

**Effectiveness of Kentalis’
Reading Method for Early Literacy
for Deaf and Hard-of-Hearing Early Grade Learners in Zambia**

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Abstract

The early development of literacy skills forms a critical foundation for learners in general, and particularly for those who are deaf or hard of hearing. This study aimed to evaluate the effectiveness of the Kentalis’ Reading Method for Early Literacy (RMEL) for grade one learners who are deaf and hard-of-hearing (DHH) in Zambia. A concurrent nested design, employing a mixed-methods approach, was used as the research framework. Sixty grade one learners who are DHH and thirty teachers participated in the study. The learners were divided into two groups: a control group and an experimental group taught using the RMEL. Cross-out tests in picture and word versions, designed to measure vocabulary, were administered twice to both groups. The findings revealed that there was an interaction during the study and that learners who are DHH performed better on cross-test vocabulary tasks compared to decoding tasks. The Difference of Differences (DoD) analysis using ANOVA revealed a net improvement of 5.09 units in the experimental group compared to the control group on the cross-test vocabulary task, whereas on word decoding, the experimental group showed improvement of 1.21 units compared to the control group. We conclude that the Reading Method for Early Literacy significantly enhanced key foundational components of reading, specifically vocabulary acquisition and word decoding, among deaf and hard of hearing learners in the experimental group. While the method did not assess aspects of reading such as fluency and comprehension, the significant gains in word vocabulary and decoding suggest that it supports early literacy development by creating a visually rich, linguistically supportive learning environment. The study recommends increasing teacher training in the Reading Method in schools for learners who are deaf and hard of hearing across Zambia. Due to the fact that the study investigated the impact of only two semesters, with a small-sized control group there is a need for longitudinal research. The word decoding tasks should be complemented by measuring the decoding fluency as well as assessing the comprehension of written words.

Keywords; Assessment, deaf and hard of hearing, Learners, Reading Method for Early Literacy (RMEL)

INTRODUCTION

The ability to read and write empowers individuals to communicate effectively, easily access information, and actively participate in society. For children who are deaf and hard of hearing (DHH), the early acquisition of literacy skills forms a crucial foundation for mastering more complex skills and achieving academic advancement (Wang & Andrews, 2017; Lederberg et al., 2014). Unlike children with regular hearing, many DHH children enter grade one with limited language and emergent literacy skills (Scott et al., 2019). Research indicates that learners who are DHH face significant challenges in communication and reading comprehension, which hinder their academic progression and ability to perform well in examinations later in their educational journey (Mandyata & Kamukwamba, 2018; Chifinda, 2017; Manchishi, 2015; Kumatongo & Muzata, 2021). Learners who are deaf and hard of hearing need exposure to literacy skills during their early academic lives. Teaching sign language vocabulary is a foundation for language development, enabling learners to connect words with their meanings through signs, which is essential for building linguistic competence. Storytelling in sign language enhances comprehension by engaging learners in narrative structures, fostering sequencing skills, and promoting critical thinking in their primary mode of communication. Finally, reading stories and texts reinforces these skills, allowing learners to practice and deepen their understanding through exposure to written language in context. Therefore, exposing learners with hearing loss to effective teaching methods that enhance their language and literacy skills is essential. This study investigated the effectiveness of the Reading Method for Early Literacy (RMEL) for early-grade learners who are DHH in Zambia.

Aim of the study

The study aimed at exploring the effectiveness of the RMEL in grade one learners who are deaf and hard of hearing in Zambian primary schools. The study further explores perceptions of teachers for learners who are DHH on Using RMEL in their classrooms.

Research Objectives

The study was guided by the following objectives;

1. To assess the reading abilities of Deaf and Hard of Hearing learners in early grades.
2. To determine the effects of the Reading Method on the Deaf and Hard of Hearing learners in early grades.
3. To explore the perceptions of teachers on the Reading Method for the Deaf and Hard of Hearing learners

LITERATURE REVIEW

Literacy of Learners who are Deaf and Hard of Hearing in Early Grades

Early exposure to language is crucial for the acquisition of literacy skills in children who are deaf or hard of hearing (Wang & Andrews, 2017). However, learners with hearing impairments often experience challenges with foundational literacy skills, particularly letter-word identification, in the early grades. The literacy challenges faced by learners who are DHH are linked to the inappropriate methodology used by teachers. Chifinda (2017) writes that the gaps and limitations affect learners who are DHH in Zambia, resulting in the learners experiencing comprehension problems.

The use of inappropriate teaching methods and unsuitable materials (Banja & Mandyata, 2018; Ndonyo et al., 2017) has been reported to affect the education of learners with hearing impairments. Ndonyo et al. (2017) established that teachers of learners who are deaf and hard of hearing were using inappropriate teaching methods. The study also reported insufficient teaching resources for learners with hearing impairments, which resulted in learners' difficulties in developing literacy skills.

