders in children 5-21 years. The Iheanacho's culture free test for language development focuses on evaluating the following aspects of language, grammar, comprehension, listening, reasoning, vocabulary and more. These abilities were measured via broad based caption on reading, spelling and verbal memory across the lifespan.

The experimental group participated in a music-mediated intervention program designed to enhance language development. The program focused on integrating music with language learning activities such as

Singing songs: Using rhythm and melody to improve vocabulary, phonemic awareness, and sentence structure.

Rhythm exercises: Activities like clapping to a beat to enhance auditory discrimination and language timing.

Music and storytelling: Children will create stories to go along with a melody or rhythm, fostering creativity and verbal skills.

Music-based language games: Games that encourage word recall, sentence construction, and vocabulary expansion.

The intervention lasted for over a period of 8 weeks, with two sessions a week for 45 minutes per session.

The control group did not receive any music-mediated intervention but were subjected to standard language development activities that do not integrate music such as traditional language exercises (e.g., reading comprehension, spelling practice). Basic language games like word matching or vocabulary drills. The control group also participated in 45-minute sessions, twice a week for 8 weeks, ensuring that the total time spent in the intervention is equivalent for both groups.

To measure and ascertain the impact of the intervention the following were used Pre-Test which is a baseline measure of the children's language skills was conducted before the intervention; vocabulary tests (e.g., standardized vocabulary assessment), phonological awareness tests (e.g., rhyme detection, syllable segmentation), sentence construction tasks (evaluating grammar and sentence complexity). Post-Test: The same tests were administered after the 8-weeks intervention period to assess changes in language development.

A follow-up assessment took place 4 weeks after the completion of the intervention to evaluate the long-term effects of the music-mediated intervention on language development. During each intervention sessions, trained observers took note of the children's participation, enthusiasm, and engagement in language-related tasks, assessing qualitative aspects of their development.

The following instruments were used for data collection; language assessments: both pre-test and post-test scores on language development tests, session observation notes provided qualitative insights into the children's progress, engagement, and behaviour during the music-mediated activities, while parents and teachers feedback from interviews conducted to capture changes in language use and communication outside of the classroom setting. The instrument was validated via face, content and construct validity. Also to ensure reliability of the instruments used, a pilot study with 8 pupils who consist of the target population but were not part of the sample were. The reliability coefficient was calculated using Cronbach ‘s Alpha. The overall reliability coefficient value at pretest level is 0.840 for the control group and 0.822 for the experimental group. And, at the post test level, overall reliability coefficient value for the control group is 0.832 and 0.829 for the experimental group. Therefore, there was consistency in the experiment thus, making the data reliable for the study.

Descriptive Statistics were used to summarize the demographic data and pre-test/post-test results, and the Paired t-tests were used to compare the pre- and post-test scores within each group (experimental and control) and between the two groups. The observational and interview data were analyzed thematically to identify patterns in the children’s language development during and after the intervention.

Ethical Considerations ensured for this study were: Informed Consent; Parents or legal guardians of all participants were asked to provide informed consent for their children's participation in the study. All data were anonymized and kept confidential; participants were informed of their right to withdraw from the study at any time without any penalty. The study

ensured that the intervention is fun, non-stressful, and beneficial for the children. No physical or psychological harm were allowed to befall any participants.

3.0 FINDINGS

Demographic information: Among the 20 learners with dyslexia that participated in the experiment, 62.5% (12) were female and 37.5% (8) were male and based on age range, majority 90% (18) fall within the age range of 8-10 and 10.0% (2) within the age range of 11-12. Among the eight (08) teachers interviewed, 3 were male and 5 females. The 10 parents who participated constituted 6 females and 4 males. By age group, 5 were 40-49, while 2 were within the range of 30-39 with 1 of the teachers and for the parents 4 were within the age range of 35-39, and 6 were 40-49, years.

