



Carel du Toit Centre (Cape Town):  
Outcome survey of 'their' listening and spoken  
language approach for children with a hearing loss

(PSG2: Improve Education Outcomes and Opportunities for Youth  
Development; specifically, Persons with Disabilities)

WCG Partner: Department of Social Development

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## ABSTRACT

Hearing impairment is a widespread societal issue, with particularly high prevalence rates in South Africa. The consequences of and costs associated with undetected hearing loss are pervasive and far-reaching, especially when it comes to language development. Hearing impairment in childhood can cause delays in the development of speech and language, as well as cognition which may later lead to educational disadvantage, social isolation, and ultimately economic disadvantage such as unemployment (1).

The overall purpose of this study was to investigate the current status of the alumni of the Carel du Toit Listening and Spoken Language (LSL) programme and to determine the effectiveness of the intervention i.e. does the programme result in an improved overall quality of life for persons with a hearing impairment? To date no research has been done concerning the Carel du Toit programme.

A consumer survey was completed by 'graduates'/alumni of the Carel du Toit Centre. The selection criteria included: the individual should have participated in the programme for at least three years; have successfully completed Grade 12 (matric) and should be 18 years or older. Due to learner data not being readily available, snowball sampling was used. A list of names of alumni was gathered for 68 potential participants, with 31 out of the total number of invited participants (n=48), for whom we had contact details, actually completing the online survey, representing a response rate of 64.5%. These past learners were queried regarding degree and type of hearing loss, age of onset, hearing technology used, and educational and employment history, among other topics.

Results indicate that the targeted outcome of the Carel du Toit (LSL) practice seems to lead to its stated goals with the majority of the respondents being integrated into regular primary and secondary learning environments, continuing with post-secondary education and are either self-employed or employed. Many of the children with a hearing impairment who participate in the programme, have the opportunity to grow up in regular learning and living environments, and become contributing citizens of mainstream South African society, sometimes despite late detection and intervention, as evidenced by the participants in this study. LSL thus places them at a distinct economic advantage.

This study is a first step in documenting that for the majority of learners who attended the Carel du Toit Centre, their Listening and Language programme and practice did indeed provide them with the opportunity to grow up in regular learning and living environments that enabled them to become independent, fully-functioning members of mainstream society, contributing to the economy and not being a burden on the state. Once the data has been fully analysed and with this emerging evidence, the Western Cape Government is encouraged to provide additional resources to expand the existing programme to other areas of the province, to increase the capacity of the existing CDT Centre in Cape Town to increase the enrolment numbers and human resources to support teachers (in mainstream and specialised environments) and the learners as they transition through the education system, and to inform policy and practice nationally.

## INTRODUCTION AND PROJECT AIMS / QUESTIONS

According to the World Health Organization (2) over 5% of the world's population – or 466 million people – has disabling hearing loss (432 million adults and 34 million children). It is estimated that by 2050 over 900 million people – or one in every ten people – will have disabling hearing loss. Disabling hearing loss refers to hearing loss greater than 40 decibels (dB) in the better hearing ear in adults and a hearing loss greater than 30 dB in the better hearing ear in children. The vast majority of the 34 million children live in the world's low-income and middle-income countries. In fact, more than 90% of people living with hearing loss, do so in developing countries (3). In South Africa, that means 1.5 million children have disabling hearing loss, with approximately 6 116 babies a year born with permanent bilateral hearing loss or acquiring it in the first weeks of life. This means that every day 17 babies are born with or will develop hearing loss (4). Owing to the absence of infant screening programmes in South Africa, hearing loss is on average only diagnosed at 30 months in the Western Cape and at 48 months of age in the Free State (5), with a further delay of 8 months from diagnosis to intervention. The consequences of and costs associated with undetected hearing loss are pervasive and far-reaching, especially when it comes to language development. The most critical developmental periods for optimal language acquisition are between birth and 3 years of age (6).

### **Why is early identification so important?**

- For children born with congenital hearing loss, this condition can be detected within the first few days after birth.
- Hearing screening programmes for infants and young children can identify hearing loss at very young ages.
- Early identification of hearing loss in children when followed by timely and appropriate interventions (EHDI- Early Hearing Detection and Intervention) can minimize developmental delays and facilitate language development and communication, education and social development. The gold standard for EHDI is screen by 1 month, diagnose by 3 months of age and intervene (hearing technology and family-centred early intervention) by 6 months of age.
- Research suggests that children who are born deaf or who acquire hearing loss very early in life and who receive appropriate interventions by six months of age are at par with their hearing peers in terms of language development by the time they are three years old (in the absence of other impairments (7) (8)).

### **What is the impact of hearing loss if not addressed?**

- While the most obvious impact of childhood hearing loss is on language acquisition, the condition also has consequences for overall literacy, the development of social skills and attitudes, including self-esteem.
- Untreated hearing loss is often associated with academic underachievement and illiteracy which can lead to fewer employment opportunities later in life or even unemployment.
- For a child, difficulties in communication may result in feelings of anger, stress, loneliness and emotional or psychological consequences which may have an additional profound effect on the family as a whole.

- In low-resource settings where a child would already be at higher risk of injury, hearing loss can place a child in unsafe situations due to decreased alertness.
- In a broader context, untreated hearing loss affects the social and economic development of communities and countries.

The Carel du Toit Centre ([www.careldutoit.co.za](http://www.careldutoit.co.za)) in South Africa, established 47 years ago, offers CHAT (Children Hear and Talk) services (support to parents of newly diagnosed deaf children), pre-primary education as well as primary level education (up to Grade 3) and uses the auditory/oral methodology to teach children who are deaf functional spoken language. The Centre provides an (Inter-disciplinary support team including audiologists, speech and language therapists, occupational therapists, , in addition to specially qualified teachers who are trained in the methodology as well as experiential learning, and how best to support the language and other personal development needs of deaf children.

Despite the long history of the Centre and the successful track record of children progressing from the Carel du Toit programme into either mainstream or specialised schooling environments, to date no research relating to the learning experience of the past learners and outcomes of the programme has been undertaken. The outcomes and the effects on the lived experiences of learners having come through the CDT programme are, to-date, both unreported and not documented. This lack of evidence of this programme limits efforts to improve the quality of life for many people with a hearing loss in South Africa. This study seeks to fill this void.