Reading proficiency among learners with hearing impairments remains consistently lower than that of their hearing peers, regardless of the degree of hearing loss (Antia, Jones, Reed, & Kreimeyer, 2009; Easterbrooks & Beal-Alvarez, 2012; Traxler, 2000; Runnion, 2017). Antia et al. (2009) found that between 32% and 42% of students with hearing impairments performed below average on standardized reading comprehension assessments, further emphasizing the challenges these learners face. Similarly, Spencer, Barker, and Tomblin (2003) found that children with cochlear implants performed worse than their hearing peers on reading comprehension tests, suggesting that even with assistive technology, learners with hearing impairments continue to struggle with reading comprehension.

The challenges experienced result in significant gaps between the reading skills of learners who are deaf and hard of hearing (DHH) and their hearing peers, a disparity that has persisted over time. Kotowicz (2020) attributes the lower levels of reading skills among learners who are DHH to their delayed language development. As a result, many learners who are DHH face difficulties acquiring critical literacy skills and struggle to develop reading abilities beyond the elementary level. Studies continue to show that reading comprehension remains a major concern for learners who are deaf or hard of hearing (Benedict, Rivera, & Antia, 2015). This aligns with the findings from Zambia's National Assessments in reading from 1999 to 2003, which indicated that learners with special education needs, including those with hearing loss, had the lowest performance in literacy development compared to other disability groups (MoE, 2003; Banda, 2021). Further research from Zambia has also documented challenges such as difficulties in communication, word reading, spelling, and sentence comprehension among learners with hearing impairments (Mandyata & Kamukwamba, 2018; Chifinda, 2017; Manchishi, 2015; Kumatongo & Muzata, 2021).

Despite most studies conducted in Zambia showing learners who are DHH experiencing literacy problems, some studies done outside Zambia have shown that learners who are DHH can acquire literacy skills in early grades. Birinci & Sarıçoban (2021) found that learners with hearing impairments showed significant improvement in vocabulary when using visual materials. Their study, which involved both a control and experimental group, revealed that the experimental group, who were taught vocabulary using visual items in addition to sign language, had greater vocabulary growth compared to the control group. This suggests that using visual support alongside sign language may enhance vocabulary acquisition for learners with hearing impairments.

The use of storybooks with explicit instructions to teach novel words to pre-school learners with hearing impairments was found to improve vocabulary in learners. Bobzien et al.(2015) used story reading with explicit instructions to teach novel words to pre-school learners with bilateral hearing loss of various degrees and found that all the learners improved their vocabulary. In this study, it can be noted that appropriate teaching resources are inevitable in literacy development for learners who are deaf and hard of hearing.

The use of visualization was to promote a causal relationship between the language for learning curriculum and an increase in language accuracy for learners with hearing impairments. A study by Bennet et al. (2014) to promote learners' ability to respond to a picture prompt by producing grammatically correct sentences by either using spoken or English-based sign system was implemented for four 11 year old learners with moderate to profound hearing loss. The Language for Learning curriculum, which consisted of 100 lessons with different strategies of learning language, such as actions, descriptions of objects, information, and background knowledge, increased learners' language accuracy (Bennet et al.,2014).

Associating words with their images to teach learners with hearing impairments using interactive technology was found to be effective in promoting learners' vocabulary. Massaro & Light (2004) used computer animated tutor to enable learners to associate words with their images. Learners with hearing impairments would progress through a series of exercises such as presentation, perception of words, reading, and spelling (Massaro & Light, 2004). In this study, the use of interactive technology revealed a significant effect on the acquisition of vocabulary in learners.

Reading challenges in students who are deaf are often attributed to variability in early language exposure. Many children who are deaf experience relative impoverishment in their early language input, which can hinder their reading development. While bilingual education, which promotes the use of both sign language and written language, is sometimes proposed as a solution to these challenges (Center for ASL/English Bilingual Education and Research, 2002), there is limited empirical evidence supporting its effectiveness in improving literacy outcomes (Mayer & Akamatsu, 1999, 2003; Rydberg, Gellerstedt, & Danermark, 2009). Research indicates that early access to fluent language, especially for children with deaf parents, is linked to better reading achievement (Chamberlain & Mayberry, 2000; Padden & Ramsey, 2000). However, even deaf children of deaf parents do not always achieve the same reading proficiency levels as their hearing

peers (Marschark & Wauters, 2008). While language-rich early environments are important for age-appropriate literacy skills, they alone may not be sufficient for overcoming the barriers to reading development faced by learners who are deaf or hard of hearing

Studies that have shown positive literacy skills in learners with hearing impairments have been linked to the use of appropriate pedagogy. Incorporating appropriate methodology in the teaching and learning processes of learners who are deaf and hard of hearing is likely to improve their literacy skills. It is therefore important for teachers of learners who are deaf and hard of hearing to explore various methods that can enhance the literacy abilities of learners who are deaf and hard of hearing.

The Reading Method for Early Literacy for Learners Who Are Deaf and Hard of Hearing

The Reading Method for Early Literacy (RMEL) is founded on the principle that learners who are deaf require teaching strategies specifically designed to meet their unique needs. This approach includes strategies aimed at bridging the gap between the learners' sensory limitations and the essential components of literacy development.

