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A Bilingual–Bicultural literacy programme for deaf learners in Namibia

Abstract

The poor academic performance and literacy level of deaf learners in Namibia are a major concern, and it is necessary to understand the centre of the situation. Even though deaf learners can become proficient readers and writers, the challenge remains in finding an appropriate instructional approach to attain these results. This presents an even greater challenge, as deaf learners not only differ from their hearing peers, but also significantly differ from one another in terms of their various familial and social contexts, language use, and overall holistic development. The Bilingual-Bicultural approach is considered a good approach for teaching deaf learners, and it offers them the chance to become biliterate; therefore, this study explored the impact of a Bilingual-Bicultural literacy program on 41 d/hh learners (age = 7-13 yrs). Through a one-group pre-test post-test design, participants were pre-evaluated, followed by an intervention and post-evaluation. The intervention's main goal was to implement practical teaching strategies using a Bilingual-Bicultural teaching approach that can reduce the delay and gap in language learning and literacy for deaf learners. Results from t-tests calculated to determine the statistical significance of the pre and post-test concerning the total scores and all the sub-tests for NSL as well as Written English skills indicated significant results (p< 0.05). The study offers insight into the psychology of teaching deaf learners while advancing the Bilingual-Bicultural approach's theory and application. Additionally, it promotes debate of the best practices for ensuring that deaf learners receive a quality education and full participation in society.

Keywords: *Bilingual-Bicultural, Biliteracy, Deaf Education, Namibian Sign Language, Translanguaging, Written English*

1. Introduction

Literacy's fundamental components are reading, writing and the ability to understand and apply written information to daily tasks. In addition to being able to think and reason within a particular community, being literate also means being able to accomplish objectives and grow in knowledge and potential through language (Steward & Clarke, 2003; Ortiz & Ordoñez-Jasis, 2010). Thus, regardless of the language or language modality, a literate person should be able to think critically about information and process it in a way that allows them to connect with others (Kuntze, Golos

& Enns, 2014). Concerns about the low literacy and substandard academic achievement of deaf learners have been ongoing (Qi & Mitchell, 2012; Hrastinski & Wilbur, 2016; Mayer & Trezek, 2020). It is no different in Namibia, and a need to understand and resolve this scenario has arisen.

Sign bilingual programmes have been a part of the educational environment since Sweden's first classes were established in the early 1980s, and their implementation has been realised on a global scale for more than 20 years (Mayer & Trezek, 2020). Although the sign bilingual-bicultural approach is considered an effective method for helping deaf learners become bi-lite-rate, deaf learners in Namibia continue to do poorly even with this approach in place.

According to the claim that forms the basis of the bilingual model for deaf learners, if a child's natural Sign Language is completely developed and utilised as the main language of instruction, their literacy in a second language, or spoken language, will advance. This is based on the linguistic interdependence theory proposed by Cummins (1981), who contends that mastery of a first language is an essential requirement for learning a second language. Questions are, however, raised about the applicability of the linguistic interdependence model of Deaf Education in which Sign Language as a first language, and a written or spoken lan-guage as a second language do not share a common mode (Holzinger & Fellinger, 2014; Mayer & Trezek, 2020). Finding appropriate teaching practices to achieve the desired literacy outcomes for deaf learners therefore remains a challenge in Namibia.

According to Kuntze *et al*. (2014), Deaf adults who struggle to acquire English through print can relate best to their deaf children's difficulties by drawing on their own difficulties and struggles when they were younger. Thus, they have personal experience and can help their children. Kuntze *et al*. (2014) cite these parents as examples of practices that can be used in a classroom setting to teach deaf learners to read and write. These practices include interpreting print by using Sign Language or integrating fingerspelling, Sign Language, and print in conversations with deaf learners. This method is seen not as language mixing but, as stated by Garcia and Cole (2014), as Translanguaging. Translanguaging is a pedagogical means that involves switching between Written English and Sign Language to improve comprehension (O'Neill, 2017). Based on this premise, this study offers a discussion on the methods used in a bilingual-bicultural literacy intervention programme for learners who are deaf in Namibia. The programme's objective was to develop and put into practice teaching strategies for the bilingual-bicultural method that will meet the needs of learners who are deaf in Namibia.

