

EARLY LANGUAGE INTERVENTION IN DEAF CHILDREN OF HEARING PARENTS

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ABSTRACT

Language development is often hampered by the fact that 90 per cent of deaf children are born into hearing families who do not know Sign language (SL) or haven't had any previous contact with the deaf world. Such parents often use only spoken language to communicate with the child, which results in no or very little language exposure. Many deaf children only start to learn a language, signed or spoken, when they start attending school, usually between the ages of three and seven. As a result, the deaf child has a delay in cognitive and language development and finds it hard to learn a SL, like South African Sign Language (SASL), as well as a written language (e.g., English). This late exposure to SL proves to be a serious cognitive problem for deaf children when compared to those children who acquired language from birth.

This problem led to the research question namely, whether deaf children's language and cognition can still develop to the required level for school readiness if early language intervention (ELI) takes place within the critical period of language acquisition. To answer the question, a case study was done at a school for the deaf and blind with a small group of deaf learners in the foundation phase. The results show that the little language exposure these children received in only one year of school already made a huge difference to their language and cognitive development. This article also makes recommendations to the various stakeholders in deaf education.

Keywords: Deaf Education Early Language Intervention, Language and Cognitive Development Language Acquisition, South African Sign language.

INTRODUCTION

Hearing children born into a hearing family or deaf children born into a Deaf ¹ family normally have no problems with language learning because they use natural languages (spoken or signed language) from birth and they develop normally linguistically. When a deaf baby is born into a hearing family, however, it can be a traumatic experience for the parents because they do not have any information on the choices they can make regarding their deaf child's future in terms of language acquisition, education, social integration, etc. This is due to the limited assistance and knowledge available from clinics and social workers who often do not know how to guide these parents.

In addition, parents must make decisions concerning the child's language, i.e., sign or spoken language, the mode of instruction and the appropriate school. If the choice is SL, more choices will follow, like whether the family will also learn SL or where to find an instructor to teach the child. The family must adapt to the new situation that encompasses deafness with limited knowledge and access to resources. If this is not possible, especially in rural areas, the child will not have the typical accessible linguistic inputs. Therefore, no language or cognitive development can take place.

One of the problems this study identified is that many deaf children only start to learn a language when they start attending school between the ages of three and seven and sometimes older. As a result of this, the deaf child has a cognitive and language development delay and often finds it hard to learn a SL and the written form of a spoken language, e.g., English² simultaneously. This leads to the research question, namely whether deaf children's language and cognition can still develop to the required level of school readiness if early language intervention (ELI) takes place within the critical period of language acquisition. To answer this question, a case study was done with a small group of deaf learners in the foundation phase at a school for the deaf and blind.

This article, based on a Master's dissertation, will look at literature based on a conceptual framework, discuss the methodology, data analysis and results, and provide some recommendations on how different stakeholders can become involved in these issues.

LITERATURE REVIEW

Conceptual Framework

The conceptual framework for this study is based on two components, namely the ideas of Mayberry (2002:95) and Piaget (1952:7) about language and cognitive development, and the theories of Guralnick (2000:17) and Moeller (2000:1) on early intervention. According to Mayberry (2002) and Piaget (1952:1), language and cognitive development is the child's attempt to understand the family and the world at large; during this time, rapid growth of the brain and learning take place. To Piaget (1952:7), cognitive development is a progressive reorganisation of mental processes because of biological maturation and environmental experiences (McLeod, n.d.:1) and children go through four stages of cognitive development that build on each other, namely sensorimotor, preoperational, concrete operational and formal operational.

The second component that forms the conceptual framework of this study is the concept of ELI which can be seen as a system of support and services to assist young children who have developmental delays due to factors such as poverty or disability. ELI consists of education, nutrition, childcare and family support, which are designed to reduce the effect of disabilities or prevent learning and developmental problems later in a child's life (Heward, Alber-Morgan & Konrad, 2018). Guralnick (2017:22) notes that the quality of the relationships with their parents promotes children's social and cognitive competence. Therefore, ELI contributes to a child's progress and ensures positive outcomes in language development (Moeller, 2000:4).