The RMEL is based on the understanding that language acquisition must occur before literacy development. Reading is not just a standalone skill; it is an extension of language. Hearing children typically enter school with well-developed spoken language skills, which they acquire through daily interactions and incidental learning. They have extensive vocabulary, a solid grasp of grammar, and an internalized understanding of the phonological structure of spoken language. This phonemic awareness enables them to connect sounds to written words and decode text efficiently. In contrast, children who are DHH lack these foundational language skills upon entering school due to limited access to spoken language. Many deaf children do not acquire sign language until they start school, while others only begin learning spoken language when they start reading. As a result, their language development is significantly delayed, making it difficult for them to attach meaning to written words. Unlike hearing children, they cannot naturally develop phonemic awareness, making traditional phonics-based reading instruction ineffective.

To address this, the RMEL prioritizes language development before literacy instruction. This approach aligns with research demonstrating that proficiency in sign language is positively correlated with reading ability (Strong & Prinz, 1997; Hermans et al., 2008). By developing signing skills first, learners who are DHH build a strong linguistic foundation upon which literacy instruction can be effectively introduced. The RMEL is organized into four primary steps: teaching sign language vocabulary, using sign language stories, teaching words, and engaging in reading stories and texts. This method aims to foster language development through visual and multisensory input, leveraging the strengths of deaf learners' visual processing abilities.

One of the key instructional strategies used in the RMEL is PERC, which stands for *Pretreat, Elucidate, Reinforce, and Check*. The Pretreat phase involves activating prior knowledge by introducing novel signs and showing how they can be used in context. Elucidate focuses on

providing clear explanations of the signs and their meanings, using language, demonstration, visualization, and graphic design to ensure that learners can grasp the new concepts. Reinforce aims to consolidate the new signs, ensuring that learners understand and can use the words in context. Signs and their meanings are repeated until learners fully grasp them, with repetition emphasized, at least eight times for mastery . Finally, the Check phase assesses whether learners have internalized the new signs through activities designed to test their retention and understanding.

The first two steps primarily focus on teaching novel signs. The process begins with the teacher carefully selecting words that will be introduced to the students. These words may be unfamiliar to the students, requiring clear definitions and context to help them attach meaning. To aid this process, the teacher creates semantic networks, which are visual representations of the connections between the new word and related words or concepts. A semantic network is a vital tool in human memory, storing definitions and linking words to meanings (Kamiya, 2023). From a sign language perspective, the Semantic Network Model (SNM) helps represent the relationships between concepts, offering a structured way to understand and memorize signs (Kang et al., 2022).

In RMEL, visualization plays a central role in helping learners understand new vocabulary. By accompanying new words with graphic designs and images, the method helps reinforce the connection between signs and their meanings. This approach is particularly effective for learners with hearing impairments, as visual aids provide concrete support for understanding abstract concepts. Language, which can be fleeting, is made more tangible through the use of visualization, aiding in the comprehension and retention of written words . Graphic designs can take various forms, such as stairs, umbrellas, or word spiders, depending on the teacher's preference and the specific vocabulary being taught.

After creating the graphic design, the teacher engages learners in a “Two Minutes of Fame,” a fun and dynamic activity where new signs are introduced through a brief play or skit. This approach captures the students' attention and makes learning more engaging. Following this activity, consolidation games are incorporated into the routine to reinforce the new signs. Learning games are an essential component of the RMEL, as they help promote attention, increase motivation, and stimulate engagement, which are all critical for effective learning (Khenissi, Bouzid, Essalmi, & Jemni, 2015). Games such as ball toss, flashcards, and “throw the dice” are incorporated into daily routines and played at least twice a day to enhance vocabulary retention and comprehension.

The Direct Instruction Model (DIM) is a key teaching method used in the RMEL. This model is teacher-directed, where the teacher takes an active role in demonstrating, explaining, and guiding learners through the learning process. One of the strategies within DIM is the "sandwich" approach, where two modalities are used: the teacher first signs the word, followed by showing the word on a card, and then repeats the sign. Research has shown that the sandwich approach can significantly improve reading comprehension skills (Maryline, 2021). Another strategy is chaining, which uses multiple modalities, such as signing, fingerspelling, showing the word, and

using pictures to represent the new word. Both approaches are guided by the “I do, we do, you do” structure, which promotes active participation from the learners.

As part of the Reading Method, deaf and hard of hearing learners are also exposed to reading stories. Depending on the learners' levels, the teacher can write stories based on the novel words and concepts introduced through the "Two Minutes of Fame" and other lessons. During the storytelling process, the teacher uses *wh*-questions (who, what, when, where, why) before, during, and after the story to encourage comprehension and engagement. The Direct Instruction Model is also employed in story reading, where the teacher models reading, guides the students, and eventually encourages independent reading, following the same "I do, we do, you do" approach.