Table 1: Comparing Learners Mean Score at Pretest Level without the Use of Music Mediated Intervention

Test level	Group	N	Mean	Minimum	Maximum	Std. Deviation	Std. Error of Mean
Pre-test	Experimental	10	12.45	2	27	7.937	1.775
	Control	10	15.55	11	21	3.576	.800
	Total		**14.00**	**2**	**27**	**6.276**	**.992**

Comparing the learners mean score at the pretest level without the music mediated intervention, the mean score for learners in the experimental group was 12.45 plus or minus 1.775 while that for learners in the control group was 15.55 plus or minus 0.800. The minimum score for learners in the experimental group was 2 and maximum was 27 while the minimum score for learners in the control group was 11 and maximum was 21. The low standard deviation value in control group 0.800 implies that the learners perform almost at the same but not as in the case with those in the experimental group 1.775.

Table 2: Comparing Learners Mean Score at Post Test Level after the Use of Music Mediated Intervention

Test level	Group	N	Mean	Minimum	Maximum	Std. Deviation	Std. Error of Mean
Post-test	Experimental	10	44.65	20	70	14.343	3.207
	Control	10	22.30	11	40	7.371	1.648
	Total	**20**	**33.48**	**11**	**70**	**15.961**	**2.524**

Comparing the learners at post test level with the use of music as a teaching strategy on learners in the experimental group and not on those in the control group, the mean score for learners in the experimental group increase significantly from 12.45 plus or minus 1.775 observed at the pretest level to 44.65 plus or minus 3.207 at the post test which double the mean score for learners in the control at the post test level 22.30 plus or minus 1.648. The minimum score for learners in the experimental group is 20 and maximum is 70 while the minimum score for learners in the control group is 11 and maximum is 40.

Verification of Hypothesis Two

H_{o2}: Music Mediated intervention significantly impact the language ability of learners with dyslexia age 8-12 in regular primary schools in Fako Division.

H_{a2}: Music mediated intervention significantly impact the language ability of learners with dyslexia in regular primary schools in Fako Division.

Table 3: Relationship between Music as Mediated Intervention and Language Development of Learners with Dyslexia

Test level	Group	N	Mean	Std. Deviation	Std. Error of Mean	T-Test Value	*P*-Value
Post- test	Experimental	10	44.65	14.343	3.207	6.198	.000
	Control	10	22.30	7.371	1.648		

Equal variances not assumed, df=38, mean difference=22.35, Std. Error Difference=3.606

Statistically, results showed that music mediated intervention significantly impact the language ability of learners with dyslexia (t test value=6.198, p-value < 0.001 far less than 0.05) with learners in the experimental group having a higher mean score of 44.65 two times higher than the mean score of learners in the control group who were not exposed to music mediated intervention at the post test level with a mean score of 22.30 and the mean difference between both groups is 22.35. The high difference in the standard deviation value between the experimental group 14.343 and the control group 7.371 implies that many of the learners with dyslexia at the post test level who took the music mediated intervention perform higher than their mates in the control group. Therefore, the alternative hypothesis which states that music mediated intervention significantly impacts the language ability for learners with dyslexia in regular primary schools in Fako division was accepted.

Thematic Analysis on How Music Mediated Intervention Influence the Language Ability of Learners with Dyslexia?

Theme 1: Increased Engagement and Motivation

Observation Notes: Many children in the experimental group, particularly those who typically struggle with traditional reading or language tasks, showed increased enthusiasm and engagement during music sessions. The rhythmic nature of the activities appeared to captivate their attention, making language tasks less stressful and more enjoyable.

Code:

Therapist: "*When we clapped to the beat of the song, SA was smiling and clapping in time with the rhythm, which he rarely does during reading activities."*

Teacher A: "*Pupils who typically disengaged in traditional language lessons were suddenly eager to join in the music-based activities. The rhythm and songs helped them stay focused and interested, even during language tasks they usually avoid."*

Teacher B: "*One of my pupils, who is usually very quiet and withdrawn, began participating more after the music mediated intervention. It was like they found a way to connect with language in a fun way."*

Analysis*:* Music's inherent rhythm, melody, and repetition made learning more accessible for children with dyslexia by offering multisensory cues, which helped maintain their attention and motivation during the intervention. Music-based interventions appear to break the monotony of traditional language learning tasks, creating a dynamic environment that encourages greater participation. The playful, enjoyable nature of music provides a much-needed motivational boost for children with dyslexia.