2. Literature review

Literacy skills, also referred to as appropriate reading and writing skills, are crucial for success in educational environments. Without age-appropriate reading and writing abilities, learners are less likely to participate in class activities and are more likely to fail academically, which can cause problems with employment and social adjustment (Hrastinski & Wilbur, 2016). Studies indicate that, generally, deaf learners perform substantially lower in school and have lower literacy skills when compared to their hearing counterparts (Hrastinski & Wilbur, 2016; Mayer & Trezek, 2020). This implies that deaf learners have difficulty learning reading and writing skills. There is a complicated link between deafness and poor English literacy that is influenced by many variables including language competence, academic achievement,

cognitive ability, family history, and reading and writing proficiency test design. It is rare for deaf learners to become proficient in spoken or signed languages to the point of having conversations. This means that when they begin learning to read and write, they are devoid of the proper vocabulary and sentence structure that children who are hearing possess (Hrastinski & Wilbur, 2016).

As per Storbeck (2016), the concept of bilingualism in Deaf education acknowledges that Sign Language serves as the primary language for deaf learners. According to this bilingual approach, many deaf learners are raised in hearing communities without being exposed to a language they can learn quickly or naturally pick up their family's language. Thus, the spoken language that the family or community uses is acknowledged as the second language, with an emphasis on the development of second language literacy (Storbeck, 2016; Mayer & Trezek, 2020). The goal of sign bilingual education is to recognise the special qualities of Deaf culture and Sign Language while simultaneously pursuing the humanitarian and democratic goals of social inclusion and diversity (Swanwick, 2016) This approach provides deaf learners with access to and inclusion in an educational system, in addition to providing them with the chance to study Sign Language and a spoken or written language. A bilingual education strategy benefits deaf learners, because it allows them to access the curriculum in their language and within a setting that values deafness, Sign Language, and Deaf culture (Knoors, Tang & Marschark, 2014a; Swanwick, 2016).

Deaf learners are different from hearing learners. They are also distinct from one another in terms of their various familial and social contexts, linguistic abilities, and overall development. It is challenging to teach all deaf learners using the same approach, due to the individual differences among them and the many variables that affect learning within a sign bilingual programme. Finding the best teaching strategy to use when using a bilingual-bicultural approach to teaching while also fulfilling each deaf learner's criteria is a challenge. Unlike hearing bilinguals, the concept of Deaf bilingualism holds that the flexibility of language practices used by Deaf people is not a pragmatic choice, but rather a 'pooling of resources' to generate meaning. For the Deaf person, this 'language mixing' is a crucial tool that strengthens the functionality of bilingual development through metalinguistic reflection, necessitating various pedagogical approaches (Garcia & Cole, 2014). The metalinguistic awareness of the deaf learner is one of the linguistic skills and refers to the understanding of the separation of Sign Language and spoken language/written language and their existence as two mutually separate linguistic modalities (Kovačević, Isaković & Arsić, 2019). In Deaf education, this relates to the use of sign, spoken and written language in the classroom by both deaf educators and learners (Swanwick, 2017).

Swanwick (2016) states that research highlights the significance of Deaf parents' opinions and experiences as parents in understanding the development of biliteracy and guiding instructional and support approaches. According to Hoffmeister and Caldwell-Harris (2014), deaf parents teach their deaf children more efficient ways to help with English literacy. These include teaching meaning sets and other methods that go beyond merely mapping translation equivalents, helping with English polysemies, and matching English print words with related signs. When their children have trouble with English in a bilingual learning setting, Deaf parents help them based on their own experiences. They talk about problems they had and how they solved them when they were learning English via printed materials. Swanwick (2016) reports that research has looked at how bilingual Deaf parents mediate between written language

and Sign Language during book-sharing events with their young deaf children. Some of the strategies used by Deaf mothers have been compared to those covered in the educational research, for instance, using Sign Language to define and discuss language in general, as well as to decipher and clarify certain terms or written language elements and customs, such as onomatopoeia or rhyme (also see Howerton-Fox & Falk, 2019).

Deaf parents also employ the techniques of signing in English word order or adding English grammar to a signed conversation (such as a fingerspelled function word). This pedagogical research literature is also listed as a teaching strategy. Aside from linguistic practices, Deaf parents also have a unique manner of position and placement in how they set up a book, their child, and themselves for story-time activities. By touching them and using non-verbal cues, Deaf parents can capture and hold their child's focus. They use signing grammar to indicate changes in action, add character or emphasis, and give life to books' narratives (Swanwick, 2016).