Early Intervention in Language and Cognitive Development

The introduction of language at birth is through discourse with the parents which sets the stage for children to acquire and express themselves using language and to develop their vocabulary. According to Yilmaz and Aslan (2015:84), parental guidance is an essential factor in language and cognitive acquisition and development. Children need to discover the world around them, which they can achieve through communication with their parents. All children are born with *language competence* (Chomsky, 1965:119) but that needs to be developed creatively and appropriately in a language-rich environment where the child has meaningful interactions with people and has access to a variety of resources. First language (L1) acquisition takes place within the family and is therefore not a formal or intentional process. However, if the parents and the child do not share the same mode of communication, i.e., oral/auditory or signed/visual, acquisition might not take place and consequently the child's language and cognition will not develop satisfactorily. This becomes a significant concern for the parents of deaf children in a hearing environment.

Research done by the California School for the Deaf (n.d.) shows that language development is triggered when intervention is applied early, even before the child goes to nursery school. Most ELI programmes over the last ten years have focussed more on hearing children, which creates a need for ELI programmes for deaf children that use SL. The lack of ELI cognitive programmes for deaf children places them at a disadvantage when they go to school (Samuelsson & Kaga, 2008:37). Hearing parents of deaf children have to make many decisions about their child's needs and ELI programmes can help parents with decisions pertaining to school placement, the language of communication, hearing aids and other devices to assist the child. Parents might only begin to suspect that their child may be deaf by the age of three. If parents seek the necessary help and advice early enough, language acquisition and cognitive development can still take place (Tomlins, 2015). Ideally, ELI should be the combined responsibility of the family, community and professionals such as doctors, audiologists, social workers and teachers (Guralnick, 2000). Therefore, decisions about the deaf child must involve intensive consultations between parents and professionals (Desjardin, Eisenberg & Hodapp, 2006:58).

Although SL acquisition takes place in the same way as a spoken language, i.e., in stages (Dewolf, Smit & Wander, 2017), there are different milestones and inputs in the language development (Cormier, Schembri, Vinson & Orfanidou, 2012:50). This is because SL is a visual language using the hands, body and facial expressions (Anona, n.d.) while hearing children use sound. Woolfe, Herman, Roy and Woll (2010: 322) confirm that 'Sign language has the same capabilities as any human language and is acquired naturally by children in deaf families where Sign language is used. Research on Sign language acquisition among native signers has drawn parallels with hearing children exposed to a spoken language in terms of ages and stages of development'.

The first stage (babbling phase) is an important step in brain and language development, whether spoken or signed. This means that hearing babies use their voices while deaf babies use their hands to babble (Chandler, 2013:1). Therefore, it can be extremely helpful for hearing parents of deaf babies to familiarise themselves with the way Deaf parents communicate with their babies. The relationship between the parents and their deaf child is particularly important during ELI and if this transpires early enough, meaningful communication can take place (Sass-Lehrer & Bodner-Johnson, 2003). Important skills are

learned during this time, which makes it easier for parents to be part of their deaf child's language and cognitive development.

If the development of the home language is strong, it will support the continuity of cognitive growth. It is, therefore, important to develop a strong language basis from an early age. Piaget (1952:3) referred to this as the logical way of making sense of things happening around children. He distinguished three basic components as part of his cognitive theory, namely the sensorimotor component, the preoperational component and the concrete operational component. These components apply to all people, hearing or deaf. Research done by Di Paolo, Barandiaran, Beaton and Buhrmann (2014) indicated that representational thoughts begin with direct action and interaction with the environment which happens during the sensorimotor stage.

Claudio, Toppelberg and Shapiro (2000:143) regard the first ten years of a child's life as the critical period for optimal language development and therefore, deaf children should be exposed to SL during this period (Vanhove, 2013:1). Van Staden, Badenhorst and Ridge (2009:46) confirm that these children perform better academically than those who have not been exposed to SL at all. Furthermore, if children are exposed to SL from birth, they will be able to use it at the same level as a spoken L1. If they are exposed to SL after the critical period, language acquisition is delayed and this will have an impact on their cognitive development. Children with a backlog in language and cognitive development place a huge burden on the school, teachers and themselves because they have to learn two languages (a signed and a written language) simultaneously as well as additional school subjects. Moeller (2012:1) notes that children who are enrolled in ELI programmes usually develop good vocabulary and reasoning skills by the age of five, which contributes to good language development in general.