Theme 2: Improvement in Phonological Awareness

Observation Notes: A significant number of children in the experimental group displayed improvements in their phonological awareness, including better sound discrimination and

blending. Rhythm exercises helped children break down words into syllables, a foundational skill for reading and spelling.

Code:

Therapist *"When asked to break the word 'butterfly' into syllables, EM was able to clap the syllables out rhythmically without hesitation, something she struggled with during previous sessions."*

Teacher B: "*I noticed a significant improvement in how the children were breaking down words. They were able to clap out syllables with ease, something they struggled with in traditional phonic lessons.*"

Teacher D: *"The pupils were singing songs with words they couldn't pronounce before the intervention, and now they're using those same words in conversations. It was as if the melody and rhythm gave them a pathway to remember the vocabulary."*

Analysis: The repetitive and rhythmic nature of music-based activities, such as clapping or chanting syllables, appeared to improve the children's ability to segment and blend sounds. This is essential for children with dyslexia, who often find phonemic segmentation challenging. The repetitive nature of music, combined with its melodic structure, helps reinforce phonological awareness and vocabulary retention. These elements allow students to process and retain new language material in a more memorable way.

Theme 3: Vocabulary Acquisition and Retention

Observation Notes: Music provided a unique opportunity for vocabulary expansion. Children seemed to retain new words introduced through songs more easily than through traditional rote memorization methods. Additionally, these words were often used in different contexts during class discussions.

Code:

Therapist "After singing the song about animals, TM used words like 'giraffe' and 'elephant' in his conversation with peers, which he had never done before."

Analysis: The use of rhythm and melody helped reinforce vocabulary retention. The music made new words more memorable by linking them to melody and repetition, which supported the children in recalling and using the words correctly.

Theme 4: Pronunciation and Articulation Improvement

Observation Notes: Some children demonstrated improved pronunciation and clearer articulation of words after engaging with songs. The slow pace and clear pronunciation in many songs provided a model for the children, making it easier for them to mimic and practice words.

Code: "SA, who struggled with pronouncing 'th' sounds, was able to pronounce 'this' and 'that' correctly during the song 'This is the Way' after a few repetitions."

Analysis: Music-based interventions appear to provide children with dyslexia a safe and supportive space to practice articulation. The slower tempo and repetition of songs may reduce the pressure they typically feel during traditional speech and language tasks.

Theme 5: Enhanced Confidence and Reduced Anxiety

Observation Notes: Several children who displayed low confidence in language tasks showed a noticeable improvement in their willingness to participate. Music's non-judgmental nature and the positive reinforcement from peers during group activities seemed to encourage children to take risks in their language use.

Code: "MX, who rarely participates in reading tasks due to his frustration, confidently read his lines from the song during the group activity without hesitation."

Analysis: Music-based activities provide a low-pressure environment where children can practice language skills without the typical anxiety associated with reading or spelling tasks. The enjoyable and supportive nature of music helped reduce the fear of failure, which is common in children with dyslexia.

Theme 6: Social Interaction and Collaboration

Observation Notes: Music activities fostered social interaction and collaboration among the children. Working together on group songs and games helped improve communication skills and encouraged turn-taking. Some children who typically struggled in social situations seemed more open to engaging with peers in the music-based tasks.

Codes:

Therapist: *"During the group activity, 'AB' was seen helping a peer by showing them how to sing the next part of the song, something she rarely does outside of music activities."*

Teacher E: *"I saw a noticeable change in how the children interacted with each other. They were more open and communicative, especially during group music sessions. There was less anxiety and more willingness to work together."*

Teacher F: *"One of my Pupil who used to avoid speaking in front of the class, suddenly volunteered to sing in front of everyone during a group activity. That was a huge breakthrough for them emotionally."*

Analysis: The collaborative aspect of the music-based intervention encouraged positive social behaviours. Children with dyslexia often experience difficulties in social communication, but music-based tasks seemed to create a more supportive environment where they could interact and practice language in a relaxed, enjoyable context. Music provides a non-judgmental, supportive environment where students can practice language without the pressure they feel in traditional academic settings. This can result in a boost in self-confidence and social skills, reducing feelings of isolation or frustration.

