The use of unaided augmentative and alternative communication strategies to support learners in South African special schools: A study of teachers' perceptions.

by

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The author declares that she has observed the ethical standards required in terms of the University of Pretoria's Code of ethics for researchers and the Policy guidelines for responsible research.

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ABSTRACT

Manual signing using keywords, an unaided augmentative and alternative communication (AAC) strategy, has an important role to play in the education system. To date, limited research exists with regard to the usage and effectiveness of unaided AAC strategies in the school environment. This gap is even more pronounced in the South African context. To address this research gap, the current study aimed to explore the perceptions of teachers towards the use of unaided AAC strategies in the educational context. The study used a quantitative, non-experimental survey, involving fixed and open-ended questions. The sample focused upon five urban school districts within the Gauteng province and considered both public and private schools for learners with special educational needs (LSEN), since these schools accommodate learners with a broad spectrum of disabilities and are likely to include learners with complex communication needs (CCN). A total of 101 teachers from ten schools participated. The participants identified various factors which influence manual signing within the educational system. These factors are related to the teachers' school and classroom context (e.g. school culture), the team members involved (e.g. parents), community awareness, learner-related factors and training needs. These factors and challenges are assessed and discussed with reference to both local and international norms. Recommendations are made with regard to expanding both an understanding and acceptance of unaided AAC strategies as a further means to support learning in the educational context for LSEN.

Keywords:

Unaided augmentative and alternative communication, manual signing, KWS, perceptions, teachers, special needs schools

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LIST OF ABBREVIATIONS

AAC	-	Augmentative and Alternative Communication
ADHD	-	Attention Deficit Hyperactivity Disorder
CAPS	-	Curriculum and Assessment Policy Statement
CCN	-	Complex Communication Needs
CRC	-	Convention on the Rights of the Child
CRPD	-	Convention for the Rights of Persons with Disability
ECD	-	Early Child Development Phase
ID	-	Intellectual Disability
KWS	-	Key-word-signing
LSEN	-	Learners with Special Educational Needs
LOLT	-	Language of learning and teaching
MCE	-	Manually Coded English
OTs	-	Occupational Therapists
PECS	-	Picture exchange communication system
PRISMA	-	Preferred Reporting Items for Systematic Reviews and Meta-Analyses
SASL	-	South African Sign Language
SGB	-	School Governing Body
SGDs	-	Speech generating devices
SID	-	Severely Intellectual Disability
SLPs	-	Speech-language Pathologists
UP	-	University of Pretoria

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1. PROBLEM STATEMENT AND LITERATURE REVIEW

1.1 Introduction

Communication is both an intrinsic human right and a fundamental human need. In order to function effectively, humans have to connect to others and be able to express specific wants and needs (Dada, Kathard, Tönsing, & Harty, 2017). Since education during a child's formative years is also a human right, this would extend to a need for effective communication for all in the classroom. International treaties such as Article 23 of the United Nation's Convention on the Rights of the Child (CRC) (UN, 1989) and Article 24 of the United Nation's Convention for the Rights of Persons with Disabilities (CRPD) (UN, 2006) have progressively directed South African policies and practices towards the inclusion of children with disabilities. This has resulted in embedded legislation such as Section 29 of The Constitution of the Republic of South Africa (South Africa, 1995) that supports equal access to education for all, to include learners with complex communication needs (CCN). This right is subsequently supported by the Education White Paper 6 on Inclusive Education (Department of Education, 2001).

Previously in South Africa, separation between general and special needs education perpetuated differentiation and promoted the medical view of disability (Donohue & Bornman, 2014; Engelbrecht, Eloff, Pettipher, & Swart, 2002). As a result, education focused upon the learners' supposed intellectual and physical inadequacies (Carrington, 1999). Unsurprisingly, this was counterproductive, producing few teachers in South Africa with the necessarily skills to truly teach learners with disability (Bornman & Donohue, 2013). This in turn resulted in ineffective practices with less than optimum outcomes for individuals with disabilities (Engelbrecht, 2006; Muthukrishna & Schoeman, 2000). Since special needs schools almost exclusively attend to the needs of learners with CCN, it stands to reason that special needs teachers play and will play an important role in supporting augmentative and alternative communication (AAC) implementation in the classroom (Dada & Alant, 2002). The challenge therefore includes unwinding the influence which the medical model has had upon teacher training and beliefs, attitudes and practice in education (Carrington, 1999).