Deafness affects a child's cognitive development and without any exposure to language, the situation can become quite complex (Mayberry, 2002:71). On the other hand, deaf children who use SL often perform above-average on nonverbal IQ tests and visual tasks. Although deaf children might have a delay in language development, their nonlanguage cognitive development, like play behaviour and conceptual development, is on the same level as a hearing child. However, Musselman (2000:9) found that there is a difference between deaf and hearing children in their academic achievement as regards to their reading and writing skills. A delay in language development can cause poor reading development and because it is based on spoken language, many deaf children struggle with this. However, if deaf children are exposed to language input early enough, this can be prevented and might help children overcome their learning obstacles faster (Humphries, Kushalnagar, Mathur, Jo Napoli, Padden, Rathmann & Smith, 2012:2).

The three main aspects discussed above namely ELI, language and cognitive development, form the foundation upon which this study was based and links the conceptual framework to the findings of this research.

METHODOLOGY

The study was done at the Bartimea School for the Deaf and Blind in ThabaNchu, one of 44 schools for the Deaf in South Africa and one of two schools for the Deaf in the Free State. The school caters for deaf and blind learners from the age of four, Grade R up to school-leaving age, 18 years and older. Most learners are accommodated in the school's boarding

facilities and the school can, therefore, enrol learners from all over South Africa and neighbouring countries. Deaf and blind learners are accommodated in different sections of the school and do not share the same classrooms. The languages of learning and teaching (LOLT) of the school are SASL and English.

Although all the deaf learners in the foundation phase class participated in the activities, only seven learners were observed and analysed during the research. These seven formed a homogenous group because of the following common factors: all are profoundly deaf, all stayed in the hostel, all have hearing parents, they were either born deaf or lost their hearing shortly after birth and therefore could not use or benefit from spoken language, and none of the learners made use of a hearing aid or other forms of sound amplification. When the children arrived at Bartimea School for the Deaf and Blind, an IQ test specially designed for deaf children was done by an occupational therapist to see in which class the learner should be placed and to determine the cognitive level of the child.

The ages of participants in this study varied from four to ten years. Although age was not a common factor amongst the participants, the findings of the research were not jeopardised because of the other common factors mentioned above. Three of the seven learners had arrived at the beginning of the previous year while a fourth had arrived at the end of the previous year and was placed in the same group. This was taken into consideration during the data analysis. When the research commenced, most of the learners in the class could sign basic concepts that they had learned in the first few weeks of school.

The Department of Education in the Free State gave written consent for the research to be conducted at the aforementioned school, on condition that data collected during the study would remain the property of the department and that research material and video recordings of the participants would remain anonymous. The identities of learners were protected at all times to ensure this condition and the names of learners were changed to ensure anonymity. Research data and video recordings were stored in a secure location. Written permission for the study was also obtained from the school, the class teacher and class assistant of the specific class used in the study.

As required when working with children, a vulnerable group, written consent from parents or guardians was obtained, giving permission for the recordings to be used and for the findings and the results of the study to be published. As a result of some of the parents not being fully literate, an interpreter was used to interpret the content for them. No harm was done to the participants during this research and they were informed that the researcher would only be present for a specific period of time. Teachers and assistants remained the consistent factors in the learning environment. The University of the Free State granted ethical clearance for this study.

Research Method/Data Collection

This study used a mixed-method research approach on the gathering and analysis of both qualitative and quantitative data. As an empirical study, direct interaction with participants as well as observations were used to gather data, which were collected over seven months with different time intervals between the activities. Interaction with participants was restricted to 50 minutes to ensure that they stayed focused. Research activities took place within school hours and school terms.