Hoffmeister and Caldwell-Harris (2014) and Swanwick (2016) further discuss how Deaf parents use chaining to link words to signs using fingerspelling. It has been established that very young deaf children interpret fingerspelled words as a single integral shape, but when they are about five years old, they start to realise that written letters and fingerspelled letters have a specific relationship. The connection between the English reading vocabulary of deaf learners and their fingerspelling abilities is positive. Consequently, integrating fluent fingerspelling into classroom teaching is a promising method that may improve reading ability (Swanwick, 2016). Chaining is thus another method that has been mentioned in literature for training deaf children to read and write. This approach is used by Deaf parents to underline the semantic equivalency between the two languages and to teach their deaf children new vocabulary in English. This approach is viewed as translanguaging, as defined by Garcia and Cole (2014), which is the process of alternating between Written English and Sign Language to improve understanding (O'Neill, 2017). It also involves creating a vibrant communication environment where learners may interact with others and discuss a variety of subjects while connecting them to English print. More than 90% of deaf learners are not exposed to such a language-rich environment, but deaf children who have parents who are deaf naturally benefit from such language-rich environments. According to Kuntze *et al*. (2014), deaf learners' limited opportunities and inadequate support systems for learning to read and write through visual means may be the cause of their slow progress in reading and writing development rather than their incomplete grasp of English phonemes.

The fact that deaf learners are naturally visually oriented has been overlooked throughout the history of Deaf education as the focus has been on the lack of auditory access rather than the benefits of being visually oriented (Kuntze *et al*., 2014). Written texts, visual processing and Sign Language are other frameworks for visual language. These approaches to visual processing rely on visual learning or learning that is processed via the eyes. Visual attention, gaze behaviour, visual joint attention, and the utilisation of images, illustrations, drawings, prints, films and visual media are some ways to promote visual engagement (Andrews *et al*., 2016). The primary component of literacy achievement is exposure to language, books, print, and extended discourse, because learners who are exposed to print more often will start to create more sophisticated mappings when they come across words or phrases that are difficult to translate into Sign Language (Hoffmeister & Caldwell-Harris, 2014). Therefore, the emphasis is on providing deaf learners with appropriate teaching and learning resources that

meet their needs. As a bilingual pedagogy, translanguaging is essential for helping learners and teachers make sense of language and content as well as for enhancing their extensive and varied language practices (Garcia & Cole: 2014). According to Swanwick (2017), this is a step in the right direction towards a greater understanding of the language repertoires and potentials of deaf learners, and the enhancement of bilingual Deaf education.

3.   Research design and research methodology

The findings of a quantitative research design are presented in this study. Experimentation with a one-group pre-test and post-test approach to gather quantitative data was motivated by the exploration of an intervention programme. The intervention was given to a single group of participants after they had undergone pre-evaluation. Following the intervention, the same group was evaluated for a second time. The research design allowed all the junior primary learners (N=41) at a particular school to benefit from the intervention programme (Creswell, 2014). Diagnostic measurements determined biliteracy skills and the probable effects of the intervention programme on the learners.

Even though a randomised control group is often thought to have a higher level of credibility when establishing the success of an intervention programme (Harris *et al*., 2006), all the learners from the junior primary phase (N=41) were included in the study. This eliminated any ethical issues with choosing a randomised control group and keeping some learners from gaining the benefit of the intervention programme (Creswell, 2014).

3.1 Participants and sampling

The selection of the research participants was guided by stratified purposive sampling, in that the different grades (Grades 1–3) were taken as a stratified population, as it consisted of different groups of distinctly different types of individuals (Leedy & Ormrod, 2016). The participants were purposefully selected based on the selected criteria, i.e.:

- junior primary phase (Grade 1–3) of a school for deaf learners that proclaims the bilingual-bicultural philosophy;

- learners with hearing impairment (deaf);

- no distinction between the level of deafness (d/hh); and

- the inclusion of Namibian Sign Language (NSL) as a medium of teaching and Written English as a second language.

All of the junior primary learners in the limited population sample were consistent with the main phenomenon. The learners were between the ages of 7 and 13. The ages of the learners are not associated with any specific grades. All (N = 41) learners had parents who could hear. The minority of the group (22%) were day scholars and the bigger part of the group (78%) resided in the hostel. From the total number of learners (N=41), 34% had attended CLaSH (the Association for Children with Language, Speech, and Hearing Impairment of Namibia), a kindergarten and early intervention programme for deaf learners, and 66% had never acquired/learned NSL or attended any form of schooling. The diversity of learners in the three grades justified a stratified population within a stratified purposive sample.