Strategic Goal 2 speaks to “Improve education outcomes and opportunities for youth development”. The Western Cape Government is committed to expanding quality education across the province and providing opportunities for youth to realise their full potential. Currently the Carel du Toit Centre is the only school of its kind in the Western Cape (following the WCED mainstream curriculum), located on the grounds of Tygerberg Hospital and servicing approximately 200 deaf children per year. Most of the children are fetched from home and brought to the Centre and returned home at the end of the day as they predominantly come from underprivileged, poor socio-economic backgrounds, emanating from far-reaching areas around the Western Cape. Sometimes it takes the children two hours just to get to school. As mentioned previously in South Africa, 1.5 million children have disabling hearing loss, with approximately 6 116 babies a year born with permanent bilateral hearing loss or acquire it in the first weeks of life. This means that every day 17 babies are born with or will develop hearing loss (Swanepoel, Storbeck, Friedland, 2009). In the Western Cape the prevalence rate of hearing loss is 12.35% (9).

This project aligns well with the Provincial Government Strategic Plan as the programme offered by the Carel du Toit Centre helps to improve the educational outcomes and opportunities for persons with disabilities, or vulnerable, marginalised youth. Through achieving age-appropriate language, the alumni of the Centre are able to continue into the workforce or pursue a college or university education; enabling them to become independent, self-sufficient and to live a happy and purposeful life as a member of mainstream society. Quality of education, such as provided by the Carel du Toit Centre, is

closely correlated with economic development and social cohesion. The intent is for this study to provide evidence to this effect.

Many international studies with a similar focus such as Goldberg and Flexer (10); First Voice (11); and Antia et al., (12) were conducted in developed countries. There is no study, however, focusing specifically on the outcome of the auditory verbal method in developing countries or on the African continent. This study therefore provides insight into the Listening and Spoken Language (LSL) approach (one AVT method) in the context of a developing country.

The overall purpose of this study was to investigate, through the use of an online consumer survey, the current status of the 'graduates' of the Carel du Toit Listening and Spoken Language programme and to determine if the intervention is effective i.e. allows persons with hearing impairment opportunities to improve their overall quality of life.

### **Main research questions:**

How do these now grown-up recipients of the Carel du Toit Listening and Spoken Language programme describe themselves and their histories?

Does the Carel du Toit Listening and Spoken Language methodology/practice, in fact, reach its stated goals as reported by its recipients?

The following areas of inquiry were included in this study (refer to Annexure A):

- Comprehensive background on each participant's hearing loss and hearing sensory technology from childhood to the time of the survey
- History of therapeutic and other specialised services
- Complete educational background and history through to post-secondary education
- Accommodations used
- Occupation and professional status
- And a key question, "Thinking back to your time spent as a Learner at the Carel du Toit Centre, how would you now describe the benefits of having attended their listening and spoken language programme?"

## **RESEARCH APPROACH AND METHODS**

This study received ethics approval from the Cape Peninsula University of Technology, thus the anonymity and confidentiality of any information shared with the researchers, has been protected.

The pragmatic approach to scientific research was used which involves making use of the method which is most appropriate in terms of the research problem. This study was descriptive in nature with data being obtained through two sources, (a) online form via Google Forms (<https://forms.gle/KirPjxdpgyMZniM97>) and (b) a questionnaire. The questionnaire was 4 pages in length in a word document (Appendix 1). The questions included both fill-in and open-ended questions, similar to a 1993 study with a focus on the

same areas: “degree and etiology of hearing loss, age of onset, amplification, and educational and employment history”, and more (10).

There were challenges in obtaining past learner data from the Carel du Toit Centre as the digital copy of their data was destroyed due to a computer virus. Because of this, use was made of both snowball and convenience sampling. Some of the teachers as well as two of the Audiologists at the Centre remained in contact with alumni and were able to provide a preliminary list of individuals to contact. These participants then referred the researchers to additional potential participants with whom they were still in contact with. Agreeable participants were asked to complete the survey at their convenience.

Former learners at the Carel du Toit Centre needed to satisfy the following criteria to be included in the study:

- Be 18 years or older; and
- Attended the Carel du Toit Centre (LSL programme) for at least 3 years as a young child.
- Completed Grade 12 (matric).

The past learners (alumni) of the Carel du Toit Centre were contacted in 3 ways, either by (a) SMS (if they did not make use of WhatsApp), (b) WhatsApp or (c) Email (if no cell phone number was available) to invite them to participate in the study. A link to the online survey (GoogleForm) was provided in the invitation to participate. The survey questions contained both open and closed questions. For those participants who were unable or preferred not to access the electronic link provided, or for whom we had no cell phone number, but had an email address, an MS Word document version of the online survey was emailed to them for completion and return via email. Thereafter the information provided was entered manually into the GoogleForm, for inclusion in the study. Originally a total of 68 names of potential participants were compiled. From this list, there were no contact details for 20 individuals. From the remaining 48 past learners, 31 agreed to participate in the study after at least one or two reminders via WhatsApp or email, indicating a positive response rate of 64.5%.

The online Google Form was our main source of data and included a brief description of the study. The description outlined what the study was about, why it was being investigated, who was investigating the study and how long it would take. In the form, a name and email address was required in order to complete the form, this was explained to the participants that it was only for follow ups should we need to contact them. The form also included a section of referral details for other alumni which was used to contact them and ask if they wish to also participate (snowball sampling). It was also indicated in the online form, that if they wish to use the word document, they can request it to be emailed to them.

The word document questionnaire had the same information and format as the Google Form for consistency. The only item that was different was the details of the study was in a separate consent booklet. As per ethical guidelines and consent, we included a section in the online form and in the separate consent booklet in word mentioned previously, about their rights as a participant (Appendix). This was to ensure that the participants knew more

about what the project was about, how their answers would be used, that they would remain anonymous, as well as to be informed that they can leave the study at any time should they wish to decline to answer.

The Google Form and Word document inquired about (a) hearing loss and amplification, (b) Primary School, High School and Post Grade 12 Educational History, (c) work history, (d) and other aspects of the participants' lives after leaving Carel du Toit. The survey was mostly made of multiple-choice questions, tick all appropriate boxes and a few open-ended questions. The questionnaire was aimed to identify key aspects of their responses that can be used to estimate the value of the Carel du Toit LSL methodology.

## KEY FINDINGS

### *Demographics*

All of the participants would have attended the Carel du Toit Centre in Cape Town (on the grounds of Tygerberg Hospital) for a minimum period of 3 years, completed Grade 12 and were at least 18 years or older at the time of the survey completion. In total, 31 participants completed the survey. In terms of gender, 17 (55%) of the participants were female and 14 (45%) male. Twenty-two (22) of the participants reported their age. The age ranged from 19 (born 2000) years of age to 49 (born 1970) years of age, with the mode of those being born in the year 1997 (age 22 in 2019).