The researcher was introduced to the participants and the nature of her visits to the class was explained. The first visit was informal, no data was gathered and participants were familiarised with the camera being used to record interactions. The instruments used for data collection included the following: Firstly, video recordings of direct, formal interactions, planned for sessions of 30 to 50 minutes each to ensure optimal participation were made. Secondly, specific activities, such as signed stories, flashcards and drawings by the participants were used to test memory, identify specific characters, understand sequences, and evaluate the ability to make connections and understanding of signed events/stories. Some activities were completed within one session while others were done over more sessions. Thirdly, the Woodcock-Johnson III Test of Achievement (WJ III ACH) (Wendling, Schrank & Schmitt, 2007:2) designed for written and oral skills was adapted by the researcher to cater for deaf learners by including drawings to replace writing and signs to replace oral skills. This test is a ‘valid and reliable assessment tool for both cognitive abilities and achievement among children and adults’ (Abu-Hamour, Al Hmouz, Mattar & Muhaidat, 2012:1).

ANALYSIS AND DISCUSSION OF DATA

Data Analysis

Although there were 16 learners in the class not all of them participated all the time. Only seven completed all seven activities that had been done during the ten sessions and only the data from these participants were used and analysed. The second activity took place over two sessions and the last session was a summary of all the activities.

The data analysis was done using the following instruments: video recordings, drawings, a rubric for assessment of SL expressive and receptive skills from the California School for the Deaf (Anon*b*, n.d.), and also the content analysis method for qualitative research. This method is a widely used research technique (Hsieh & Shannon, 2005:1278) because it shows three approaches: conventional, directed and summative; all three are used to interpret meaning from the content (Krippendorff, 2004).

The different activities as well as the data collected according to the Woodcock-Johnson test during the research are summarised in Table 1.

Table 1: Activity descriptions

Activity number	Activity name	Activity description
Activity 1	Signing story: My family and I (Pienaar, 2010).	Testing participants' understanding of the researcher's signing and if they could answer questions.
Activity 2	Story recall	Recalling of a story after the signing of it. Drawing to show their understanding of the story.
Activity 3	Story recall delayed	Determining if they could recall the correct sequencing of the story after a time delay of two weeks. Drawing to show the sequence of the story the learners remembered.
Activity 4	Letter identification	Establishing if the learners could identify the letter (hand form) of the sign that was made by the researcher and match the correct picture of the hand form with the fingerspelled letter card.

Activity 5	Picture vocabulary	Testing if they could match a picture on the card with the sign that was signed to them.
Activity 6	Comprehension	Determining if the learners could explain, in sign language, the picture that was shown to them.
Activity 7	(Visual) Reading vocabulary	Testing if the learners could give the signs or sign names of the characters in the story after pictures of the characters were shown to them.

These activities were specifically done to obtain data related to the learners’ signing and comprehension skills to determine if they were on a language level appropriate for their age. Memory and cognitive skills were also tested during these activities. The results of the analyses are discussed below. The Likert Scale method was used to assess each learner’s level of signing as well as their cognitive development (see the key³).

Discussion of Results

Figure 1 below shows the individual learner’s signing skills and cognitive development that were tested during the observation period. Decimals were included because it gives a more accurate reading of the learner’s performance. The averages were calculated over the seven activities, which include the scores of the drawings in Activity 2 and 3.