3.2 Data-gathering strategies and measuring instruments

Customised diagnostic testing tools were created for Written English and NSL evaluation. According to Knoors and Marschark (2014b), there are several tests with strong psychometric qualities that can be used with a spoken language like English. However, they maintain that the majority of these tests are intended specifically for those who can hear. These tests are unsuitable for evaluating the spoken language of deaf learners, since their proficiency in spoken language varies from that of hearing learners. In contrast to research on spoken language acquisition, Knoors and Marschark (2014b) maintain that evaluating Sign Language proficiency is even more difficult due to the relative paucity of knowledge regarding many elements of Sign Language development. The difficulty of assessing Sign Language is influenced by some factors, including the disparities in proficiency between native and non-native signers, the absence of standardised assessment tools, and the scarcity of tools with strong psychometric properties that are valid and reliable. Pizzo and Chilvers (2019) concur with Knoors and Marschark (2014b) that there are not many assessments available to evaluate deaf learners. This casts doubt on the validity of the assessments, because a deaf learner cannot access test items that are based on auditory notions. Additionally, Pizzo and Chilvers (2019) suggest that translating these test items into a signed language would not be feasible. For these reasons, the diagnostic tools used in the present study were customised specifically for the deaf child in Namibia.

In the NSL and Written English assessment instruments, careful thought was given to which language areas to measure, which assessment methods to utilise, how the assessment should be done, and by whom it should be done (Herman, 2015). Different instruments were designed for every grade level (Grades 1-3). A decision was taken regarding the form and procedure of the assessment after consulting with a deaf colleague, an informed individual from the CCDS (Centre for Communication and Deaf Studies), and the teachers from the junior primary grades (Grades 1-3) at the school for deaf learners. These colleagues also assisted with the content validity checks of the instruments. The items in the assessment instruments were thoughtfully and methodically created to blend manageable activities into more stimulating ones. This was carried out to demonstrate validity and lessen innate biases (Pizzo & Chilvers, 2019). A decision was made to assign the testing to a single person and to evaluate each learner on an individual basis to maintain uniformity. There are five distinct testing components included in the NSL assessment instruments that are focused on Picture Signing, Sign Identification, Picture Story Arrangement, Expression and Communication, and Observation Comprehension. A Namibian Deaf signer signed all the signed texts, and this was produced on videos. During the assessment, the learners watched the videos. The five testing components that comprise the Written English assessment are Word Reading, Word Identification, Fingerspelling, Syntax Development, and Reading Comprehension.

3.3 Procedures

The researcher first secured written approval from the Ministry of Education, Arts, and Culture before receiving final approval from the principal of the school to carry out the study at the particular school. After being invited to a parent meeting at the school, the researcher had the chance to explain the aims and objectives of the bilingual-bicultural literacy intervention

programme to the parents and guardians of the learners. Following that, parents and legal guardians were contacted for written consent before including the learners in the intervention programme. Only after receiving parental and guardian written consent, were learners included in the study.

Before the intervention programme started in February for the academic year, learners took pre-tests in Written English and NSL. The evaluations were completed in compliance with the guidelines provided by the assessment instruments. The learners were exposed to the intervention programme for a complete academic year (February to October). When evaluating learners in October towards the end of the academic year, the same measuring tools that were used for the pre-test at the start of the year were also employed for the post-test.