METHODOLOGY

Study Population

The study involved a total of 90 participants, comprising 60 Grade One learners who are deaf and hard of hearing (DHH) and 30 teachers of learners with hearing impairments. The learners were drawn from selected schools in Choma and Mazabuka districts of Southern Province, and Lufwanyama, Mufulira, Kitwe, Chilabombwe, and Ndola districts of Copperbelt Province in Zambia. The average age of the learners was 11 years. A purposive sampling method was used to select both teachers and learners. Of the 30 teachers, 10 were from Southern Province and 20 from Copperbelt Province.

Research Design

The study employed a mixed-methods approach using a concurrent nested design, which involves the simultaneous collection of both quantitative and qualitative data. In this design, one method (quantitative) was dominant, while the qualitative component was embedded to provide deeper insights. A sub-sample of the main participants (teachers) was used for qualitative exploration, aligning with best practices in nested design methodology (Kumatongo & Muzata, 2021b; Berman, 2017).

Test Instruments

To assess literacy outcomes, two cross-out tests were administered to the learners: a vocabulary and word decoding test, both designed to measure early grade vocabulary acquisition in DHH learners. These instruments evaluated learners' recognition and decoding abilities related to visual and written vocabulary. Additionally, a semi-structured questionnaire was used to collect qualitative data from teachers, capturing their experiences, perceptions, and recommendations regarding the Reading Method for Early Literacy.

Intervention

The intervention group, consisting of 45 learners, was taught reading using the Reading Method for Early Literacy. The control group of 15 learners continued with standard reading instruction methods typically used in Zambian schools for learners with hearing impairments. Before data collection, participating teachers who taught learner in the experimental group received training in the Reading Methods for Early Literacy to ensure consistent implementation of the intervention, whereas teachers of learners in control groups taught learners using other methods used in Zambian schools.

Procedure

The study was conducted over one academic year. Learners in both the experimental and control groups were assessed at two points: Phase 1 (after six months of instruction) and Phase 2 (after twelve months). The same vocabulary and word decoding tests were administered at both phases to track progress. Ethical clearance for the study was obtained from the Zambian Ministry of Education. Informed consent was sought from the teachers and guardians of the learners before data collection.

Quantitative data (test scores) were analyzed using Analysis of Variance (ANOVA) in SPSS version 26, focusing on the Difference of Differences (DoD) between experimental and control groups across both testing phases. Qualitative data from teachers' responses were analyzed thematically using inductive coding, identifying recurring themes that provided insights into the practicality and perceived effectiveness of the RMEL.

RESULTS AND DISCUSSION

The study aimed to establish the impact of interventions across two experimental phases on participants' performance in cross-test evaluations, focusing on both the picture and word versions. To analyze the data, the study employed descriptive statistics using ANOVA to determine the Difference of Differences in the experimental and control group, between the two phases of cross out tests.

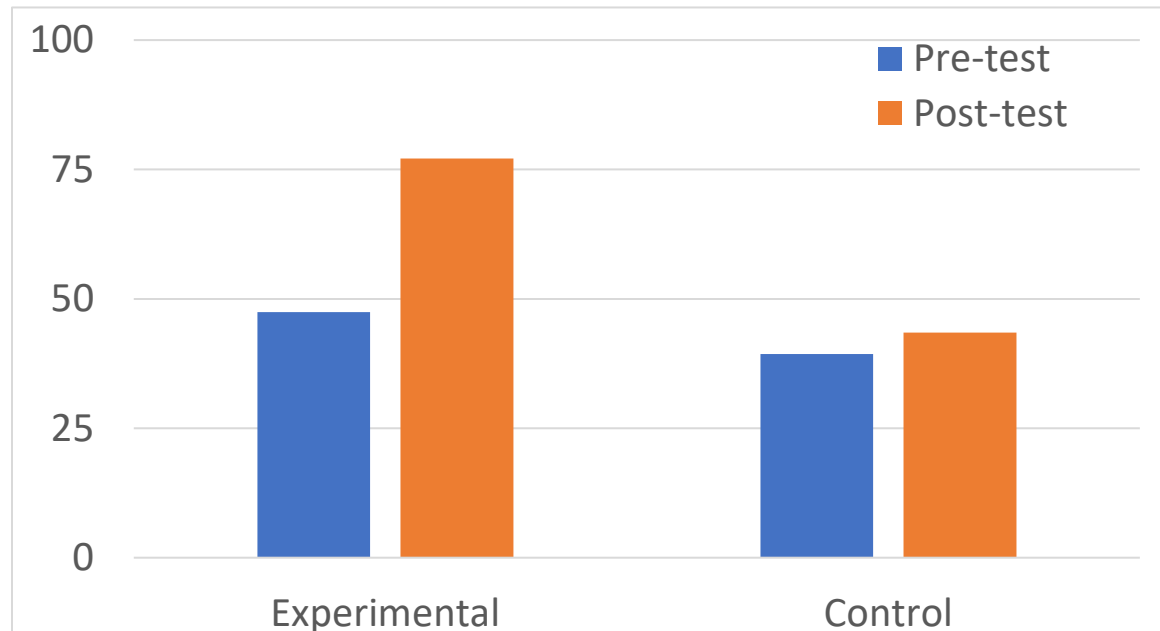
Table 1: Descriptive statistics for vocabulary test

