


Original Research

Speech, Literacy, Numeracy, and Communication Development in an 11-Year-Old Girl with Down syndrome: A Case Report of an Evidence-Based Home Intervention

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ABSTRACT

This Case Study report presents the developmental progress of an 11-year-old girl with Down syndrome (DS) within the context of a structured home-based intervention implemented three times weekly over three and a half years. Diagnosed prenatally at the University Teaching Hospital, Ibadan, Nigeria, the child initially experienced delayed developmental milestones and academic stagnation due to insufficient support in mainstream schooling, illustrating the educational challenges faced by learners with DS in under-resourced settings. Following her transition to a special school and commencement of individualised therapy, she achieved mastery of 200 high-frequency sight words, read and comprehended over twenty simple storybooks, accurately wrote numbers from 1 to 1000 in figures and from 1 to 100 in words, and mastered multiplication tables for two and three with minimal assistance. Her conversational skills improved considerably, although she continues to experience difficulty producing the /f/, /sh/ and /V/ phonemes, highlighting ongoing speech therapy needs. The intervention combined evidence-based strategies, including scaffolding, the Neurological Impress Method, phonological training, rote learning, and concrete representational activities delivered within a structured, multisensory framework and reinforced by active parental involvement. This report exemplifies a single-subject educational and clinical case study, demonstrating how targeted, evidence-based interventions can effectively foster literacy, numeracy, and communication in children with DS, while underscoring the importance of early diagnosis, family engagement, and appropriately tailored educational placement.

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1. INTRODUCTION

Down syndrome (DS), clinically known as trisomy 21, represents the most common chromosomal aetiology of intellectual disability worldwide. The condition arises when an individual possesses an additional complete or partial copy of chromosome 21, disrupting typical neurological development and affecting cognitive functioning, language acquisition, and adaptive behaviour (Chapman, 2019; Kent & Vorperian, 2019). Since its first clinical description by John Langdon Down in 1866 and later genetic

confirmation by Jérôme Lejeune in 1959, Down syndrome has been recognised as a lifelong neurodevelopmental condition characterised by distinctive physical features, cognitive limitations, and developmental delays (Bull, 2020).

Globally, the prevalence of Down syndrome is estimated at approximately one in every 700 live births, although this figure varies depending on maternal age distribution, accessibility to healthcare services, and the uptake of prenatal diagnostic screening (de Graaf et al., 2021). In many developing countries, including Nigeria, comprehensive national prevalence data remain limited due to inconsistent reporting systems and the lack of large-scale population studies. Nonetheless, hospital-based studies suggest that the incidence may align with or slightly exceed global averages, partly because prenatal diagnostic services are less widely utilised and cultural factors influence the reporting of congenital conditions (Akinmoladun & Olusanya, 2018). The World Health Organisation (2022) describes Down syndrome as a congenital condition arising from the presence of an additional chromosome 21, which produces varying degrees of intellectual impairment and developmental delay. Children with Down syndrome typically exhibit uneven developmental profiles. Research indicates relative strengths in visual-spatial processing, social interaction, and receptive language, while notable weaknesses are often observed in verbal working memory, expressive language, and sequential information processing (Fidler, 2018; Chapman, 2019; Jarrold & Baddeley, 2001). The discrepancy between receptive and expressive language often results in challenges with verbal communication, particularly in classroom settings, where rapid comprehension and verbal participation are required. Difficulties with speech production are frequently associated with phonological processing deficits and reduced speech intelligibility, which can further exacerbate learning challenges (Kent & Vorperian, 2019).