However, despite clearly noble legislation, the implementation of inclusive education in South African schools has been slow and somewhat limited (Dalton, McKenzie, & Kahonde,

2012; Donohue & Bornman, 2014). Consequently, a tangible risk remains, namely that within such structures, learners with CCN will not optimally participate in, or worse, be excluded from classroom activities. Although inclusive education remains an idealistic goal within South Africa, in practice, special needs schools almost exclusively attend to the specialized needs of learners with disabilities to include those with autism spectrum disorder (ASD), cerebral palsy, intellectual challenges and sensory disabilities (Tönsing & Dada, 2016) due to motor, language, cognitive and/or sensory impairment (Light & Drager, 2007). Such a heterogeneous group of learners with CCN clearly require different forms and degrees of educational support (Blackstone, Williams, & Wilkins, 2007). Special needs teachers are therefore challenged to provide these learners at the earliest possible age with access to communication strategies which will provide optimal support to their educational needs (Light & Drager, 2007).

1.2 Learners with CCN: Language groups and AAC

Learners with CCN are either devoid of speech or cannot use speech to adequately meet all of their communication needs (Sigafoos & Drasgow, 2001). Augmentative and alternative communication (AAC) as an instructional approach can facilitate learners with CCN towards attaining their fullest potential by supporting their communication and educational needs in order to increase participation and interaction in the classroom (Dada & Alant, 2002). Von Tetzchner and Martinsen (1992) categorized individuals who might benefit from AAC into three distinct groups. The first group is the expressive language group, in which individuals understand others' spoken language but have difficulty expressing themselves. This group includes individuals with motor impairments such as cerebral palsy, severe verbal dyspraxia and less often expressive aphasia. The difficulties of individuals in this group are persistent and they need an AAC system that can be used permanently (Branson & Demchak, 2009; Murray & Goldbart, 2009). The second group is the supportive language group which includes individuals with limited expressive skills (speech and language) such as individuals with Down Syndrome. They are divided into two subgroups: developmental and situational. Both subgroups need AAC systems at certain periods of their lives or in certain situations (Branson & Demchak, 2009; Murray & Goldbart, 2009). Lastly, the alternative language group includes individuals with ASD, intellectual disabilities and individuals who have not develop speech (Murray & Goldbart, 2009). For this group AAC is a permanent means of receptive and expressive communication. Learners

with CCN could fall into any of these three groups (von Tetzchner & Martinsen, 1992). While the specific needs of the three groups may differ, all learners with CCN will benefit from an appropriate form of AAC.

AAC comprises two fundamental forms of communication, namely aided and unaided methods. Aided methods require an external aid or device such as alphabet boards, picture communication books or speech generating devices (SGDs). Unaided methods, which are the focus of this research, require only the body to communicate a message such as vocalizations, gestures, eye pointing or manual signs (Bornman & Tönsing, 2017; Tönsing & Dada, 2016). Unaided AAC may be sub-divided into non-linguistic (less like language) and linguistic (more like language) systems.

Non-linguistic systems consist of a limited set of signs that can be used for day-to-day communication, and include vocalizations and gestures. Gestures are generally understood within a certain culture and include body movements like pointing, head nodding, shaking or mime (Bornman & Tönsing, 2017). In certain situations, these may be extended to include informal or idiosyncratic gestures which are fabricated gestures that communicate specific concepts (Beukelman & Mirenda, 2013; Sigafoos & Drasgow, 2001). In a classroom environment, however, the full repertoire of gestures are often too limited to impart concepts such as numeracy and, in such event, gestures may be employed in conjunction with a linguistic system such as manual signing (Loncke, Campbell, England, & Haley, 2006).