### *Hearing Loss Characteristics*

The majority, 22 of the participants reported in equal number, a profound hearing loss in both their right and left ears. There were no reports of a mild hearing loss in the left ear, with 1 report of a mild loss in their right ear. Severe hearing loss was reported as follows: right ear (6) and left ear (5), and moderate hearing loss: right ear (2) and left ear (3) (Figure 1). Nineteen participants reported that their hearing loss is not progressive, with 7 reporting a progressive hearing loss and 5 being unsure of their specific diagnosis.

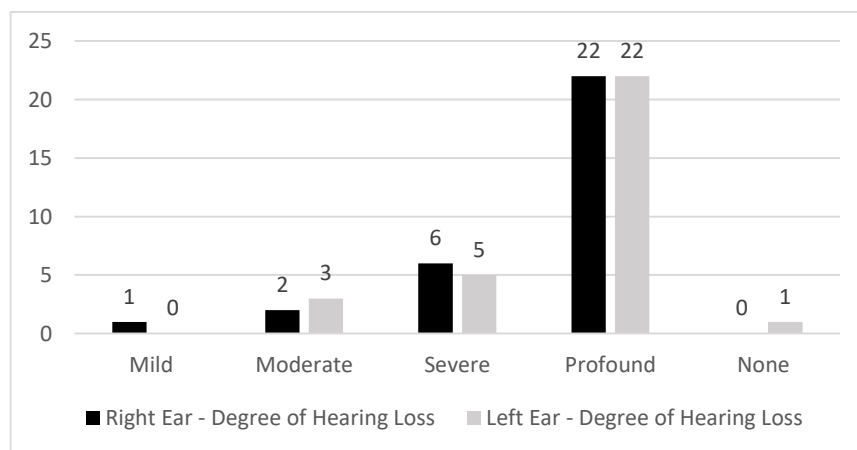


Figure 1: Degree of hearing loss

On average, participants were identified with a hearing loss at between birth and 2 years of age, whereas 74.19% of participants reported their hearing loss onset was at birth. This clearly indicates a discrepancy between the age of onset and the age of identifying the hearing loss (Figure 2).

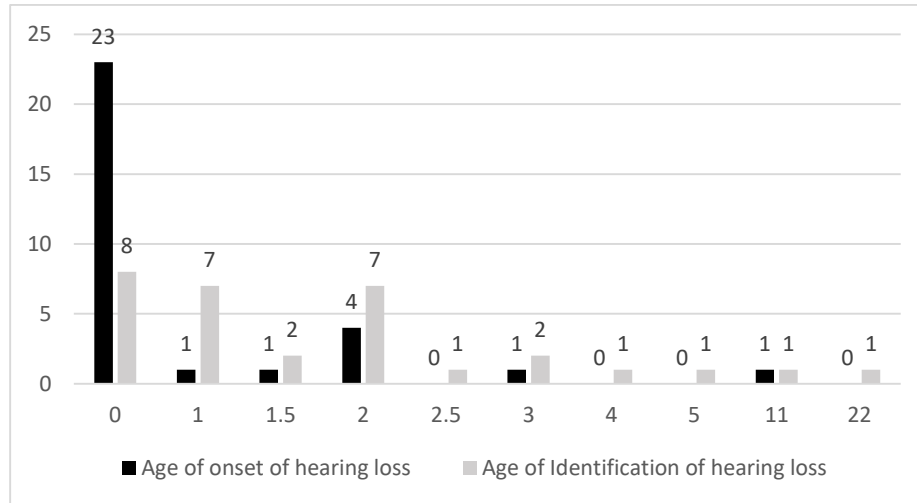


Figure 2: Age of onset of hearing loss

Looking at the causes of hearing loss (an open ended question), 38.70% of participants reported that they did not know what the cause of their hearing loss was, but 4 participants reported bacterial meningitis, 4 reported the cause being due to genetics and another 4 participants reported that it was due to rubella (German Measles). Other participants also reported the following reasons: premature birth, viral infection, jaundice, the MMR vaccine and that their cochlear did not develop.

Taking it one step further, we asked the participants if there were any associated conditions during their mother's pregnancy or when they were a baby, providing them with a list of options to choose from. The majority of participants, at 45.16%, were unsure of any associated conditions. Six reported Rubella (German Measles), 4 reported low birth weight, 3 reported bacterial meningitis, 1 was reported each for yellow fever, ventricle shunt, hydrocephalus, Dandy Walker Syndrome, dry birth, kidney infection, family history, defects of the head and neck and jaundice. None were reported for congenital perinatal infections and asphyxia.

Figure 3 below shows the age of acquisition of their hearing instruments, including the migration of Hearing Aid to Cochlear Implant (CI) in the data set. Cochlear Implants were only implanted from the age of 1, which is consistent with the later identification of the hearing loss in Figure 2 above. The age of receiving CI's was across the age spectrum.