Motor development may also be delayed in children with Down syndrome due to hypotonia and reduced muscle tone. This affects both gross and fine motor skills, impeding activities such as writing, drawing, manipulating educational materials, and participating in physical education (Ulrich et al., 2019). Consequently, these developmental characteristics influence academic performance, particularly in literacy and numeracy, which are foundational skills for lifelong learning. Literacy acquisition in learners with Down syndrome is often constrained by limitations in phonemic awareness, auditory short-term memory, and the capacity to link sounds to written symbols (Miller & Leddy, 2017; Bull et al., 2021). Reading difficulties are exacerbated when children are unable to decode new words independently or rely heavily on memorisation of whole words. In mathematics, impairments in working memory and abstract reasoning hinder understanding of numerical concepts, relationships, and problem-solving. Learners may rely on visual supports, concrete materials, and repetitive practice to consolidate skills (Kaufmann & von Aster, 2018; Lanfranchi et al., 2021).

Educational research emphasises the critical importance of structured and individualised instructional strategies to support learners with Down syndrome. Evidence-based approaches include multisensory instruction, scaffolded learning, guided reading, phonological training, repetitive practice, and the use of concrete instructional materials (Bull et al., 2021; Samway & McKeon, 2016). One particularly effective reading technique is the Neurological Impress Method (NIM), in which the learner reads simultaneously with a fluent reader, enhancing reading fluency and comprehension (Ohanele, 2022). Studies have demonstrated that guided and repetitive exposure to language and literacy tasks improves both vocabulary and reading skills in children with Down syndrome (Chapman, 2019; Lemons et al., 2018; Alqahtani, 2021).

Despite the availability of effective strategies, implementing such interventions in resource-constrained environments remains challenging. Schools in many developing countries face shortages of trained special educators, inadequate access to specialised instructional materials, and limited support services for children with intellectual disabilities (Akinbode, Akinola & Osisanya, 2025). In Nigeria, the Discrimination against Persons with Disabilities (Prohibition) Act of 2019 provides a legal framework for inclusive education. However, the practical implementation of this policy is often limited due to insufficient teacher preparation, lack of specialised resources, and minimal awareness of best practices in disability education (Adebisi et al., 2021). Another critical challenge is the scarcity of African-based research documenting effective educational strategies for children with Down syndrome. Most studies originate from Western contexts, where educational systems, resources, and parental expectations differ substantially from those in Africa. Consequently, there is a pressing need for context-specific investigations that demonstrate how interventions can be implemented in low-resource environments while remaining effective and sustainable. The aim of this study is to examine how a structured home-based intervention programmes, combined with specialised school attendance and active parental involvement, and supported the developmental progress of a Nigerian learner with Down syndrome. By documenting the learner's developmental trajectory over a three-and-a-half-year period, this study contributes to the limited body of African research on Down syndrome education and provides insights into practical strategies that may be applied in similar contexts.

2. METHODOLOGY

A single-subject case study design was employed to explore the developmental progress of a learner with Down syndrome in depth. Case study methodology is particularly suitable for examining complex developmental processes in their natural contexts, allowing for rich qualitative insights into the effectiveness of instructional strategies (Epstein & Dallery, 2022). This design enabled continuous observation and documentation of the learner's progress over an extended period while capturing the nuances of the intervention procedures. The participant was an eleven-year-old female with a confirmed prenatal diagnosis of Down syndrome from the University College Hospital, Ibadan. She was part of a twin birth, with her male twin sibling unaffected by any developmental condition. The family comprises five children, with the learner residing with her mother, a civil servant who provides daily educational support. The father, an engineer working abroad, contributed financial support. Both twins were initially enrolled in mainstream nursery and primary schools, but the participant had received no specialised educational support prior to the intervention, resulting in limited academic progress.

2.1. Intervention procedure

After conducting an initial functional assessment, the author implemented a carefully structured home-based programme designed to support the participant's speech, language, literacy, and numeracy development. The programme was delivered consistently over a period of three and a half years, with sessions scheduled three times weekly, specifically on Tuesdays, Thursdays, and Saturdays. Each session lasted between sixty and ninety minutes, allowing sufficient time to engage in meaningful practice while maintaining the learner's attention and motivation. The frequency and duration were chosen to provide intensive, yet manageable, learning opportunities, ensuring that skills could be developed progressively and reinforced consistently over time.