3.4 The bilingual–bicultural literacy intervention programme

The intervention programme used in this study includes a methodical approach to simultaneously teach deaf learners two languages. It uses a dual-integrated approach, assimilating not only with the weekly theme and topic, but also with some other subjects. Additionally, it incorporates language-specific skills that are taught within each language. For instance, the skill of Word Building in Written English links to Reading, Writing, and Language Structure, and the skill of Observation & Comprehension in Namibian Sign Language (NSL) links to Expression & Communication, Deaf culture & Literature, and Linguistics (see Figure 1).
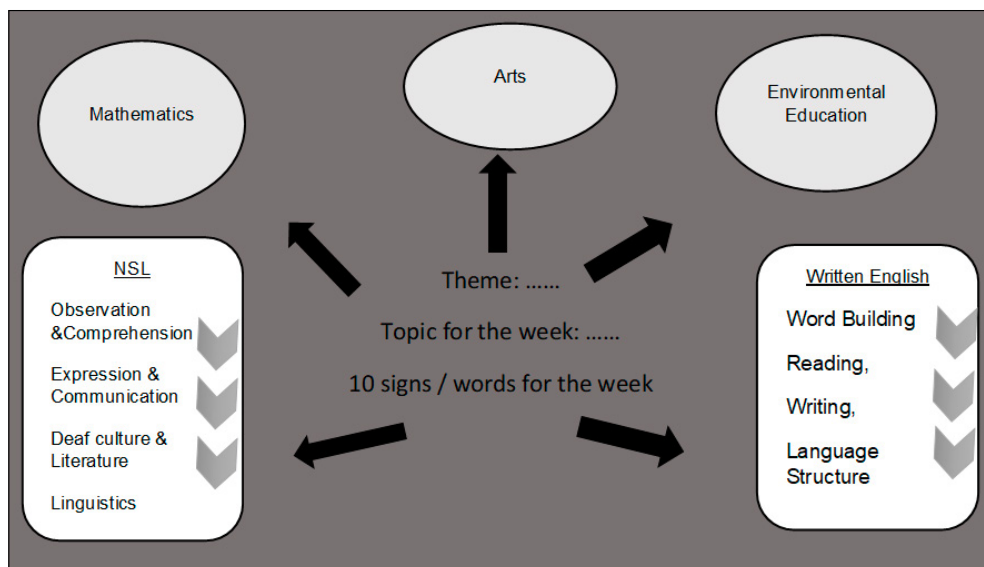

Figure 1: Duel-integrated approach

The approach is systematic in that its goal is to teach learners NSL and Written English in small doses, gradually building on their existing knowledge, keeping consistency, and introducing new vocabulary and grammatical features of each language in tiny dosages. Additionally, it also performs revision by incorporating content that has already been addressed numerous times in previous lessons.

The programme aims to teach Written English by starting with NSL. For instance, new signs are first taught in NSL, and then Written English is used to teach the words associated with the signs. For the learners to learn through this method, the particular words must repeatedly be taught to them to understand and eventually be able to read and write it. Ten new words are completed each week; these words are first presented as ten new signs for the week in the NSL Observation and Comprehension session. The ten signs are introduced to the learners through visuals and a signed story for that specific week, which makes it easy for them to understand. Each time the learners view the images, they associate the new signs with the pictures. Thereafter, they are introduced to the written format of the ten words for the week in the Written English lesson (see Figure 2).

Figure 2: Linear format of sign/word introduction

At the end of the week, the ten words are categorised into Nouns, Verbs, Adjectives and Adverbs, because these are content words with a connection to a visual image that can immediately be translated into NSL. Four different-coloured posters that symbolise the various categories of content words are used for the categorisation. This is done so that the learners can understand the connection between using words they already know to construct, read, and write phrases, and then ultimately sentences.

Reading texts are first given to the learners in the form of a signed story as an observed text before it is given to them in Written English as a reading text. Grammar concepts are also first taught in NSL and thereafter it is taught in Written English. The two languages are compartmentalised by using colour. Written English and NSL can each have their distinct colour. At the start of Grade 1, teachers must introduce the distinctions between the two languages to the learners. In some of the classes, particularly the Written English lessons, translanguaging occurs by using the two colours for the two languages. In these lessons, learners can transfer their existing knowledge and skills from one language to the other. For instance, learners can employ their NSL knowledge and skills in Written English as well as their Written English knowledge and skills in NSL. The teaching of sentence construction is an excellent example. An English phrase can be written by a learner applying the NSL sentence structure. The teacher can then mark on the NSL poster whether the learner used the proper NSL sentence structure or not, while also showing the learner how the sentence should be written on the Written English poster. NSL rules are introduced to learners, such as the fact that an Object comes first in a sentence before the Subject and Verb. In English, the Subject comes first, then the Verb, and finally the Object. The differences between these language rules are indicated on the two colour posters. English will utilise both functional elements and content words, but Sign Language will use more content words (Humphrey & Alcorn, 2007). The learners receive guidance on how to recognise words that are unique to the English language, how to understand a sentence by applying their understanding of content words, and how to examine functional components to understand the sentences further.