Despite the positive impacts, several challenges were identified by teachers such as the fact that some students, especially those with more severe dyslexia, required additional support and more individualized activities. Teachers also faced logistical challenges, such as limited resources and time to implement music-based interventions consistently. While music-mediated interventions are beneficial, they are not a one-size-fits-all solution. Teachers noted the need for more personalized approaches, additional training, and adequate resources to maximize the impact of these interventions.

The thematic analysis of teachers' interviews revealed that music-mediated interventions had significant benefits for children with dyslexia, particularly in enhancing engagement, improving language skills (such as phonological awareness and vocabulary), and promoting emotional and social development. However, challenges such as time constraints, resource limitations, and the need for individualized approaches were also identified. Teachers emphasized the importance of incorporating music into language development programs as a tool for motivating students, reducing anxiety, and fostering positive interactions among peers. Further research and resources are needed to address the challenges highlighted by teachers and to enhance the effectiveness of music-based interventions for learners with dyslexia.

Some of the challenges highlighted by teachers included:

Lack of trained personnels: Many teachers have not been trained on how to integrate music as a therapy and as a teaching strategy for language. While teachers may have general knowledge on music specific skills are needed in using music to support learners with dyslexia and such skills are limited.

Insufficient resources: many schools in Cameroon do not have access to basic musical instruments such as keyboard, drums, and more. Without these resources it will be difficult to implement music-based interventions. Some schools lack infrastructure such as dedicated spaces for music activities, poor acoustics, overcrowded classrooms, making it difficult to conduct group music lessons or individual music therapy.

Also, curriculum constraint is a major challenge. The national curriculum is too rigid with focused on traditional academic subjects and limited or no flexibility to introduce music as a tool for addressing learning problems.

Economic constraints such as limited funding to diagnose dyslexia and facilitate the implementation of music mediated interventions.

Discussion

The analysis of data and thematic findings from the intervention study on music-mediated approaches for learners with dyslexia in the age group of 8-12 years shows significant positive effects on various aspects of language development. The key themes from the interviews and observation notes suggest that music interventions contributed to improvements in phonological awareness, reading fluency/articulation, vocabulary acquisition, and social-emotional well-being. This discussion aims to synthesize these findings with existing scientific literature, providing a robust explanation for the observed outcomes and reinforcing the argument that music-mediated interventions significantly impact language development in learners with dyslexia.

The results revealed that pupils experienced a major improvement in phonological awareness, particularly in sound segmentation, blending, and recognition. Phonological awareness is critical for reading and spelling, as it involves recognizing and manipulating the sounds in spoken language. Learners with dyslexia often struggle with these skills, which impede their language development, after the intervention the pupils in the experimental group experienced an increase in their phonological awareness ability. The findings align with existing research demonstrating that music, especially rhythmic training, plays a vital role in improving phonological awareness. Studies by Overy (2003) and Kraus et al. (2014) have shown that rhythm and melody exercises enhance the brain's ability to process phonological components of speech. Rhythmic training, such as clapping syllables or chanting, helps children with dyslexia segment words into smaller phonetic components, facilitating reading and writing skills. This improvement is supported by neuroscience studies, which indicate that rhythmic music stimulates neural circuits involved in phonological processing, compensating for the deficits that typically occur in dyslexic children (Schön et al., 2010).

Another key finding from the analysis was the improvement in vocabulary acquisition and word recall among students involved in music-mediated interventions. Teachers reported that children were more capable of remembering new words learned through songs and rhythmic activities. This is consistent with the body of research suggesting that music aids in memory retention, particularly through the repetitive and engaging nature of musical activities. The association between music and enhanced vocabulary recall is well-documented. A study by Trainor et al. (2002) found that children exposed to song-based learning strategies performed better in word recall tasks than those who learned through non-musical means. The repetitive

structure of songs, which often includes rhyme and rhythm, helps anchor new words in memory. Furthermore, the multisensory nature of music engages both auditory and motor pathways, which supports the formation of stronger memory traces (Hanna-Pladdy, 2006).