The programme employed a combination of research-supported teaching strategies that addressed the participant's individual learning needs. One central approach was scaffolding. Learning activities were broken into smaller, achievable steps, and support was provided by the facilitator during the early stages of each task. As the participant gained confidence and mastery, support was gradually withdrawn, encouraging independence while ensuring that the learner remained motivated and capable of completing tasks successfully. Scaffolding allowed the participant to engage with tasks that might otherwise have been overwhelming, and it promoted the gradual acquisition of skills in a structured manner. Scaffolding encouraged problem-solving, persistence, and self-directed learning because it provided a framework that adapted to the learner's developing abilities. The Neurological Impress Method (NIM) was integrated into the guided reading activities. In this approach, the facilitator and the learner read aloud simultaneously, creating a shared reading experience in which the learner could model pronunciation, rhythm, and intonation. This method provided immediate auditory feedback and reinforced correct word recognition, promoting fluent reading and comprehension. Simultaneous reading helped the participant internalise the mechanics of reading while increasing confidence in literacy tasks. The method has been widely recognised in literacy education for its ability to support learners who experience difficulties with reading, as it combines auditory, visual, and kinaesthetic elements to reinforce learning. The repetitive nature of the reading tasks also contributed to the consolidation of literacy skills over time.

Phonological training was another essential component of the programme. Activities were designed to enhance phoneme recognition, blending, and articulation, which are foundational for both speaking and reading skills. The participant engaged in exercises that targeted specific sounds, practiced blending sounds into words, and repeated articulation drills to improve clarity of speech. This systematic approach allowed for gradual mastery of phonological skills, which are critical in developing accurate pronunciation, decoding skills, and literacy competence. Repetition and consistency within these exercises helped the participant to internalise sound patterns, thereby improving both expressive and receptive language abilities.

Repetitive practice was incorporated to support memory and retention across both literacy and numeracy domains. The participant regularly rehearsed numerical sequences, vocabulary items, and multiplication tables. This approach reinforced prior learning and strengthened working memory, allowing the participant to retrieve information efficiently and perform tasks with increased fluency. Repetition also provided opportunities to consolidate knowledge in a progressive manner, building a foundation for more advanced learning. In numeracy, repetitive practice helped the participant develop automaticity with basic operations, reducing cognitive load during more complex calculations. Similarly, in literacy, repeated engagement with words and sounds promoted fluency and accuracy in reading and spelling.

The use of concrete materials was employed to bridge the gap between abstract concepts and practical understanding. Counting blocks, pictorial cards, and other visual aids were used to illustrate mathematical and linguistic concepts tangibly. For instance, counting blocks enabled the participant to visualise addition and subtraction, making abstract numerical operations more accessible. Pictorial cards provided visual support for new vocabulary and concepts in literacy tasks, aiding comprehension and retention. The integration of concrete

materials addressed multiple learning modalities, allowing the participant to engage visually, tactilely, and cognitively with the learning content. This multisensory approach supported engagement, understanding, and long-term retention of knowledge. Sessions were conducted in a calm and well-organised environment within the home, designed to minimise distractions and maximise the participant's focus. The sequencing of tasks was deliberately planned, beginning with activities that built confidence and gradually introducing more challenging tasks as the participant demonstrated readiness. Flexibility was maintained in pacing to accommodate fatigue and attention, ensuring that the participant remained engaged and capable of completing each session successfully. This approach provided a balance between structured guidance and adaptive responsiveness to the participant's immediate needs. Ongoing monitoring and assessment were integral to the programme's implementation. The facilitator kept detailed records of the participant's performance during each session, noting progress, challenges, and areas requiring additional focus. These records informed adjustments to the programme, ensuring that instructional strategies remained appropriate and effective. Monitoring progress also allowed for the reinforcement of strengths while addressing difficulties promptly, providing a personalised approach that responded to the participant's evolving learning needs. The programme maintained a focus on sustained improvement and skill consolidation through the continuous evaluation of performance. The home-based context of the intervention offered several additional advantages. Conducting sessions in a familiar setting reduced anxiety, promoted comfort, and facilitated concentration, allowing the participant to engage fully with learning tasks. The consistent schedule reinforced routine, providing stability and predictability, which are particularly beneficial for learners with developmental challenges. The extended duration of the programme ensured that learning was cumulative, enabling the gradual development and reinforcement of essential skills over time.