The programme reiterates the importance of a suitable, fun, and engaging learning environment for deaf learners to want to learn. Teachers are encouraged to provide posters and other learning materials on topics and lessons that they teach. This is especially useful for more complex topics and topics on language grammar. These topics are sometimes a little more challenging for learners to understand. By providing them with additional learning materials and by putting fun colourful posters on the walls of the classroom and corridors of the school, the learners can similarly review the material in a more relaxed way to help them understand a topic that they might experience as more challenging. The learners are consequently given a chance to learn through accidental learning. Additionally, learners should be given fun methods to learn new signs and words, for instance, through games like word games and small competitions like fingerspellathons. This creates healthy competition among the learners as to who can read the most words and they enjoy themselves while also working hard to acquire new vocabulary. A reading and writing corner is also encouraged by the programme. This is to expose learners to a fun reading and writing setting, to make reading and writing materials easily accessible to learners, and to give both learners and teachers a break from the routine of the classroom. Learners can be relocated to the reading nook to read aloud or to read and write independently. In addition, as a reward for accomplished work, or for finishing tasks promptly teachers can send learners to the reading and writing corner.

4. Results

The pre-intervention test score of 43 out of 100 and the post-intervention test score of 70 out of 100 indicate a considerable improvement in the NSL proficiency of all three grades. As the grades progressed, so did the pre-and post-test average scores. This can be assigned to the progression of years of school attendance in an NSL environment. To compare the deaf learners' pre- and post-test outcomes, i.e. before and after the intervention programme (total scores), paired sample t-tests were used. Results yielded statistically significant when comparing the pre- and post-test NSL total scores: (M=26.82, SD=14.3); t(37)=19.34, $p < 0.0001$).

Out of the five components, Picture Signing and Sign Identification showed the best results. In general, learners did better in the Sign Identification section. This component assesses the ability of learners to recognise the right picture among a set of pictures by using a specific sign provided by the assessor. The Picture Signing component assesses the ability of learners to identify the appropriate sign for an item on a picture. Although learners did better in the Sign Identification component, averaging 17 out of 20 on the pre-test and 19 out of 20 on the post-test, they made greater progress in the Picture Signing component. This indicates that the pre-test average is 9 out of 20, and the post-test average is 17 out of 20.

The learners found it difficult to complete the picture story component in chronological order, particularly during the pre-test. In contrast, the Grade 3 group significantly improved in this component, averaging 15 out of 20 in the post-test compared to an average of 7 out of 20 in the pre-test. The section for Expression and Communication also indicated a challenge to the learners in the pre-test, with an average score of 8 out of 20. However, in the post-test, all grade groups showed an improvement, with an average score of 14 out of 20. When computing inferential statistics, t-tests have also shown significant results for all test variables (i.e. the five sub-tests) included in this study, namely Picture Signing (M=7.29, SD=2.05); t(37)=17.36, $p < 0.0001$); Sign Identification (M=3.74, SD=6.67); t(37)=6.97, $p < 0.0001$); Arranging of

picture stories (*M*=6.18, *SD*=5.83); *t*(37)=8.10, *p* < 0.0001); Expression and Communication (*M*=4.92, *SD*=2.88); *t*(37)=8.65, *p* < 0.0001); and Observation Comprehension (*M*=4.68, *SD*=4.99); *t*(37)=8.50, *p* < 0.0001).

Learners in Grades 1 and 2 scored marks if their signed responses to the WHO, WHAT, WHERE, and HOW questions were complete. In these grades, learners have difficulty expressing themselves and doing so in the appropriate NSL. Thus, the primary goal was to evaluate the learners' ability to convey whatever knowledge they could deduce from an image. Learners in Grade 3 received points for using classifiers, facial expressions, verb movements, and the proper positioning and arrangement of persons and objects. They also received points for following a prescribed format for their narrative, which began with an introduction and concluded with a conclusion. Their ability to arrange the images from a picture story in the correct order is related to their ability to arrange their stories in the correct sequence of events. Since learners in Grade 3 were more advanced and had more years of exposure to NSL, they were evaluated differently. For Grades 1 and 2, the Observation and Comprehension component was more difficult than for the Grade 3 group. Nonetheless, all three grades' post-test results for this component showed improvements.