	Phase 1			Phase 2		
	N	M	SD	N	M	SD
Experimental	42	9.38	2.97	45	15.82	3.46
Control	13	7.38	1.89	15	8.73	3.49

The experimental group showed a marked improvement in mean scores from Phase 1, which showed ($M = 9.38$, $SD = 2.97$), to Phase 2, which showed ($M = 15.82$, $SD = 3.46$), with a mean increase of 6.44 points. Similarly, the control group showed an increase in mean scores from Phase 1 ($M = 7.38$, $SD = 1.89$) to Phase 2 ($M = 8.73$, $SD = 3.49$), corresponding to an improvement of 1.35 points.

The Difference of Differences (DoD) = $\Delta M(\text{Experimental}) - \Delta M(\text{Control}) = 6.44 - 1.35 = 5.09$ The Difference of Differences (DoD) is 5.09, indicating that the experimental group showed a significantly greater improvement of (5.09 units) on picture version tests between phase 1 and 2 compared to the control group.

Graph 1: Positive impact of RMEL intervention on vocabulary skills



Repeated measure analyses of variance with Time (Pre-test / Post-test) as within subject variable and Group (experimental / control) as between-subject variable revealed a significant interaction between Time (Pre-test / Post-test) and Group (experimental / control): $F(1,58) = 39.46$, $p < .001$, effect size = .41

The Post-hoc analyses revealed that the effect of time for the experimental group was $F(1,44) = 204.43$, $p < .001$, effect size = .82, indicating an increase in learners' signing skills. The effect of Time for control group was $F(1,14) = 1.88$, $p > .1$ indicating no significant increase in children's signing skills.

The percentage correct for Pre-test on the experimental group was 47,44 and the Post-test was 77,11, showing an improvement of 62.55%. For the control group, the Pre-test percentage was 39,33 and the Post-test at 43,67, indicating an improvement of 11.03 %.

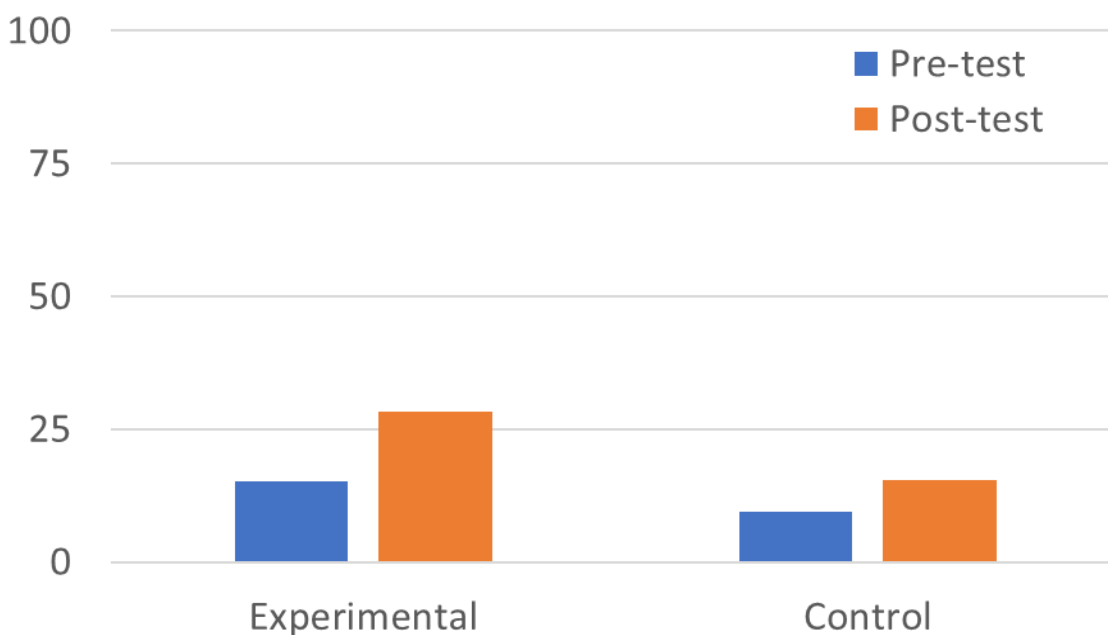
Table 2: Descriptive Statistics for word decoding test

	Phase 1			Phase 2		
	N	M	SD	N	M	SD
Experimental	45	3.04	1.73	43	5.53	1.98
Control	15	1.87	1.36	15	3.15	1.86

The mean scores for the experimental group increased from Phase 1 ($M=3.04$, $SD=1.73$) to Phase 2 ($M = 5.53$, $SD = 1.98$), reflecting an improvement of 2.49 points. In the control group, mean scores rose from Phase 1 ($M = 1.87$, $SD = 1.36$) to Phase 2 ($M = 3.15$, $SD = 1.86$), showing a smaller improvement of 1.28 points.