On the other hand, linguistic systems are generative, which means they are rule governed and can create unlimited messages such as sign language and alphabet-based signs such as fingerspelling. Locally, South African Sign Language (SASL) is employed by the South African Deaf community and has its own expressive ability, own grammar rules and syntax, and is therefore considered a fully fledged language in its own right (Bornman & Tönsing, 2017). Furthermore, the Curriculum and Assessment Policy Statement (CAPS) has been developed for SASL Grades R-3 and was recently approved to ensure better quality education for Deaf learners in South African schools. Indeed, the South African Schools Act 84 (South Africa, 1996) recognizes SASL as a language of learning and teaching (LOLT) (Department of Education,

2018). Universally, other linguistic systems include Manually Coded English (MCE) or key-word-signing (KWS) which is a strategy of complementing speech with manual signs (Rombouts, Maes, & Zink, 2017a) and of which Makaton™ is a prime example (Goldbart & Marshall, 2004; Alant, Lloyd & Tönsing , 2005). The Makaton Vocabulary was constructed by adopting a selection of specific manual signs from a sign language which typified the keyword approach (Makaton Charity, 2018). Makaton is the most popular language system used in the United Kingdom (UK) for children with intellectual disabilities and has been implemented in over 40 countries, including South Africa (Sheehy & Budiyanto, 2014).

1.3 The usage and benefits of KWS as strategy in the classroom

When unaided AAC is employed within a special needs classroom to facilitate communication needs and language learning, it is done in a KWS manner. This differs from schools for learners who are Deaf where the focus is on using SASL to teach the curriculum. When using KWS, some key signs from a sign language (e.g. SASL) is used while the teacher continues to use e.g. English, Afrikaans, isiZulu to highlight the key educational concepts (Bornman & Tönsing, 2017). In a particular sentence only the most important words in the lesson are supported (i.e. nouns, adjectives, verbs, pronouns, adverbs) by a manual sign and not all the words are signed when accompanied with speech (Bornman & Tönsing, 2017). It is believed that KWS may support receptive language, because the simultaneous production of manual signs will visualize aspects of the spoken language, thereby allowing learners with CCN to rely upon both auditory and visual input to decode the message being presented (Rombouts et al., 2017a; Tan, Trembach, Bloomberg, Iacono, & Caithness, 2014). Inevitably, the use of manual signs slows down speech and emphasizes the key concepts of the message. In this way, learners with slow processing skills are provided more time for encoding of their understanding and decoding of information (Rombouts et al., 2017a).

According to Clibbens (2001), the visual nature of signing may increase attention and assist learners to attend more easily to what the teacher is communicating. Importantly, signing may reduce frustration and challenging behaviour in the classroom (Bornman & Rose, 2017) and improve interaction patterns, which in turn will assist with speech development and intelligibility (Clibbens, 2001; Cravotta, Busă, & Prieto, 2019; Light & McNaughton, 2012). All three groups

with CCN may benefit from unaided AAC, more specifically KWS: The expressive group may find it easier to express themselves; the supportive group may find that both their understanding of spoken language and their expressed language is supported, with a positive impact on their communication effectiveness and intelligibility; and the alternative group may use KWS as a permanent means to support receptive and expressive communication.

However, in order for such benefits to be realized, it is critical that teachers in special schools communicate effectively and efficiently with all learners, including those with CCN. Teachers should be able to provide appropriate education through meaningful instructions, thereby enhancing the learners' knowledge and skills (Tönsing & Dada, 2016). Research has indicated that teachers' perceptions and their beliefs influence their judgement and have a direct impact on their behaviour in the classroom (Carrington, 1999; Rombouts et al., 2017a). The drive towards inclusive education has influenced such perceptions and challenged previously held views on best practice with regard to the education of learners with disability.

1.4 Factors influencing teacher perceptions in the classroom

Research has shown that the perception of teachers and their inherent expectations has a significant influence upon their classroom environment and their communicative interaction with learners with CCN (Donohue & Bornman, 2014; Donohue & Bornman, 2015). According to Soto (1997), a positive perception will reflect confidence in the marriage between teachers' skills and their perception of the learners' ability to perform. When teachers can engage in scaffolding processes while interacting with these learners, they are better equipped to assist such learners in realizing their potential. Expressed in another manner, this may be referred to as teacher efficacy, which is defined as a teacher's belief that he or she can bring about change in a child's learning and development (Schmitt & Justice, 2011). As such, teachers with a high level of self-efficacy are likely to not only commit to an innovative approach, but to attempt new instructional approaches and persist with complex teaching strategies while remaining positive about their effectiveness, even in negative situations (Schmitt & Justice, 2011). Collectively, this is important in view of inclusive education, since a positive and rewarding environment will better prepare learners with CCN for the possibility of entering mainstream schools (Tönsing & Dada, 2016). Since it is also known that teachers' perceptions towards AAC may impede or facilitate

AAC implementation (Rombouts, Maes, & Zink, 2016a), then clearly for teachers to employ AAC, more specifically unaided AAC, they need to understand why this strategy is essential for the development of learners with CCN and how it may facilitate interaction with these learners to ensure sustainability.