For Written English, the average pre-test score was 16 out of 100, and the average post-test score was 28 out of 100. This indicates a difference in the overall average score. When compared to the difference observed in the overall average pre-test score of 43 out of 100 and the overall average post-test score of 70 out of 100 for NSL, the difference for Written English is extremely modest. Similar to NSL, scores improved more as grades advanced. The Grade 3 group had a larger difference between the pre-and post-test scores, averaging 21 out of 100 for the pre-test and 49 out of 100 for the post-test. The Grade 1 group demonstrated a very slight difference, with an average score of 10 out of 100 for the pre-test and 12 out of 100 for the post-test. The Word Reading and Fingerspelling activities were challenging to the learners. The pre- and post-test averages for these components ranged from zero to one for the Grade 1 group. The pre-and post-test averages for the Grade 2 group varied from zero to four. The Grade 3 group's Word Reading component average scores differed, averaging 5 out of 30 for the pre-test and 14 out of 30 for the post-test. In the Fingerspelling component, the Grade 3 group also demonstrated dissimilar performance, averaging 0 out of 15 for the pre-test and 5 out of 15 for the post-test.

There was not much difference between the groups in Grades 1 and 2 when it came to the Word Identification component. The Grade 3 group did, however, show a difference, averaging 10 out of 20 for the pre-test and 14 out of 20 for the post-test. Between the Grade 1 and 2 groups, there was little difference in the Syntax Development component. The Grade 3 group showed a difference once again, averaging 2 out of 15 for the pre-test and 8 out of 15 for the post-test.

There was a difference in the Reading Comprehension component across the three groups. The Grade 1 group showed a very small difference, with an average score of 0 out of 20 for the pre-test and 1 out of 20 for the post-test. The Grade 2 group similarly showed a very small difference, averaging 3 out of 20 for the pre-test and 5 out of 20 for the post-test. The Grade 3 group outperformed the other two groups, averaging a score of 3 out of 20 on the pre-test and 7 out of 20 on the post-test. To find out whether these results were statistically significant, paired sample *t*-tests were conducted. The pre-and post-test scores

for the English Written language (i.e. the overall score as well as for the different sub-tests) produced statistically significant results. For example: Total score (M=12.24, SD=28.36); $t(37)$=4.15, $p < 0.0001$); Word Reading (M=4.5, SD=9.22); $t(37)$=4.38, $p < 0.00009$); Word Identification (M=1.55, SD=5.57); $t(37)$=2.84, $p < 0.0072$); Fingerspelling (M=2.3, SD=3.69); $t(37)$=3.93, $p < 0.0003$); Syntax Development (M=1.95, SD=4.02); $t(37)$=2.71, $p < 0.0010$) and Reading Comprehension (M=2.16, SD=5.10); $t(37)$=3.90, $p < 0.0003$).

5. Discussion

The connection between deafness and poor English literacy skills is complex, and some variables, including language ability, academic success, cognitive abilities, and family back-ground, as well as the design of reading proficiency tests all play a role (Hrastinski & Wilbur, 2016). There is a need for children who are deaf to suitably integrate into society (Knoors & Marschark, 2012). This entails, among other things, possessing good reading and writing skills. As stated by Knoors *et al*. (2014a), Swanwick (2016), and Mayer and Trezek (2020), a bilingual education approach offers deaf learners the chance to learn spoken and written language as well as Sign Language. It also gives them access to the curriculum in the language that they can understand best and a setting that respects deafness, Sign Language and Deaf culture. Furthermore, through the bilingual-bicultural literacy intervention programme implemented in this study, there were positive changes in deaf learners' language learning and biliteracy skills. This was confirmed by the teachers who implemented the programme. Some of the changes noted in the learners were observable changes, such as their attitude towards how they approached NSL and Written English. For example, during NSL lessons when they watched stories and poems signed by Deaf adults, they would practise signing them afterward by repeating what they had observed. The deaf learners were conscious of how they signed their own stories after being exposed to signed poetry and literature. They began to mimic the grammatical structures that the Deaf adults employed in the videos by using similar grammatical features that the Deaf adults used in the signed stories. The learners gained the confidence to express their ideas in class making use of NSL. Their proficiency in NSL increased to the extent that they felt confident enough to question the teacher during class discussions by bringing up their own ideas and points of argument. When working, the learners exhibit greater confidence in themselves and their work.