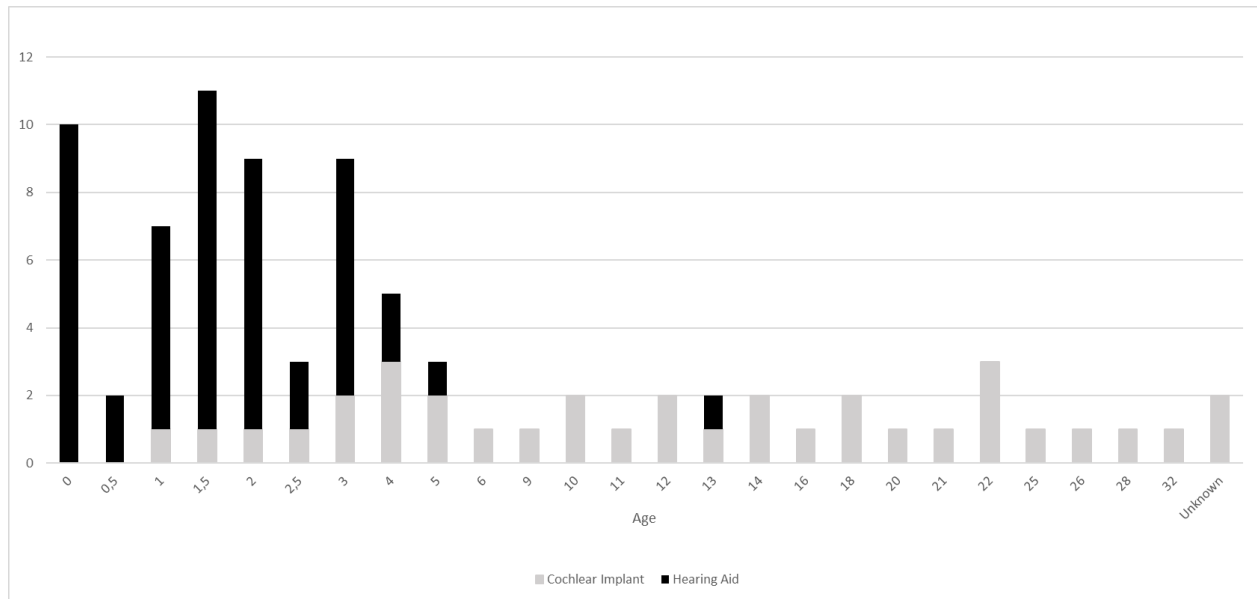


Figure 3: Age of acquisition Cochlear Implant versus Hearing Aid

### ***Additional Disabilities***

In addition to their hearing loss, 19.4% of participants reported having additional disabilities, including cerebral palsy, stigmatism of the eyes, vision impairment and a learning disability.

### ***Hearing Technology***

When inquiring about the type of hearing technology being used and including the options of Hearing Aids, Cochlear Implants, Bone Anchored Hearing Aids or Bone Conduction Implants, 15 and 12 participants reported using Hearing Aids in their right and left ears respectively. Seventeen (17) and 19 participants reported having Cochlear Implants in their right and left ears respectively. This data includes the migration from hearing aid/s to cochlear implant/s. None of the participants reported making use of either Bone Anchored Hearing Aids and/or Bone Conduction Implants. When asked about whether they make use of certain modes of listening or assistance, all 31 participants answered, with 80.6% reporting making use of Lip Reading/Speech reading, 35.5% reported using FM systems, 25.8% reported using Bluetooth systems, 22.6% reported using Audio/Induction Loop System, and 6.5% reported that they do not make use of any.

### ***Primary, Secondary and Tertiary Education History***

Participants were asked about their education and the schools they attended. Two of the participants reported finishing secondary schooling at the age of 17, nineteen reported finishing at the age of 18 and ten of them reported finishing Grade 12 at the age of 19. Regarding types of schools attended, this was divided into 4 types of schools, namely; private special, private mainstream, public special and public mainstream. As shown in Figure 3 below, in Primary School, 88% of participants were enrolled in the public schooling

sector, and it was split evenly between mainstream and special (44% each). Only 10% attended a private mainstream school. When they progressed from primary to secondary school (junior to high school), the public sector enrolment decreased by 12%, with private mainstream school attendance increasing by 11%. A large proportion of participants are thus migrating to the private sector for their secondary education, to mainstream schools.

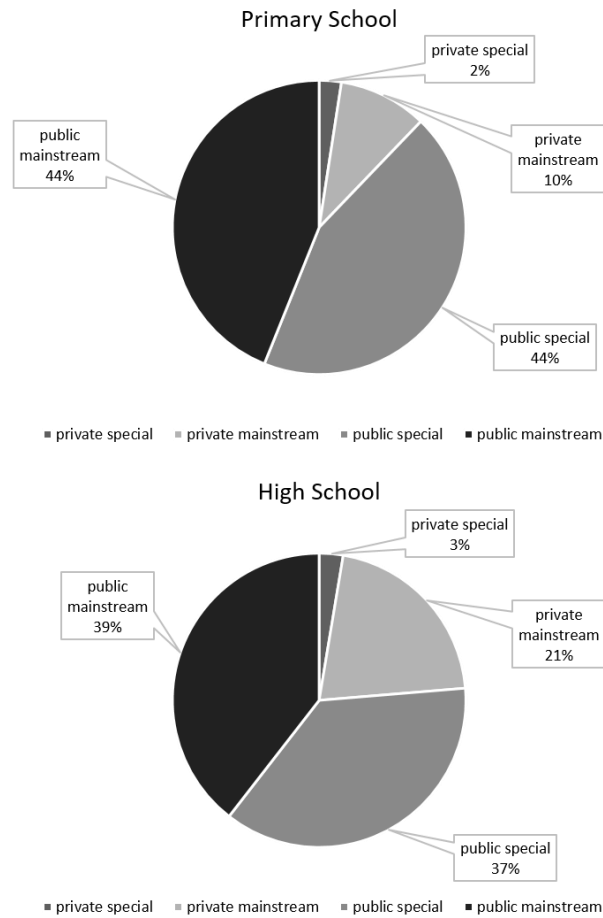


Figure 4: Type of school attended

Referring to Figure 5 below, exploring the mode of communication used at the various types of schools, 3 options were given: Spoken, Sign Language, as well as Spoken and Sign Language. 'Spoken' refers to oral/verbal communication and Sign Language to South African Sign Language (SASL) i.e. non-verbal communication. During their Primary School years, 73% of participants reported attending a school that only used Spoken (verbal) communication, and 22% reported a combined communication approach. During their tenure at High School, 92% of participants reported attending a school that was only Spoken, and none of the participants reported making use of Sign Language. A large proportion of participants are thus migrating from Sign Language to Spoken language by the time they transition to High School.

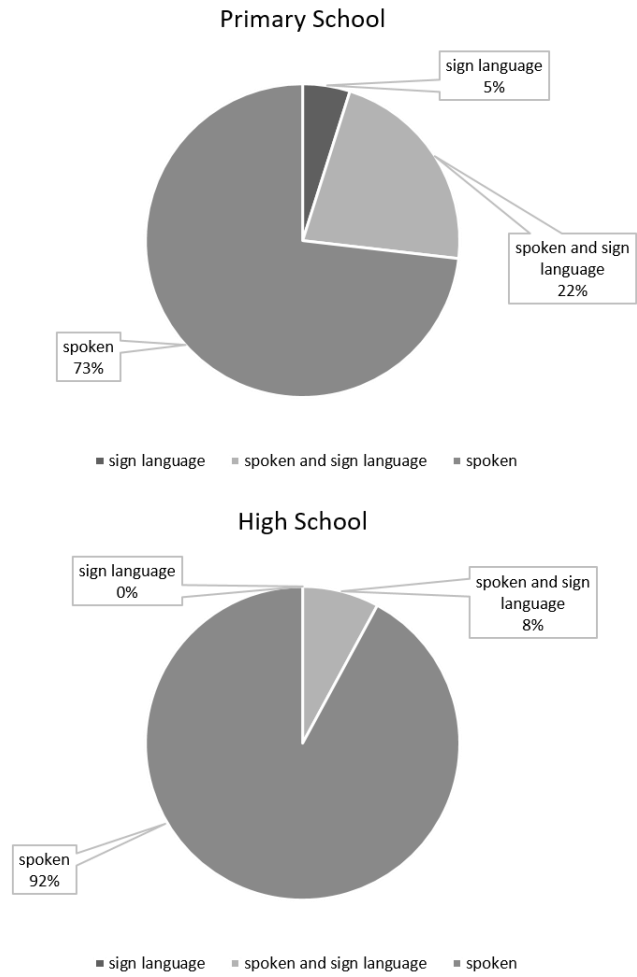


Figure 5: Mode of communication at school attended

Regarding the use of therapeutic or specialised services at primary or high school, 18 participants reported accessing Speech and Language Therapy, 13 reported asking for extra time during exams, 11 reported using tutoring, 6 reported making use of counselling, 6 indicated using a qualified teacher for hearing impaired students, 4 indicated using Occupational Therapy, with no participants reporting using a Sign Language Interpreter, and 5 participants indicated not using any of the services listed.