Vocabulary acquisition and word recall are often difficult for dyslexic children, as they struggle with the automatic retrieval of words and may have difficulty remembering new vocabulary. Music-based interventions that incorporate song lyrics and repeated melodies have been shown to improve vocabulary retention. A study by Trainor et al. (2002) demonstrated that music enhanced the recall of word pairs, especially when the words were presented in a song with a steady rhythm. The repetition and predictability of songs help embed new vocabulary into long-term memory.

The analysis revealed improvements in reading fluency and decoding skills among students who participated in music-mediated interventions. Teachers noted that children were able to read more smoothly, with fewer hesitations and more accurate pronunciation after engaging in music-based activities. Music, particularly rhythm and melody, helps synchronize the brain's timing mechanisms, which are essential for fluent reading. The study by Ho et al. (2007) demonstrated that rhythmic training improved reading fluency in dyslexic children by supporting the brain's ability to process the timing and sequencing of language. Music engages areas of the brain responsible for timing and motor control, which are also important for smooth, fluent speech (Gordon et al., 2015).

Additionally, rhythmic exercises help children with dyslexia learn the natural flow of language, improving their ability to decode words in a fluid, automatic manner. Reading fluency, or the ability to read text quickly and accurately, is often compromised in children with dyslexia due to difficulties with word decoding. Music-mediated interventions that incorporate rhythm and melody have been shown to improve reading fluency by reinforcing the natural rhythms of speech. For example, a study by Ho et al. (2007) found that children with dyslexia who participated in a musical intervention showed improvements in both reading fluency and accuracy. The rhythm of music helps children better synchronize the timing of syllables and words, which in turn facilitates smoother, more fluent reading.

Teachers also noted improvements in speech production and articulation. Dyslexic children often have difficulty articulating certain sounds due to underlying motor coordination challenges. Music interventions that involve singing, rhythm, and movement have been shown to improve fine motor control and articulation. Music's impact on articulation and speech production has been well-documented in the context of dyslexia. A study by Gremmo et al. (2011) found that music therapy, particularly those focused on rhythmic and melodic activities, helped children with dyslexia articulate words more clearly. Music involves both auditory processing and motor control, which are essential for speech production. The rhythmic structure of music helps children practice the timing and coordination needed for producing clear, accurate speech (Bidelman et al., 2014). Children with dyslexia often struggle with articulation, particularly with sounds that require fine motor coordination, such as "th," "r," or "s." Music interventions that focus on rhythmic patterns and melodic phrasing have been shown to support the development of clearer speech and improved articulation. The rhythmic nature of music facilitates the motor planning required for speech production.

Another theme emerging from the analysis was the positive impact of music on the social and emotional well-being of children with dyslexia. Teachers observed that children became more confident, less anxious, and more engaged with their peers during music-mediated interventions. This emotional boost likely contributed to their improved participation and engagement in language learning tasks. Emotional and motivational aspects are crucial for

children with dyslexia, who often experience frustration and low self-esteem due to their language difficulties. Music provides a non-judgmental, enjoyable context that helps reduce anxiety and fosters a sense of accomplishment. Hanna-Pladdy et al., (2008) suggests that music interventions can improve mood, reduce stress, and enhance overall well-being, which in turn supports better learning outcomes. Additionally, group music-making activities foster collaboration and peer interaction, which are beneficial for developing social communication skills.

Music and language share overlapping neural networks, particularly in areas involved in auditory processing, memory, and motor control. Cognitive neuroscience indicates that both music and language processing engage the brain's auditory cortex, which is critical for distinguishing sounds and phonemes. Moreover, studies have found that rhythmic and melodic components of music activate brain areas involved in motor and sensory processing, areas that also play a role in phonological processing the ability to manipulate sounds and recognize linguistic patterns Hallam (2010).

Music, specifically rhythm and melody, offers unique advantages for children with dyslexia by enhancing their ability to process auditory information. The rhythmic elements in music can help reinforce phonological awareness the ability to hear, identify, and manipulate sounds while the repetitive and predictable nature of songs supports memory and recall. Furthermore, music-mediated interventions can create a multisensory learning environment, where auditory, motor, and sometimes visual cues work together to improve learning outcomes, particularly for learners with dyslexia Gremmo et al. (2011).