The deaf learners also improved in their use and confidence in Written English. They improved as the grades advanced. For example, the Grade 3 group showed more awareness of correct fingerspelling and writing of words than the lower grades did. Under the supervision of the teacher, the Grade 3 group also showed greater progress in building, reading and writing simple sentences. They showed motivation to want to read and succeeded in reading short paragraphs, extracting information from these short paragraphs. The primary goals of reading, according to Daly III *et al*. (2015), are knowledge acquisition, enjoyment and fos-tering the capacity for autonomous learning. Reading more often will help learners become proficient readers because they are more likely to prefer to read when they can comprehend what they are reading. Since the teachers first had to create the groundwork and establish the fundamentals of the intervention programme for the Grade 1 group of learners, it was more challenging for them to learn following the programme. They had to become used to learning both Written English and NSL simultaneously. According to Dostal and Wolbers (2014), most deaf learners do not have any experience with an accessible language when they first enter

the classroom. This is because the majority of deaf learners are born to hearing parents who may not utilise Sign Language, meaning that many deaf learners enter school lacking a language that they can utilise for instruction or communication.

The teachers who implemented the programme also gained from it in that they now understand better how to prepare and present their NSL and Written English lessons than before the programme's implementation. However, in their Written English lessons, they still indicated a tendency to focus more on Word Building and Fingerspelling than on Reading, Writing and Grammatical Structures. The degree of progress that deaf learners have in Written English may be affected negatively by this inclination of the teachers. According to Wauters and De Klerk (2014), reading is a skill that must be taught or acquired, and it is typically acquired in school. Teachers must be proficient in teaching this skill, because the quality of instruction has a significant impact on deaf learners' academic success (also see Cripps, Supalla & Blackburn, 2020).

Evidence shows a parallel performance between deaf learners' reading and writing abilities (Marschark, 1997). This indicates that deaf learners' writing skills and reading skills follow the same pattern. Furthermore, Stewart and Clarke (2003) discuss the significance of routine in deaf learners' educational experiences. This highlights the need for consistent reading and writing instruction activities, which will give learners frequent chances to investigate and assimilate ideas that they spontaneously gathered, enabling them to develop an appreciation for what they have learned. It is crucial for the study's programme that teachers consistently teach deaf learners all of the skills included in both NSL and Written English.

Conferring to the research results, teachers appreciate the value of educational resources and a supportive learning environment. The research findings that were looked at similarly show that learners take pleasure in and gain from using the learning resources that are made available to them. According to Kuntze *et al*. (2014), deaf children, especially those who do not have access to Deaf people or peers, may benefit greatly from media, especially recorded educational content, which can be a perfect approach to introducing Deaf culture and Sign Language. In addition to fostering and advancing reading skills, educational media, such as recordings made to help children become literate, can also help them positively understand themselves and others as well as cultivate a culture of mutual respect (Kuntze *et al*., 2014). Although the programme was beneficial to the teachers, sustainability is still a crucial component. The ongoing development of biliteracy for deaf learners will depend on how the teachers preserve and apply the knowledge they acquire through the programme in their classrooms. The success or failure of the bilingual-bicultural literacy programme and, ultimately, the deaf child's development of biliteracy are largely determined by routine and consistency.

6. Conclusion

There is an urgent need in Namibia to provide deaf children with the best chance in education and their ability to read and write will enable them to engage with society. It has been determined that the bilingual-bicultural approach is an effective method for instructing deaf learners. This pedagogical method acknowledges the distinctive characteristics of Deaf culture and Sign Language while working towards the democratic goal of diversity and social inclusion. Being a diverse group, deaf learners make it difficult to implement a single teaching strategy. For this

project, a bilingual-bicultural literacy programme was created using well-considered teaching strategies and as a result, deaf learners' language acquisition and biliteracy improved. The bilingual-bicultural literacy programme can be made sustainable over time by improving teaching techniques and making classrooms welcoming and inclusive of deaf learners. Teachers need a range of support systems in place to continue teaching and learning even though they possess important and positive teaching characteristics. These support systems need to understand the pedagogy that goes into educating and developing a deaf child. The primary goal of the intervention *programme* was to use a bilingual-bicultural approach to develop suitable teaching practices for deaf learners, and teachers needed to understand the *programme*'s goal of teaching bilingualism to deaf learners. The teachers gained knowledge of bilingual deaf education pedagogy through implementing the *programme*. However, this needs to be sustained with continued instruction and conversation about the most effective Deaf education strategies.

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