The participants were then asked about their education post-secondary school, seeking information regarding their highest level of education attained. Two (2) participants reported completing short courses, 2 reported having a Certificate, 6 informed having a Diploma, 7 stated having achieved a Degree (with 4 indicating they are still studying at the Degree level), 2 reported having completed an Honours degree (with 1 indicating they are still studying their Honours degree), and lastly 3 participants reported having achieved a Master’s degree. Regarding mode of study for their tertiary education, 23 participants reported that their mode of study was traditional face-to-face class engagement, 4 reported accessing blended learning (face-to-face and online) and 1 reported using a purely online/distance learning mode.

When asked the question “What are you most proud of achieving so far in your life?”, 9 and 6 participants indicated that their post-secondary school education and their independence were their proudest achievements, respectively. Other responses provided will be discussed in the Identity and Reflection section.

### ***Employment History***

Work history included details regarding whether they are currently employed or not employed and the reasons for this, as well as their job field and average income. Twenty-two participants report that they are working and 9 indicated they are not working. From the 9 who are not employed, 6 indicated they are still studying, with 1 participant stating that they are currently seeking employment, 1 reported that they are in the process of starting their own business and 1 did not provide any response.

All of the employed participants worked in various fields/sectors, including, but not limited to: Education, Administration, Food Wholesale, Engineering, Food Safety, Pharmacology, Geology, Manufacturing, Financial Services, Occupational Therapy, Sales, Catering, Chef, Sciences, Publishing, HR Management, Accounting, and Marketing. No emerging trends were evident. Data provided disclosed that 34.8% of participants earned (gross salary) between R10 001 to R20 000, 26.1% earned less than R10 000, and 21.7% earned between R20 001 to R30 000 per month. Only 4.3% of participants indicated they earned over R40 000 per month.

### ***Identity and Reflection***

In this section, two open-ended and one closed question was included. With regards to the closed question, participants were asked to describe themselves in terms of their hearing impairment with 3 options being provided: (A) “I am a person with a hearing loss who participates completely in the hearing world”, (B) “I am a person with a hearing loss who participates in both the hearing and 'Deaf worlds”, and (C) “I am a person who is Deaf who participates primarily in the Deaf community”. Option A was selected by 45.2% of the participants, with option B being chosen by 54.8% of the participants and no participants selecting Option C. Their choice would depend on their worldview, their upbringing and their experiences in the world.

The first open-ended posed was: “What are you most proud of achieving so far in your life?”, 9 participants indicated their post-secondary education, 6 described their employment/self-employment, 6 expressed their independence, 6 indicated them overcoming their hearing impairment, 5 referred to their sports achievements, 3 to their self-esteem and self-acceptance, 2 stated their social responsibility, 2 indicated their faith, 2 made reference to being an ambassador for hearing impairment, 1 wrote about their academic achievement at school, 1 concerning their school leadership and lastly 1 participant shared about their career success.

Two participants shared the following regarding their proudest achievements:

*“Able to speak and understand 3 languages, Afrikaans, English, German. Do not have to use sign language as can hear perfectly well with Cochlear Implant. Attend mainstream school without difficulties and finish university and work.”*

*“1) being at mainstream school, accepted at Stellenbosch University, 2) being able to talk and communicate with hearing world, 3) being able to lip read and not do sign language, 4) what I have achieved academically, 5) being part of the hearing world, 6) swimming events (8 Mile club Open Water Swim for Princess Charlene foundation and Choc) - Fundraising R10 000 each year since 2015, 7) participating in triathlons and running events, 8) participating in non-profit organisation (giving back to community), and 9) motivational speaking at Carel Du Toit.”*

The second open-ended question posed was: “Thinking back to your time spent as a learner at the Carel du Toit Centre, how would you now describe the benefits of having attended their auditory-verbal programme?”. A variety of responses were provided, including and not limited to: listening and spoken language development (n=12), quality education (n=5), inclusion in hearing society (n=4), family education and support (n=3), education attainment (n=2), economic and social access (n=2), overcoming hearing impairment (n=2), significant life impact (n=2), realizing potential (n=1) and life skills (n=1).

Three participants shared the following regarding the benefits of having attended the CDT LSL programme:

*“CDTC along with a significant investment of time and money on behalf of my parents has prepared me very well to integrate into the 'hearing world'. I don't think that I will have achieved half of what I have without the time I spent at CDTC. So, I would describe the benefits as life-changing.”*

*“Carel du Toit is certainly brilliant at what they do! I am because they are.”*

*“Really the door for people who wants a bigger and brighter world in the hearing world...”*

## DISCUSSION OF RESULTS

The purpose of this project was to present data from a survey completed by past learners ('graduates') of the Listening and Spoken Language (LSL) programme at the Carel du Toit Centre, in Parow, Western Cape. The intention of the questions posed in the survey was to learn about their past educational history and current status, in an attempt to determine if the LSL practice employed at the Carel du Toit Centre potentially leads to its stated goal.

First, considering the primary objective of the LSL approach, being to develop the speech-language and listening skills of children with hearing loss enabling them to communicate using spoken language and to fully integrated into mainstream education, society, and work (13)(14), one could ask if the data showed sufficient evidence that the LSL approach employed at the Carel du Toit Centre indeed fulfilled its primary objective? In this study, the researcher would cautiously say 'yes'. Current results are quite similar to the original findings from the 1993 Goldberg and Flexer (10). The discussion will begin with the data on demographics.

Thirty-one past learners from the Carel du Toit Centre, with an almost equal number of male and female participants, took part in the survey with their age ranging from 19 to 49 years of age, with the most frequently occurring age being 22. Almost 70% of the participants were under 30 years of age. Despite the broad age range, and irrespective of whether the participant had already completed their studies or was only starting out with their tertiary education, it was even now quite clear the difference the LSL approach had made in their lives.