Moreover, the intervention was designed as a comprehensive and systematic programme, incorporating scaffolding, the Neurological Impress Method, phonological training, repetitive practice, and concrete materials to support the participant's development in speech, literacy, and numeracy. The combination of structured sessions, a supportive learning environment, and continuous progress monitoring created a holistic framework that addressed the participant's individual learning needs. The programme facilitated meaningful development over an extended period by providing consistent, evidence-informed, and personalised instruction, effectively equipping the participant with skills essential for academic and functional competence. This approach reflects current best practices in educational support for learners with developmental challenges, emphasising sustained engagement, gradual skill acquisition, and the promotion of independence and confidence in learning.

The active participation of the learner's mother was a central component of the intervention. She was provided with structured guidance on how to support and reinforce the therapeutic activities within the home environment. This included clear instructions on supervising and assisting with reading exercises, vocabulary practice, and numeracy tasks, thereby ensuring that learning continued beyond the formal sessions. To maintain a systematic record of progress, the mother monitored the learner's performance using a logbook, which documented mastery of skills, errors, and areas that required additional reinforcement. Regular verbal interaction during these home-based activities further contributed to the development of the learner's expressive language abilities.

The inclusion of the parent in the learning process aligns with established research indicating that active parental involvement can significantly enhance educational outcomes for children with Down syndrome. Evidence suggests that when parents participate in structured learning activities at home, children benefit from increased practice, reinforcement of newly acquired skills, and strengthened communication abilities. This effect is particularly pronounced in low-resource settings, where access to formal educational supports may be limited. As reported by Adebisi et al (2021), Olusanya (2021), and Alqahtani et al (2020), parental engagement in home-based interventions facilitates skill consolidation and contributes to more sustained developmental progress. The structured and consistent support provided by the learner's mother therefore played a critical role in complementing the formal intervention and promoting overall learning gains.

2.2. Data collection and analysis

Data for the study were gathered using a combination of observational and performance-based methods. Observations were conducted during therapy sessions to document the learner's engagement, responsiveness, and interaction with instructional activities. Performance on literacy and numeracy tasks provided measurable indicators of skill acquisition and progress, while conversational interactions were analysed to assess improvements in expressive and receptive language abilities. In addition, progress records maintained over the course of the programme offered a longitudinal perspective on mastery, errors, and areas requiring reinforcement. A descriptive qualitative approach was employed to interpret the data. Baseline observations were compared with subsequent performance throughout the programme, allowing the researcher to identify patterns of development and the effects of the instructional strategies applied. Changes in literacy,

numeracy, and communication abilities were examined in relation to the specific techniques utilised within the intervention, such as scaffolding, the Neurological Impress Method, phonological training, and the use of concrete materials. This approach facilitated a nuanced understanding of how each component contributed to the learner's overall progress and enabled the identification of areas where adjustments to instructional methods could enhance outcomes. The study ensured a comprehensive and evidence-informed evaluation of the intervention's impact through a combination of systematic observation, performance assessment, and record-keeping.

2.3. Case description

The participant initially attended mainstream education but demonstrated limited academic progress, remaining in Primary 2 by the age of eight. Recognising the need for more specialised support, she was subsequently transferred to a school catering specifically to children with intellectual disabilities. In this environment, she was exposed to more structured learning opportunities, with instruction tailored to her individual developmental needs. The home-based intervention programme served to reinforce classroom instruction, providing additional practice and consolidation of skills. The learner's mother played a pivotal role in this process, consistently supporting exercises, monitoring performance, and promoting the generalisation of skills across home and school contexts. This combination of school-based and home-based support created a complementary learning framework that facilitated both academic and functional development.