The Difference of Differences (DoD) = $\Delta M(\text{Experimental}) - \Delta M(\text{Control}) = (2.49 - 1.28 = 1.21)$. The Difference of Difference is 1.21, indicating that the experimental group showed greater improvement (1.21 units) between phase 1 and phase 2 of the cross-out test word version compared to the control group.

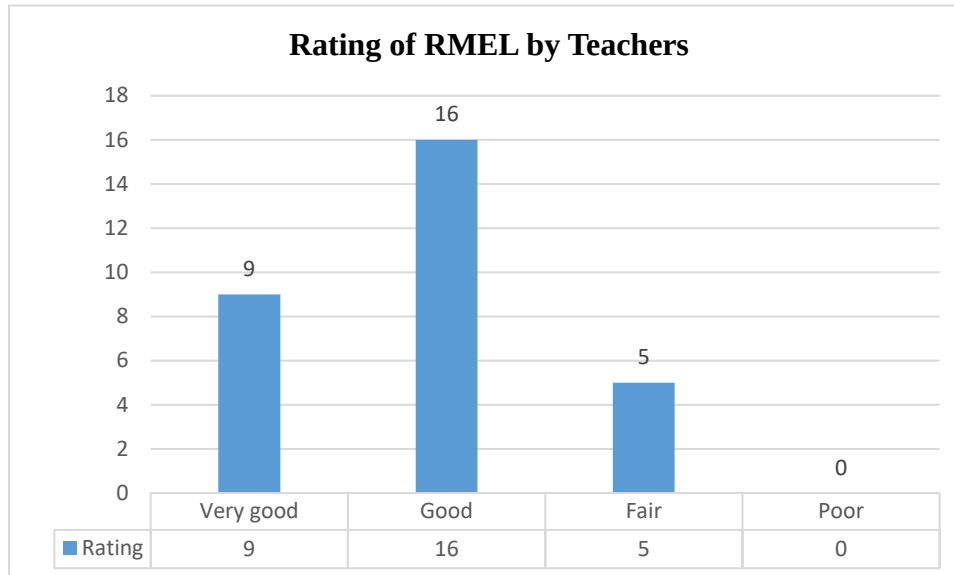
Graph 2: Positive impact of RMEL intervention on decoding skills



Repeated measure analyses of variance with Time (Pre-test / Post-test) as within subject variable and Group (experimental / control) as between-subject variable revealed significant interaction between Time (Pre-test / Post-test) and Group (experimental / control): $F(1,58) = 5.22$, $p < .05$, effect size = .08

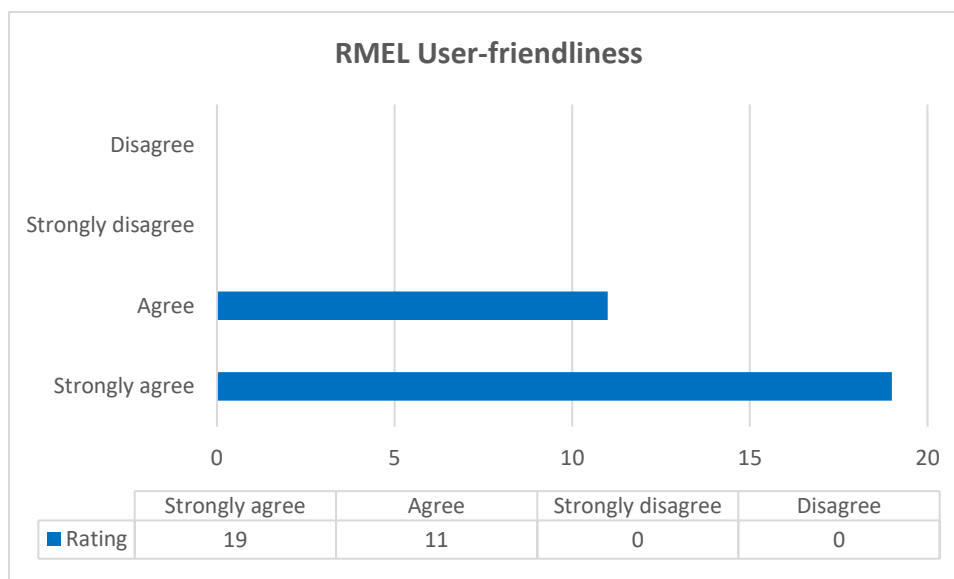
The Post-hoc analyses indicated the effect of time for experimental group $F(1,44) = 60.62$, $p < .001$, effect size = .58; children's decoding skills increased, and the Effect of Time for experimental group $F(1,14) = 12.39$, $p < .005$, effect size = .47. Children's decoding skills increase. In this study, the RMEL leads to a larger increase in word decoding skills than the usual reading method, with the percentage of correct responses at 15,22 and Post-test at 28,22 for the experimental group, while the control group had a percentage correct of 9,33 for the Pre-test and 15,33 for the Post-test.