The majority of the participants (77.4%) were identified with a hearing loss between birth and two years of age which is consistent with AV principles (early identification) and were fitted with hearing aid/s by the age of 3, with a few participants being fitted only at age 4 and 5. However, almost 75% of the participants self-reported that they were born with a hearing loss. This discrepancy between the onset and diagnosis of hearing loss can have a detrimental effect on speech and language development (not to mention other developmental areas) and is a direct result of the lack of universal neonatal screening for hearing loss at all public and private hospitals in South Africa. Almost 90% of the 31 participants would be considered “deaf” (severe to profound hearing impairment) with 22 being diagnosed with a profound hearing loss and 6 with a severe hearing loss. In line with comments made by Goldberg & Flexer (10), this finding ‘dispels the notion that only children with more moderate hearing impairments would be candidates for auditory-verbal practice’. One should also bear in mind that the older participants in this study (ages 37, 40 and 49), were learners at the Carel du Toit Centre more than 30 years ago. The LSL programme at the Centre has evolved over the years and would ‘look’ quite different today, in terms of methodology, with many improvements/enhancements being incorporated.

The data related to the causes of the hearing loss was quite limited, with, on average, 40% of the participants not being sure about the exact cause of their hearing loss. The remaining 60% had varied answers but the data does seem to indicate that Rubella (German Measles) and genetics play quite a big role as two of the most common causes which is similar to what is reported in the literature. Almost 17% of the participants reported having additional long-term impairments besides their hearing loss. Some interesting aspects emerged from the data regarding these 5 participants, namely, discrepancy between age of onset of hearing loss and the age their hearing loss was identified (ages 2, 3 and 5 respectively); a greater reliance on additional specialized/therapeutic services; 80% attending public (not private) schools with most attending special as opposed to mainstream schools and 2 (of the 5 participants) only completing Grade 12 at age 19 (rather than 17 or the norm of 18).

The data related to the age of acquisition of hearing technology revealed that participants, in the main, were fitted with hearing aid/s between birth and age 5 (N=25, out of total of 31) with 18 of the 25 participants being fitted with a hearing aid only from age 1 onwards. The highest number of the participants that received their hearing aids at 1 years of age (N=8). Participants only received their cochlear implant/s from the age of 1, with no emerging trends i.e. implantation occurred consistently across the age spectrum. The dataset shows that those participants with a profound hearing loss clearly have a preference of cochlear implants over hearing aids. Despite the additional financial burden (costs at outset as well as long-term maintenance), it seems the preference was for the technology that could provide the best hearing outcome.

It is well-known that the use of only hearing instruments is not always optimal, especially in difficult listening situations and that the individual may need to rely on additional listening support and/or communication strategies. This was supported by the data in this study i.e. with all participants making use of assistive listening devices such as FM-, Bluetooth-, induction loop-systems and/or lip/speech reading to maximize their listening 'ability'.

Two very telling points in this study related to their educational (schooling) history. There was a definite preference for moving from public to private, as well as special to mainstream secondary schooling environments. Reasons for this could include: the need for smaller classes as the child progresses to high school, improved listening skills, as well as improved verbal communication as the individual matures. Another interesting trend that emerged from the data was the move away from sign language by the time they enrolled for their high school education, with the total communication (spoken and sign language) at 8% of the participants, and the use of sign language at zero. One of the main reasons for this could be the lack of availability of SASL interpreters as well as teachers who are trained in SASL. It is also interesting to note that, on average, the participants completed their final year of high school (Grade 12) at the typical age of 18 and 19, with two finishing already at age 17. This shows that educationally, they coped well, despite their hearing loss.

With regards to higher education, participants were not asked for their reasons for qualification selection i.e. Certificate, Diploma etc., but the data clearly shows that past learners from the Carel du Toit Centre who have been exposed to the LSL programme, are able to successfully pursue qualifications post Grade 12, even in the traditional classroom (face-to-face) environment which can be highly challenging without the appropriate reasonable accommodation e.g. human note-takers (15). Further research regarding the transition from secondary to higher education, as well as the reasonable accommodation provided at universities in South Africa, is needed, in order to more fully support students with a hearing impairment.

Twenty-two participants were working at the time of the survey, with 6 of them still studying in the post-secondary school sector. These participants had transitioned into a variety of careers which demonstrates that having a hearing loss has not limited them in terms of career development in the mainstream world, thus being able to be fully integrated into mainstream society as independent individuals contributing to the South African economy. This is one of the biggest indicators of the success of the LSL approach at the CDTC. Most of the participants had a post-secondary qualification and were all employed except for 1 who was seeking employment and 6 who were still studying at a degree and honour's degree level.

Identity refers to who you are, the way you think about yourself, the way you are viewed by the world as well as the personality characteristics that define you. The statement: "I am a person with a hearing loss who participates in both the hearing and 'Deaf worlds'" was how 54.8% of the participants defined their self-identity. This illustrates the 'blended' view of themselves, recognizing their D/deafness (not to have hearing) but being integrated into the hearing world completely through the use of spoken language. "I am a person with a hearing loss who participates completely in the hearing world", as an identity was selected by 45.2% of the participants, showing they view themselves as part of the mainstream hearing world completely despite the fact they have a hearing impairment. Neither is better than the other, just different personal views, showing that despite individuals with similar

type of hearing loss, coming from similar backgrounds and attending the same LSL programme, can see themselves quite differently in terms of how they self-identify.

In reviewing the final two open-ended questions, and resulting comments, some interesting learnings emerged. Firstly, participants were asked about the proudest achievements, with most referring to their post-secondary school education, overcoming their hearing impairment, independence as well as being employed or self-employed. Some of the personal characteristics that were of specific importance to the participants included their self-esteem/self-acceptance, faith, independence, as well as leadership skills (at school) and being an ambassador or role-model for other individuals with a hearing impairment. The second open-ended question related to their perceived benefits of being part of the CDT LSL programme, with 39% of the participants referring to their speech and language development, and almost a quarter of the participants appreciating the quality of education received and through the use of technology and spoken language, feeling more included in a hearing society. These comments show that the CDT LSL practices had a positive influence on the educational outcomes of the participants, affording them the opportunity to be integrated into the mainstream schooling environment and the participation in higher education, at traditional universities that offer face-to-face, oral tuition. In addition, the programme contributed to their integration into a hearing society, employment and therefore independence.