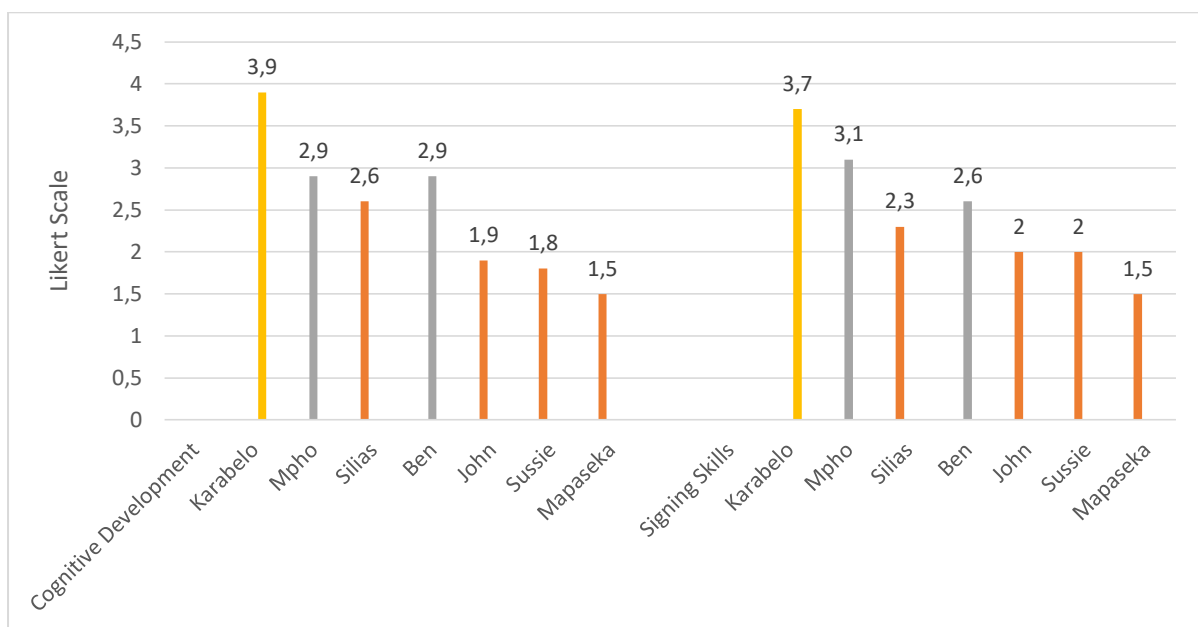


Figure 1: Evaluation of learners’ cognitive development and signing skills

The following discussions are based on the development of each participant’s cognitive and signing skills over the seven activities.

Karabelo’s performance across the seven activities shows the highest score of all the participants. His cognitive and signing skills tested above average (3.9 and 3.7 respectively). Although he had some obstacles to overcome because of the holiday breaks between activities, he could still answer simple questions and understood most of the instructions. He struggled slightly with signing fluently but showed a good understanding of SL and was eager and motivated to try new things. He managed his reading vocabulary by copy-signing⁴ the questions and overcame problems with more complex activities. His cognitive and

signing abilities improved significantly and he showed the potential to become a fluent user of SL.

Mpho's average for his cognitive and signing skills were 2.9 (below average) and 3.1 (average) respectively. He was very slow and unsure of himself in the beginning and he struggled with the correct hand form, nonmanual features and fingerspelling. Although he could recall the story, he first copy-signed the questions giving simple answers or avoiding them before he signed the story again. There was a steady improvement in the beginning stages of both cognitive and signing skills. The drawings in the first few activities also helped him to establish a conversation. Eventually, he acquired more signs and the appropriate facial expressions. At first, he needed to be motivated to participate but later he was the one assisting his peers. The challenging activity after the eight-week-long holiday delayed his progress and impacted his cognitive and signing skills negatively. However, his memory was triggered in the last activity and his cognitive skills improved again. In the end, Mpho had enough confidence to have understandable conversations with people outside the class.

Silias's cognitive and signing skills were below average (2.6 and 2.3 respectively). Both these skills developed rapidly in the first few activities. Most of the time, he would copy-sign everyone when he did not understand but later he was willing to try and his confidence grew. Despite that, his cognitive and signing skills dropped because of the challenging activity after the eight-week holiday. He had forgotten some of the signs and his signing skills deteriorated because he still had a problem with copy-signing, causing him to feel very unsure of himself. However, his cognitive and signing skills improved slowly and he could explain things in detail. His performance was very unpredictable because he lacked emotional stability. From the results it was clear that Silias could become a fluent signer provided he received the appropriate assistance.

Ben's cognitive and signing skills were below average (2.9 and 2.6 respectively) although he had been enrolled in the school during the previous year. He copy-signed many of his peers and he struggled with the more complex activities such as the delayed story-recall, remembering the names of the characters and understanding the storyline. However, his signing and facial expressions improved and he started to enjoy the activities, which gave him more confidence. This, in turn, improved the development of his language and understanding. Because he was emotionally underdeveloped, he seemed a bit unsure of himself after the long holiday although this did not seem to cause too much of a disruption in his skills development in general. Due to illness and absence from school shortly after the holidays, Ben's understanding, memory and cognitive skills began to fluctuate. Eventually, his signing and cognitive skills improved, indicating that he can reach stability and steady development over longer periods.