Graph 3: Rating of RMEL by teachers



Graph 1.2 shows that sixteen (16) out of thirty (30) teachers rated the methods good and nine (9) teachers very good, implying that twenty (25) teachers who used the Reading Method were in favor of the method, whereas five (5) teachers rated the method fair.

Graph 1.3: Responses of teachers on using RMEL for the DHH learners



Graph 3 indicates that nineteen (19) out of thirty (30) teachers strongly agreed to use the Reading Method easily whereas eleven (11) teachers agreed. The findings show that teachers who used the Reading Method were able to teach the DHH learners easily. Some of the themes that emerged teachers responded that Reading Method *consolidate learning, methods are beneficial to both*

teachers and learners and that learners grasp the concepts easily. The following are some responses from teachers.

One of the teachers responded that;

“The methods consolidate learning due to several activities when delivering the lesson to the learners with hearing impairments... The use of fingerspelling, sign language and pictures are very helpful to the learners.”

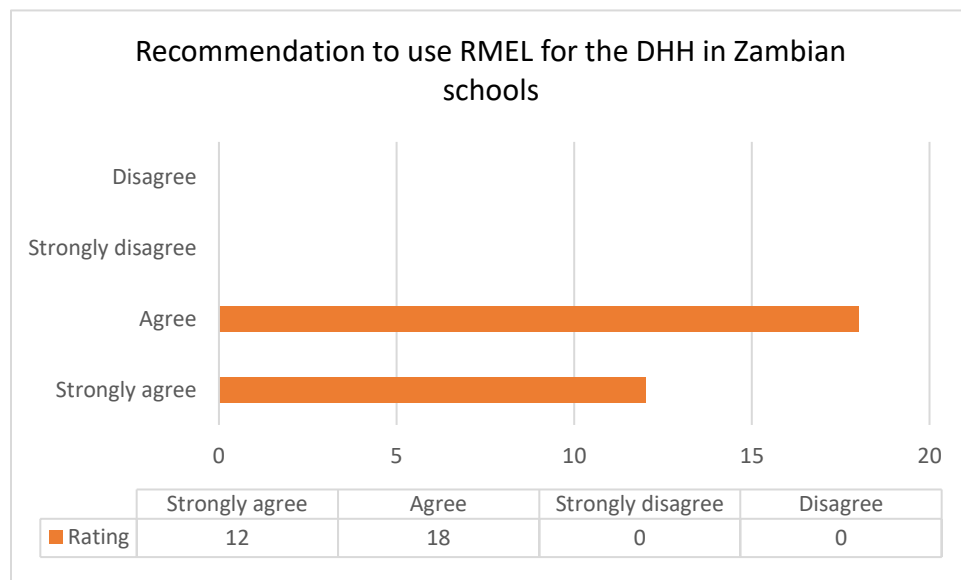
The response was that the various activities employed when using Reading Method such as visualization, sign language and fingerspelling were deemed to foster consolidation during learning.

Another response from one of the teachers was that;

“The learners are able to grasp the concepts easily, because they are able to see pictures and then learn a word...the methods even help slow learners.”

Based on the response above, it can be noted that the sequencing of activities when using the Reading Method, where the use of pictures or visualization is done first, before the introduction of words, was effective to grasping of concepts by learners who are deaf and hard of hearing. The concept of pictures helping learners to easily grasp concepts concurs with other scholars, such as Birinci & Sariçoban (2021); Bennet et al. (2014), who found that to use of visualization to be effective in teaching vocabulary to learners who are deaf and hard of hearing.

Graph 4: Recommendation by Teachers to use RMEL to DHH in Zambian Schools



Graph 1.4 show that all the thirty (30) teachers of the hard of hearing learners recommended the use of Reading Method for the DHH in Zambian schools. The themes that emerged from teachers' responses were that; *Method help teachers achieve goals, learners grasp concepts faster, the method is active oriented and captivates learners' interests*. The following are some of the verbatims;

One of the teachers' responses was that;