The findings of this study thus suggest the following:

- The targeted outcome of the Carel du Toit Listening and Spoken Language (LSL) practice seems to lead to its stated goals.
- Many of the children with hearing impairment who participate in the LSL programme (and this study) have the opportunity to grow up in regular learning (mainstream schools) and living (hearing family) environments that enables them to become independent, participating and contributing citizens of mainstream South African society, sometimes despite late detection and intervention. LS thus places them at a distinct advantage.
- The majority of the participants in this study who are LSL programme 'graduates' continue on to post-secondary education, and either are self-employed or are employed in the public or private sectors.

## CONCLUSIONS AND RECOMMENDATIONS FOR FOLLOW-UP ACTION

If the overall goal of LSL (besides listening and spoken language development) is independent functioning in the world, including mainstreaming in local schools, attendance at mainstream post-secondary institutions, being gainfully employed or self-employed and participating in social/community activities, then the Carel du Toit LSL programme has achieved its objective with these study participants. The majority of participants in this study identified themselves as successfully functioning in all of these areas.

The purpose of this survey was not to compare approaches to aural habilitation nor to debate philosophical differences between AVT methods, but rather, to determine for the

first time, if the LSL practices used and developed at the Carel du Toit Centre over the past 47 years, is capable of reaching its targeted outcome. This project is a first-step in documenting that, for the overwhelming majority of participants in this study, the CDTC LSL practices did just that, providing them with the opportunity to grow up in regular learning and living environments, achieving good educational outcomes at primary and secondary schooling levels and progressing into higher education studies, after which being gainfully employed. In essence, being fully functioning, independent, contributors to mainstream South African society.

Based on the findings of this study, the following recommendations are made:

- The implementation of universal neo-natal hearing screening programmes, as part of Universal Healthcare, in all public and private hospitals in South Africa, to assist with early identification and intervention; aiming to meet the Gold Standard of screening by 1 month and diagnosis and intervention by 3 months.
- The implementation of primary ear & hearing care programmes for young children, age 0 to 3 years of age, at ECD Centres, especially whilst the neo-natal hearing screening programmes are phased in, to assist with early identification and intervention.
- These primary ear & hearing care programmes will also be used to raise public awareness and ensure timeous action on preventable hearing loss.
- An integrated and sufficiently resourced referral system for the diagnosis and treatment of hearing loss, including ENT's and Audiologists, as well as Speech and Language Therapists/LSL accredited practitioners, in order to minimize the impact of hearing loss i.e. to reduce developmental delays and to facilitate language development and communication.
- De-Centralisation of the Carel du Toit Centre's services to make it available for the rest of South Africa/Africa through various means, such as the establishment of CHAT services in all main provinces, or possibly the development of an e-Learning programme of the LSL method used at the Carel du Toit Centre to make it available to other areas in the Western Cape, South Africa and beyond. One immediate suggestion is the establishment of hearing screening services in the Drakenstein District/Cape Winelands, as there is an immediate need and infrastructure in place. There is only one audiologist at the Paarl Hospital.
- In addition to expanding to other provinces, the Western Cape Government is encouraged to provide additional resources to grow the current/existing programme to other areas of the Western Cape province, to increase the capacity of the existing CDT Centre in Cape Town to increase the enrolment numbers and human resources to support teachers (in mainstream and specialised environments) as the school is not able to meet the extensive demand for its services.
- Due to the success of the LSL practice at the Carel du Toit Centre, 'their' methodology needs to be recorded and preserved, and recognised by Government as a successful communication practice to be integrated into all applicable Laws and Acts, especially related to Education and Persons with Disabilities and their Rights.
- This could be done through an e-portal to make skills development and training available via an online learning programme, in this way expanding reach and reducing costs.

- There needs to be differentiation between advocacy for the Deaf children who make use of South African Sign Language, and children who are deaf who make use of technology, learn to listen (use their hearing technology) and who can thus hear and learn to talk (using typical spoken language). A 'both/and' approach needs to be employed – not putting one above the other just because they are politically stronger and have a direct voice in Parliament. The rights of children and persons with a hearing loss who choose to be oral, also needs to be protected.
- Further research into the LSL programme at the Carel du Toit Centre is needed.
- Conduct further research e.g. conduct a quantitative study of a child/children diagnosed and managed early with regards to education and educational options.
- Suggested further research:
  - Conduct an analysis of the data of CDT learners over the past 10 years with a focus on diagnosis, intervention, current placements and progress.
  - A South African study on the integration outcomes of learners identified and diagnosed according to the EHDI guidelines (within 1-month identification, 3 months' diagnosis and 6 intervention)
- There is a need for health policy development and implementation on the identification and management of hearing loss in South Africa.
  - The lack of neo-natal hearing screening in South Africa results in not only the late identification and diagnosis of children with a hearing impairment, but also the resultant late LSL intervention, which can have a detrimental effect on the child in terms of their listening as well as speech and language skills, educational outcomes and social integration.
  - There is a need for neo-natal hearing screening and diagnostic facilities at all public and private hospitals to detect a hearing impairment at the earliest possible point. Children with hearing loss can benefit greatly from being identified early in life and offered appropriate interventions.

## WAY FORWARD

- The first draft of one journal article has been written for submission to the International Journal of Early Childhood Learning which investigates the dynamics of learning in the first seven years of life, including documentation of early childhood learning practices and exegeses of the effects of those practices.
- This article needs to be finalised, edited and submitted.
- The scope of the findings of this study lends itself to the publication of a second journal article which will target the same journal, for the sake of continuity.

## Acknowledgement

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## BUDGET

Kindly adhere to below description of budget line items			
Each and every budget ITEM should be <b>motivated</b> in such a way that it <b>justifies</b> the amount/s requested. Budget items must be fully described and aligned with the project work-plan provided in Section 3 above.			
	Description of budget line item	Amount Awarded	Amount Used
a.	Research assistant – conducting literature review, draft write-up [50 Hours @ R50]	R2 500	R2 500
b.	Field work (conducting interviews [fuel costs], audio-recording) [40 Hours @ R50 (20 interviews x 2 hours, including travel time) [500 Km x R3.55/km AA rate)]	R2 000 R1 775	R2 500
d.	Transcription of audio-recordings into text; data coding and initial analysis using Atlas.ti [80 Hours @ R50]	R4 000	N/A
e.	Member-checking of data analysis (fellow academic) [10 Hours @ R200]	R2 000	N/A
f.	Editing of Journal Article [15 pages = R1 500] (20c per word; 500 words per page) [15 pages = R1 500]	R3 000	Will still use
g.	Article Processing charge – International Journal – will target the International Journal of Early Childhood Learning.	*R14 566	Will still use
h.	Two workshops to disseminate the results (venue, catering, facilitation)	R4 000	Will still use
TOTAL		R33 841	R5 000

**Note:** during the course of this project the following challenges arose:

- The original budget was based on conducting a qualitative study. Thus, the full budget will not be spent.