John's average cognitive and signing skills were 1.9 (below poor) and 2.0 (poor) respectively and he copied his peers' signs and facial expressions. He also copy-signed the researcher and the class assistant but he did not benefit from that. He struggled with signing simple sentences at first and although he slowly improved, he still struggled with more complex sentences and questions. He could not discuss his own drawing but tried to get help from his peers' drawings and the class assistant. The eight-week holiday significantly interrupted his skills development and he found the activities challenging. Towards the end, his signing improved a little and he tried to answer and sign on his own. Although John's cognitive and signing skills fluctuated a lot, his understanding and signing/drawing improved. This suggests

that with more confidence in his signing, he will be able to develop his cognitive skills and become a competent signer.

Sussie's average cognitive and signing skills were 1.8 (below poor) and 2.0 (poor) respectively. She was still very young at the time of the research, copy-signed her peers and constantly sought their assistance. She used home signs with very limited signing vocabulary which were, surprisingly, understood by the other learners. Her signing skills were stable but her cognitive skills fluctuated noticeably. Her drawings in the story-recall activities had little meaning (see Figure 2) and she could only point to them without giving an explanation. Her cognitive skills improved after a while and her drawing (see Figure 3) formed the basis for communication with the researcher and her peers. She was eager to tell the story despite her limited signing capacity. During the eight-week holiday break, her cognition level dropped and she hardly remembered the story without assistance from her peers. Nevertheless, she was persistent enough to try harder. In the end, she managed to use both skills simultaneously.

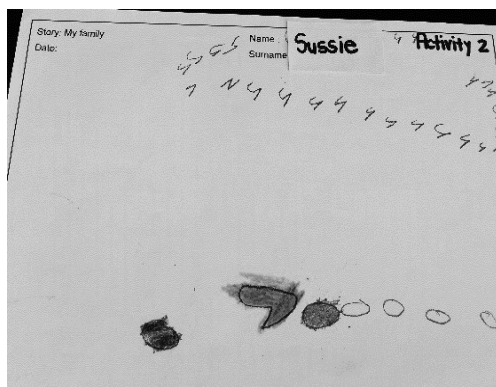


Figure 2: Sussie's First Drawing

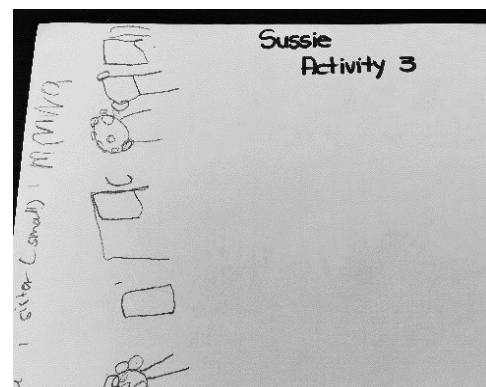


Figure 3: Sussie's Second Drawing

Mapaseka's averages for her cognitive and signing skills were both below poor (1.5). She started the school year late and was already behind her peers. Therefore, she struggled with basic vocabulary and no one understood her. She confused hand movements (gestures) with real signing and thought any movement had meaning. Her signing and cognitive skills were unpredictable and fluctuated quite a lot. She was emotionally unstable which influenced her schoolwork. She would forget signs and then copy-sign others or make up her own signs. Surprisingly, she improved after the eight-week holiday break although her signing and cognition were still very poor. Her performance in the activity after the holiday was unexpectedly better in comparison to the rest of the class. This again was proof of her unpredictable performance. Due to her absence from school and no exposure to SL she struggled in the last activity.

CONCLUSION AND RECOMMENDATIONS

When the learners entered the school, they were exposed to two new languages: SASL and English as well as other school subjects at the same time. They had no prior SASL knowledge and had a definite backlog in language development when compared to their hearing peers.

Some of the learners had acquired basic SASL in only a few months to such an extent that communication with others became a two-way process. Learners were eager to communicate

about different topics, telling stories and sharing experiences. Despite their limited vocabulary, they were understood quite well.