From the above results on the positive impact music-mediated interventions has on the language ability of learners with dyslexia aged 8-12 years, the following recommendations can be made to enhance and optimize language development for learners with dyslexia and others.

Result of this study shows that music-mediated intervention enhances phonological awareness, reading fluency, and vocabulary acquisition which are key challenges faced by learners with dyslexia. Based on this finding it is recommended that:

Schools should incorporate music-based activities and strategies into regular classroom instruction to support language development for learners with dyslexia. Integrating music into the classroom will offer dyslexic learners an opportunity to develop essential language skills in a more engaging and effective manner.

- Use songs, rhymes, and chants to teach and reinforce vocabulary and phonics. Include rhythm-based activities (e.g., clapping syllables, tapping beats) to improve phonological awareness.
- Encourage teachers to incorporate musical elements into language lessons, such as using background music during reading sessions or providing rhythmic patterns to support pronunciation.

Provide Professional Development for Educators on Music-Based Approaches: Targeted professional development for educators to help them effectively implement music-mediated interventions tailored to the needs of learners with dyslexia. This training can equip them with the skills to design and execute music-based activities that support language development in dyslexic students. Organize workshops or online courses that teach educators how to use music as an instructional tool for language development. Provide resources, such as lesson plans, music-based activities, and videos demonstrating successful music interventions. Collaborate with music therapists or experts to guide teachers in developing classroom-based music interventions.

Promote the use of multisensory approaches that combine music with visual, auditory, and tactile inputs to support language learning in dyslexic children.

- Pair music activities with visual aids like flashcards, pictures, or gestures to reinforce vocabulary learning.
- Incorporate movement (e.g., clapping, dancing) into music activities to activate kinesthetic learning pathways.
- Use songs and rhythmic patterns that include visual cues, such as lyrics or hand motions, to help children make connections between sounds and meanings.

Expand Music Therapy as a Supplementary Intervention: Schools should consider integrating formal music therapy as a supplementary intervention for learners with dyslexia. While music-based activities can be integrated into regular classrooms, formal music therapy sessions offer a more intensive, structured approach to addressing the language development needs of children with dyslexia.

- Music therapists can tailor their sessions to address specific phonological, motor, and language difficulties in a focused and personalized manner.
- Collaborate with certified music therapists to provide individualized or group therapy sessions that use rhythm, melody, and auditory processing techniques to improve language skills.
- Design a curriculum that integrates music therapy sessions alongside traditional language interventions, ensuring a holistic approach to supporting language development.
- Evaluate the impact of music therapy regularly to ensure that it is effectively addressing the needs of learners with dyslexia.

Encourage collaboration between music therapists, speech-language pathologists (SLPs), and classroom teachers to create an integrated approach to language development for learners with dyslexia. The combined expertise of music therapists, SLPs, and educators can create a more comprehensive, targeted intervention plan that addresses all aspects of a child's language development. This interdisciplinary approach ensures that music-based interventions are aligned with other therapeutic strategies and educational goals.

- Develop multidisciplinary teams consisting of music therapists, SLPs, and educators who work together to design and implement music-based interventions. This is team will create new waves in intervention research for learners with dyslexia and other learning disabilities.

There is also needed to establish training workshops and programs to equip teachers and school counsellors with skills on how to use music mediated intervention to address learning disabilities issues in primary schools in Fako.

4.0 CONCLUSION AND RECOMMENDATIONS

By incorporating these recommendations, schools and educators can significantly enhance the effectiveness of music-mediated interventions for learners with dyslexia. Music offers a powerful tool to improve phonological awareness, reading fluency, vocabulary acquisition, and articulation, all of which are key areas of difficulty for dyslexic children. Through individualized, multisensory approaches, music-based interventions can foster greater engagement, confidence, and language development, offering a promising solution to the

challenges faced by learners with dyslexia. There is need to implement this therapy on a large scale as well as on other learning disability areas such as dyscalculia, dysgraphia and more. .

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