3. RESULTS AND DISCUSSION

3.1. Literacy and reading development

Over the three-and-a-half-year intervention period, the participant demonstrated marked improvements in literacy. By the conclusion of the programme, she had acquired mastery of approximately 200 high-frequency sight words, encompassing common nouns, verbs, and adjectives relevant to everyday contexts. Her capacity to read and comprehend short, picture-based narratives also improved considerably, reflecting the effectiveness of structured and guided reading activities. For instance, in one session, she independently read a story describing a family picnic, accurately identifying characters and recounting main events with minimal support. These achievements align with prior research demonstrating the efficacy of structured reading interventions for children with Down syndrome. Chapman (2019), Lemons et al. (2018), Bull et al. (2021), and Alqahtani et al. (2020) highlight that guided reading and repetitive practice foster reading fluency and comprehension in learners with intellectual disabilities. The use of the Neurological Impress Method (NIM) appeared particularly beneficial in promoting fluent reading by modelling correct pronunciation and pacing. Through repeated practice and scaffolded instruction, the participant progressed from reading single words to forming simple sentences and eventually to reading coherent short paragraphs. This incremental approach underscores the importance of gradual skill development in literacy acquisition, especially for learners with developmental challenges. A significant observation was the participant's increasing confidence during reading tasks. While initially hesitant to attempt unfamiliar words, she gradually began to decode new words independently, indicating enhanced phonological processing and word recognition skills. These findings corroborate Alqahtani (2021), who emphasised that structured, repetitive, and supportive instruction enables children with Down syndrome to develop substantial reading competencies.

3.2. Vocabulary expansion and language skills

Vocabulary development was another area in which notable progress was observed. The participant initially relied on simple phrases, such as "I want" or "I see." Over time, she began constructing sentences that incorporated descriptive language, action verbs, and spatial prepositions. For example, she was able to articulate statements such as "I am drawing a red ball under the table," demonstrating growth in both syntactic structure and semantic understanding. This improvement reflects the combined effects of phonological training, scaffolded language exercises, and active parental reinforcement. The learner's mother consistently engaged in home-based activities, using conversational interactions, storytelling, and daily routines to encourage vocabulary use and generalisation. Research supports this approach, indicating that active parental involvement enhances expressive language acquisition, particularly in contexts where formal educational resources are limited (Adebisi et al., 2021).

The participant's receptive language abilities also advanced significantly. She demonstrated the capacity to follow two- and three-step instructions, indicating strengthened comprehension and working memory. This observation aligns with Chapman (2019), who notes that receptive language typically develops more rapidly than expressive language in children with Down syndrome, providing a foundation upon which more complex oral communication skills can be built.

3.3. Numeracy skills

Progress in numeracy was similarly evident. The participant mastered the writing of numbers from one to one thousand in figures and one to one hundred in words. She also acquired proficiency in the multiplication tables for two and three. Initial challenges with number recognition and simple calculations were addressed through the use of concrete materials, such as counting blocks, pictorial number cards, and interactive exercises. The participant's ability to apply numerical concepts in real-life contexts, such as counting objects during household tasks or measuring ingredients while cooking, demonstrated the successful transfer of skills to everyday situations. These findings are consistent with Lanfranchi et al. (2021), who emphasise the value of visual and manipulative strategies in supporting numeracy development for children with Down syndrome. Despite these gains, the participant occasionally encountered difficulties with abstract numerical concepts, such as addition and subtraction beyond ten, without visual supports, reflecting documented challenges in abstract reasoning and working memory constraints within this population (Kaufmann & von Aster, 2018).