A definite improvement in the learners' language and cognitive development was observed although learners like Sussie and Mapaseka might take longer to develop fully. Therefore, more effort from the learner and the teachers is needed to ensure proper development. There was a definite improvement in confidence in some of the participants (Karabelo, Mpho and Ben). The more reserved learners (John and Silias) used pointing at the start of the research but used only SASL to communicate towards the end.

A correlation between the different skills was clear: when the signing improved, the cognition also improved, i.e., as their SASL developed, they became more confident and their cognitive skills improved. Being a slower learner, Sussie's language skills developed slowly and so did her cognitive skills although sometimes her cognitive skills were better than her language skills.

Various factors influenced the learners' progress, for example, time lapses, copy-signing and learners' drawings. Time lapses between activities happened because of the holidays. Copy-signing was used by most learners and although it could be a good way to build confidence in signing initially, it could hamper their natural signing. Despite this, their signing improved and their confidence grew. Learners' drawings served as support when learners had to give information about the story and gave them the confidence to communicate with their peers and the researcher.

Another factor that cannot be ignored is emotional readiness as reflected in the fluctuating scores on the Likert scale in the cognition part of the activities. Because these learners were very young at the time of the research and boarded at the school they missed their homes and families. Therefore, the activity after the long holiday seemed to be the most challenging. Another aspect to note is the significant differences between scores for cognitive (understanding) and signing skills in certain activities. This is an indication that learners struggled to manage two different skills simultaneously.

In conclusion, it can be said that deaf children's language cognition can still develop to the required level for school readiness if ELI takes place within the critical period of language acquisition. Indeed, it is essential for those deaf children who grow up without the proper language support at home to receive the necessary intervention early enough. With the language intervention that took place in this group in only a few months, a huge improvement in their language and cognitive development could be seen.

As a result, the following recommendations regarding language and cognitive development and ELI in deaf children can be made. Although this study is a small case study it has implications for Deaf education in South Africa. We hope that this study will create awareness among all the stakeholders in Deaf education such as parents, teachers, schools for the Deaf and all Departments of Education and Social Development. Deaf children should be exposed to SASL at an earlier age so that their language and cognitive development are on par with their hearing peers. This means that some of these stakeholders need to know SASL to ensure that the child's home language (L1) is in place.

Implementing these recommendations will require involvement and hard work from the various stakeholders. The Department of Health could ensure that more qualified and

informed staff are employed to ensure that the signs of hearing loss are discovered early enough for the child's language and cognitive development to start at the appropriate age. The Department of Social Development could ensure that informed and knowledgeable social workers in rural areas help parents to make the right decisions concerning their children's future education. The Department of Education could employ more qualified SASL pre-primary teachers in rural areas to attend to deaf children's language needs from a young age. Parents often have to send their children far away to a school for the Deaf. The Department of Education should collaborate with universities so that prospective teachers study SASL if they are interested in teaching at a special school or schools for the Deaf.

Parents and family members should be encouraged to learn SASL to enable them to assist the deaf child in obtaining language skills. This will put the child on par with their hearing peers and create new opportunities for the child to develop proper communication with their parents. Teachers and staff at schools for the Deaf are sometimes the only stakeholders involved in a deaf child's education, therefore teaching staff should be trained and equipped adequately in SASL to be able to facilitate learning in class.

NOTES:

¹Deaf vs deaf: *Deaf* with a capital 'D' is used to refer to culturally Deaf people, and *deaf* with a lower case 'd' to refer to pathological deafness

² Bartimea School for the Deaf and Blind use SASL in the deaf section for communication and English as the written and reading language

³ KEY: 1= Very Poor: No fluency, no understanding, nearly all wrong. 2=Poor: Not very fluent, very little understanding, mostly wrong signs. 3=Average: Somehow fluent, some understanding, some correct signs. 4=Good: Good fluency, good understanding, most signs correct. 5=Very good: Very fluent, very good understanding, nearly all signs correct.

⁴ Copy-sign: Copy-signing does not necessarily mean that a person understands what is signed. Copy-sign can be compared to something that can also appear in spoken language, like copying what someone is saying and repeating it.

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