Sourcing a competent, English 1<sup>st</sup> language research assistant (who is a current M/PhD student at CPUT) proved to be a major challenge.

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ANNEXURE 1: Data Collection instrument: available at <https://forms.gle/qHKgzxvmsmEpPb38>

**Carel du Toit Centre (Cape Town): Outcomes Survey of ‘their’ listening and spoken language approach for children with hearing loss**

**Consumer Survey Questions for Carel du Toit ‘Graduates’ (Alumni)**

Name and Surname:

Email Address:

1. Hearing Loss and Amplification											
1	<b>Degree of hearing loss (Tick applicable boxes):</b>										
	<b>Right Ear</b>	<input type="checkbox"/>	Mild	<input type="checkbox"/>	Moderate	<input type="checkbox"/>	Severe	<input type="checkbox"/>	Profound	<input type="checkbox"/>	None
	<b>Left Ear</b>	<input type="checkbox"/>	Mild	<input type="checkbox"/>	Moderate	<input type="checkbox"/>	Severe	<input type="checkbox"/>	Profound	<input type="checkbox"/>	None
2	<b>Date of birth:</b>										
3	<b>Age of onset of hearing loss (in years):</b>										
4	<b>Age of identification of hearing loss (in years):</b>										
5	<b>Cause of hearing loss (if known):</b>										
6	<b>Is your hearing loss progressive?</b>		<input type="checkbox"/>	Yes	<input type="checkbox"/>	No	<input type="checkbox"/>	Don't Know			
7	<b>Did you as a baby or your mother during pregnancy have any of the following? (Tick applicable boxes)</b>										
	<input type="checkbox"/>	Asphyxia				<input type="checkbox"/>	Bacterial meningitis				
	<input type="checkbox"/>	Congenital perinatal infections				<input type="checkbox"/>	Defects of the head or neck				
	<input type="checkbox"/>	Elevated bilirubin (jaundice)				<input type="checkbox"/>	Family history of childhood hearing impairment				
	<input type="checkbox"/>	Low birth weight				<input type="checkbox"/>	Other? (Please specify)				
Other:											
8	<b>Age range and the type of Hearing Technology you used/currently use (Insert ages and tick applicable technology, and indicate Left and/or Right ear or side)</b>										
	Age range (in years)		Hearing Aid/s		Cochlear Implant/s		Bone Anchored Hearing Aid/s		Bone Conduction Implant/s		
9	<b>Do you make use of any of the following? (Tick applicable boxes)</b>										
	<input type="checkbox"/>	Lip reading / Speech reading				<input type="checkbox"/>	FM systems				
	<input type="checkbox"/>	Audio/Induction Loop System				<input type="checkbox"/>	Bluetooth Systems				
<input type="checkbox"/> No, don't make use of any of these											

**Primary School, High School and Post Grade 12 Educational History**

<b>1</b>	<b>Please list the schools you attended up to Grade 12 (after Carel du Toit)</b>							
Name of School	Ages of Attendance (in years) e.g. 7 to 12	Type of School				How were you taught?		
		Special		Mainstream		Speech only	Speech & Sign Language	Sign Language only
		Public	Private	Public	Private			
<b>2</b>	<b>Did you receive any therapeutic or other specialised services while in primary or high school (after Carel du Toit)? (Tick applicable boxes)</b>							
	Speech and Language Therapy			Sign Language Interpreter				
	Qualified teacher for hearing impaired students			Occupational Therapy				
	Tutoring / Mentoring			Examination concessions e.g. extra time				
	Counselling			Other? (please specify)				
	Other:							
<b>3</b>	<b>Did you complete high school i.e. Grade 12?</b>			Yes		No		
<b>4</b>	<b>How old were you when you completed Grade 12 (if applicable):</b>							
<b>5</b>	<b>Grade 12 Subjects and Results</b>							
	<b>Subject</b>					<b>% Achievement</b>		

6	Did you continue your education after high school?		Yes		No	
7	<b>(If applicable to you)</b> <b>Regarding your situation post-Grade 12, if you applied to study at university or college and were not accepted (i.e. unsuccessful), what course of action did take e.g. take a gap year, find work etc? Could you please provide details?</b>					
	[insert statement here]					
8	Please list your qualifications obtained after high school e.g. Certificate, Diploma, Degree, Post-graduate degree					
Qualification	Name of institution	Type of Institution (University, College)	Year acquired	Mode of Study (Tick applicable box)		
				Online/ Distance	Face-to- Face	Blended
<b>Work History</b>						
1	Do you currently work?		Yes		No	
2	If No, why not?					
	[Insert statement here]					
<b>Complete below if you selected Yes in Question 1 above</b>						
3	<b>What is your current job title and job type?</b>					
	Job Title:					
	Industry/Sector e.g. Financial services:					
4	<b>Please choose the monthly income range (gross) that describes your personal (not family) earnings currently (Tick applicable box)</b>					
	Less than R10 000		R30 001 to R40 000			
	R10 001 to R20 000		R40 000 and over			
	R20 001 to R30 000		Other or N/A			
5	<b>Briefly list your employment history</b>					
	Job Title	Job Sector/Industry	Time period (Year to year)			

Other				
1	Do you, or did you, have any other challenges in addition to your hearing loss, for example, visual impairment, learning disability, physical impairment etc.?		Yes	No
2	If yes, please describe: [insert statement here]			
3	What are you most proud of achieving so far in your life: [insert statement here]			
4	How would you describe yourself in regard to your hearing impairment? Select <b>one</b> of the following OR fill in the "OTHER" line in your own words:			
	"I am a person with a hearing loss who participates completely in the hearing world."			
	"I am a person with a hearing loss who participates in both the hearing and 'Deaf worlds."			
	"I am a person who is Deaf who participates primarily in the Deaf community."			
	OTHER: "I am a _____ " [insert statement here]			
5	Thinking back to your time spent as a Learner at the Carel du Toit Centre, how would you now describe the benefits of having attended their Listening and Spoken Language programme? [insert statement here]			
6	Are you still in contact with friends that you made whilst attending the Carel du Toit Centre?			
	Yes		No	
7	If you answered YES to the previous question, please provide some contact details, if possible i.e. Name & Surname, Email address, Cell number			
8	Please add in any other general comments here: [insert statement here]			