3.4. Communication and conversational competence

The participant's conversational abilities showed considerable improvement throughout the intervention. Initially, her interactions were limited to brief responses and gestures. She was capable of initiating conversations, responding appropriately to questions, and expressing her needs clearly by the final year. For instance, she could request specific activities, describe her emotions, and recount daily events with minimal prompting. Although articulation challenges persisted, particularly with phonemes such as /f/, /s/, and /th/, improvements in speech intelligibility were observed, especially when supported by visual cues or gestures. These observations are consistent with the work of Kent and Vorperian (2019) and Alqahtani (2021), who note that phonological exercises and guided practice can enhance clarity in children with Down syndrome. Also, the participant demonstrated progress in social communication, including increased eye contact, appropriate turn-taking, and correct use of greetings during peer and adult interactions, supporting the findings of Chapman (2019) and regarding the efficacy of structured interactive interventions.

3.5. Parental involvement

Parental engagement was a key factor in the learner's overall progress. The mother's active participation ensured that skills learned during formal sessions were reinforced at home, facilitating continuous learning. Daily monitoring, encouragement, and guided practice created a supportive environment that promoted sustained motivation and engagement. Comparative studies support this approach, with Olusanya (2021) and Alqahtani et al. (2020) demonstrating that children with active parental involvement exhibit higher gains across literacy, numeracy, and communication domains, particularly in settings where access to specialised educational resources is limited. In this case, parental support contributed significantly to the generalisation of skills across both home and school contexts.

3.6. Environmental and contextual factors

The transition to a special school provided a more conducive learning environment, with structured teaching, peer interaction, and access to specialised staff. The combination of school-based and home-based instruction created a complementary support system, highlighting the importance of contextually adaptive strategies in resource-limited settings (Bull, 2020; Lemons et al., 2018). Environmental factors, however, occasionally constrained the intervention, including limited access to teaching aids, interruptions within the school setting, and time constraints. Despite these challenges, the participant demonstrated consistent progress, illustrating the feasibility of integrating home-based and school-based support to promote skill development even in low-resource contexts.

3.7. Comparative analysis

The participant's developmental gains correspond with findings from studies conducted in Western and Middle Eastern contexts, suggesting that certain intervention strategies are universally effective. Chapman (2019) reported that guided reading and repetitive practice enhance reading fluency in children with Down syndrome. Lemons et al. (2018) found that scaffolded literacy instruction improves comprehension and confidence among learners with intellectual disabilities. Alqahtani (2021) emphasised the importance of phonological training in expressive language development, while Lanfranchi et al., (2021) highlighted the benefits of concrete materials for numeracy acquisition. O'Toole, Lee, Gibbon, van Bysterveldt & Hart (2018) demonstrated that parental reinforcement supports the generalisation of communication skills. The present study confirms that these approaches are transferable and effective within African contexts, particularly when parental involvement and structured support are integrated.

4. CHALLENGES AND LIMITATIONS

Several limitations of the study should be acknowledged. Firstly, the study involved a single participant, which restricts the generalisability of the findings to the wider population of children with Down syndrome. The insights derived from this case may not reflect the experiences or outcomes of other learners with differing abilities, environments, or support systems. Secondly, the study did not include a comparison or control group, limiting the ability to precisely quantify the specific impact of the intervention. Without a standardised benchmark, it is difficult to attribute observed improvements solely to the home-based programme and associated strategies. Thirdly, the measures used to evaluate progress relied predominantly on observational assessments and performance in structured learning tasks. Although these methods provided valuable insights into the participants' development, the absence of standardised assessment tools may reduce the reliability and comparability of the findings.

Furthermore, the implementation of the intervention was accompanied by several practical challenges that required careful consideration and management. One notable constraint was time; balancing the demands of school attendance, scheduled therapy sessions, and family responsibilities necessitated meticulous planning to ensure the learner could participate fully in each component of the programme. In addition to temporal pressures, the availability of resources presented limitations. Access to specialised teaching materials, including concrete learning aids, therapy aids, and assistive devices, was restricted, which at times constrained the range and variety of activities that could be delivered effectively.