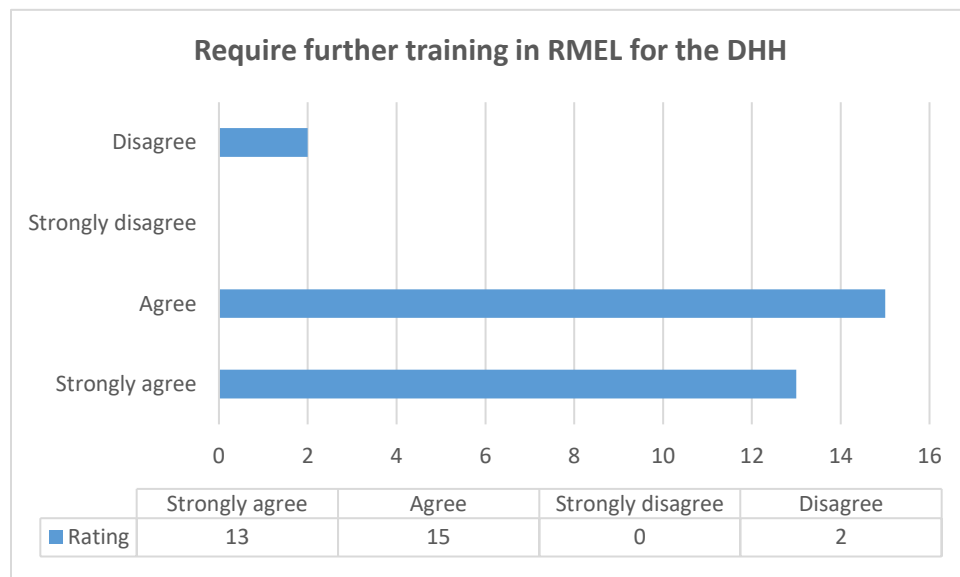
"I have used the method and have achieved my intended goals, especially for the young learners who know nothing. The method helps learners ...develop skills"

The other response was that;

"I strongly agree that the method should be used in Zambia to teach the deaf and hard of hearing learners because of the literacy benefits for the learners."

The responses from teachers indicate that recommendation on the use of Reading Method for the deaf and hard of hearing learners is based on the method helping teachers meet intended goals to develop reading skills. It has to be noted that when using the RMEL, learners are exposed to fingerspelling words. Fingerspelling words help learners to develop the skill of sequencing letters in a word. If learners can correctly sequence letters in a word, then they can also write the word correctly.

Graph 5: Teachers Responses on Further Training in RMEL



Graph 5 presents responses from teachers of learners with hearing impairments. The graph shows that twenty-eight (28) out of thirty (30) teachers indicated the need to receive further training on Reading Method for the deaf and hard of hearing learners and two (2) teachers disagreed with the

idea of having further training on the reading method. Some of the themes based on teachers' responses were; *the need to revise the method, the need to acquire additional knowledge, the need to improve teaching skills, and the need for the latest information.* Responding to the question, one of the teachers expressed that;

“There is need for more training so that teachers can acquire more knowledge and use appropriate activities when teaching reading to learners who are deaf and hard of hearing.”

The other response was, *“yes, there is need to revise on teaching skills from time to time in order for me to effective when teaching learners with hearing impairments.”*

Another teacher responded that, *“We need more training so that we have latest information...on how to teach our learners with hearing impairments.”*

The responses from teachers of learners with hearing impairments indicate the desire to acquire additional knowledge, particularly in the area of Reading Method for the deaf and hard of hearing. Despite the study revealing that nineteen (19) out of thirty (30) teachers strongly agreed to using the RMEL easily whereas eleven (11) teachers agreed to using it with ease (see graph 1.3), the desire for more knowledge and skills to teach learners with hearing impairments effectively seem to influence seeking further training .

CONCLUSION

The study assessed the effectiveness of the RMEL for improving reading outcomes among deaf and hard of hearing (DHH) children in Zambia. The study focused RMEL on learners' vocabulary development. The findings indicate that the RMEL has a positive impact on both, vocabulary acquisition and word decoding skills. Through the Difference of Differences (DoD) analysis using ANOVA, the study established a net improvement of 5.09 units in the experimental group compared to the control group on the cross-test picture version (vocabulary), and a 1.21 unit improvement on the cross-test word version (word decoding).

The evidence shows that while the picture-based vocabulary tests demonstrated a more substantial gain, there was also measurable progress in decoding skills, indicating that the method supports early components of reading development. However, the assessment did not fully capture reading comprehension or fluency skills. Therefore, it is necessary to complement the research on RMEL by assessments that also cover those aspects of the reading process. For now, we can conclude that the RMEL effectively supports vocabulary development and early decoding skills, which are foundational to reading.

Furthermore, teacher feedback overwhelmingly supported the method, highlighting its usability, effectiveness, and positive impact on learner engagement and concept acquisition. The use of

visual aids, fingerspelling, and sign language was seen as particularly beneficial for consolidating learning and supporting concept grasp.

RECOMMENDATIONS

1. In Zambia, there is a need to train more teachers of deaf and hard of hearing learners in the RMEL so that more teachers are exposed to effective methods of teaching.
2. There is a need for longitudinal research as the study investigated the impact of only two semesters, with a small sample size of the control group.
3. Further studies need to be conducted to ascertain additional areas of reading abilities enhanced in learners with hearing impairments using RMEL. The word decoding task should be adapted to ensure effectiveness in assessment tools.
4. It is strongly advised to incorporate the RMEL into teacher education curricula at institutions training special education teachers to ensure new educators are equipped with these effective strategies from the outset.
5. Continuing Professional Development (CPD) should be enhanced to enable teachers for learners with hearing impairments to acquire appropriate methods to teach the learners.

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