Environmental interruptions also posed significant challenges. Occasional disruptions within the home, such as unexpected household activities or competing family obligations, along with inconsistent support from the school, affected the regularity and continuity of sessions. Moreover, the learner benefited from a highly supportive home environment and an actively engaged parent—circumstances that may not be present in all families. The combination of family support and structured intervention likely contributed significantly to the observed outcomes, meaning that replication of the results in less supportive contexts may be challenging.

These combined factors highlight the practical difficulties associated with implementing structured interventions in resource-limited settings and underscore the importance of developing adaptable strategies that can accommodate variations in time, materials, and environmental conditions. Despite these obstacles, careful scheduling, resource optimisation, and ongoing communication with family members allowed the programme to proceed effectively. Ultimately, while caution is necessary when extrapolating the findings beyond the context of this single case, the study provides practical insights into the feasibility of sustained home-based interventions even in contexts where resources are constrained.

5. PRACTICAL IMPLICATIONS

The study yields several important practical implications for educators, therapists, and policymakers. Structured home-based programmes can serve as a valuable complement to school-based instruction, particularly in environments where access to specialised educational resources is limited. Such programmes can reinforce classroom learning, support skill consolidation, and provide opportunities for repeated practice in a familiar and supportive environment. Parental training and active involvement emerged as critical factors for effective skill acquisition and generalisation. Engaging parents in the learning process ensures that children receive consistent support beyond formal sessions, promoting sustained progress in literacy, numeracy, and communication skills. The findings also highlight the importance of early identification and appropriate placement within educational settings. Timely diagnosis of developmental needs and enrolment in schools equipped to provide structured support enhances opportunities for learning and overall developmental outcomes.

From a policy perspective, the study underscores the necessity for inclusive education policies, expanded special education training, and increased access to assistive materials and therapy services. Policymakers should prioritise initiatives that support home-based and school-based interventions, recognising the potential for parental engagement to bridge gaps where professional resources are constrained. Furthermore, the strategies employed in this study can be adapted for other children with intellectual disabilities or implemented in low-resource contexts, offering a scalable and contextually sensitive model for educational interventions.

6. CONCLUSION

This case study demonstrates that children with Down syndrome are capable of achieving meaningful gains in literacy, numeracy, speech, and communication when provided with a combination of structured home-based support, specialised schooling, and active parental involvement. The learner's progress illustrates that, even in resource-limited settings, consistent and contextualised interventions, reinforced at home, can result in

significant developmental improvements. The findings emphasise the importance of early diagnosis, family engagement, and integrated support systems as key components for optimising learning outcomes. Educators, therapists, and policymakers can draw upon this model to implement strategies that promote inclusive and equitable educational experiences. By combining home-based practice, school-based instruction, and parental reinforcement, children with developmental challenges can benefit from sustained support that enhances both academic and functional skills. This case study provides a framework for practical implementation, demonstrating that effective developmental interventions are feasible even when resources are limited.

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DECLARATION OF INTEREST

The author declares no conflicts of interest.

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ETHICAL STATEMENT

Strict adherence to ethical standards was maintained throughout the duration of this study. Prior to the commencement of the intervention or the collection of any primary data, informed consent was secured from the learner's parent. To uphold the mandate of confidentiality, all identifying details were omitted from the documentation, thereby safeguarding the participant's anonymity across every stage of the research process. Furthermore, the implementation of intervention activities was conducted in alignment with established professional benchmarks within special education and speech and language therapy. These measures ensured that the participant's well-being remained the primary concern and that all procedures were grounded in ethically robust practice.

AI USE STATEMENT

The authors declare that no generative artificial intelligence (AI) tools were used in the preparation, analysis, or writing of this manuscript.

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