In accordance with the principle of *response efficiency* (Johnston, 2006), it is vital for teachers to experience the effectiveness of AAC. This principle suggests that when teachers experience beneficial effects, they are less likely to abandon an AAC strategy. It is also likely that, as they become more knowledgeable and confident, teachers will employ AAC strategies. Such a view was reinforced by Rombouts et al. (2017a) who postulated that teachers' skills and beliefs may affect their use of AAC in the classroom. Teacher training is therefore central to improving skills and bringing about change in the classroom, in the practice of teachers, and in their beliefs and attitudes to, ultimately, improve learning outcomes (Bornman & Donohue, 2013; Chadwick, 2008; Dalton et al., 2012; Hay, Paulsen, & Smit, 2001; Patel & Khamis-Dakwar, 2005).

When special education teachers are convinced that KWS can enhance communication, they are more likely to take a positive attitude towards the implementation of such a strategy. Rombouts, Maes, and Zink (2017b) also suggested that, when teachers feel that their colleagues value KWS, they may be more inclined to implement it. In contrast, teachers with a negative attitudes towards KWS are less likely to succeed with the implementation of such an unaided AAC strategy (Rombouts et al., 2017a). Twachtman-Cullen (2008) concurs by stating that, for learners to benefit from KWS, teachers need to understand that a key component of employing unaided AAC is to ensure consistency across the learner's environment. Clearly, a motivated teacher is more likely to encourage and guide parents in the use of KWS at home, thereby creating a supportive AAC environment (Rombouts et al., 2017a). In addition, evidence seems to indicate that a negative perception, as may prevail at the beginning of an innovation, could change with time as a function of both the experience and the expertise which develop through the process of implementation (Avramidis, Bayliss, & Burden, 2000; Bornman & Donohue, 2013).

1.5 Systematic search of studies related to KWS as strategy

The aim of the systematic search was to identify studies about teacher perceptions regarding unaided AAC, such as KWS, or manual signing as strategy. The search terms searched are displayed below in Table 1, using the P10 format (Population, Issue, Outcome). Boolean operators (AND an OR) were also used as well as truncation (*).

Table 1 *Search parameters*

Population		Intervention/Issue/Exposure		Outcome
Teacher*		Key-word-sign*		Educa*
OR		OR		OR
Educator*	AND	Manual sign*	AND	Learn*
OR		OR		OR
Support staff		Sign*		Teach*

The inclusion and exclusion criteria for the database searched are displayed in Table 2, Inclusion and exclusion criteria for records screened. The inclusive and exclusive criteria are presented according to searched terms, population, age, language, scholarly journals and date of publications.

Table 2 *Inclusion and exclusion criteria for records screened*

Aspect	Inclusion criteria	Exclusion criteria
Searched databases	CINAHL, ERIC, Humanities, MEDLINE, PsycINFO, PsycARTICLES and Teacher Reference Centre	
Population	Learners or children	Adults
Age	All age groups	Adults
Language	Published in English	
Scholarly journals	Peer reviewed	
Date of publication	2000–2018	Records published prior to 2000

The results from the systematic search based on the specific search terms (Table 1) after applying the inclusion and exclusion criteria (Table 2) were as follows: 195 articles were identified by database search, and after exact duplicates were removed 135 articles remained. The articles were screened at title level, resulting in 124 articles being excluded from the database search, as these articles were not relevant to KWS as a strategy. The 11 remaining articles from the database search were assessed at abstract level. Seven articles were removed, as they were not relevant to the study: One article was about KWS as intervention for children with autism; two articles were about KWS as intervention for adults with intellectual disabilities (ID); one article was about KWS usage in adults with ID; one article was about a KWS training program for adults with ID, and one article was an intervention study about gesture and signing in support of expressive language. A total of five articles were summarized and are displayed in Table 3. The PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) diagram in Figure 1 depicts the systematic search process.

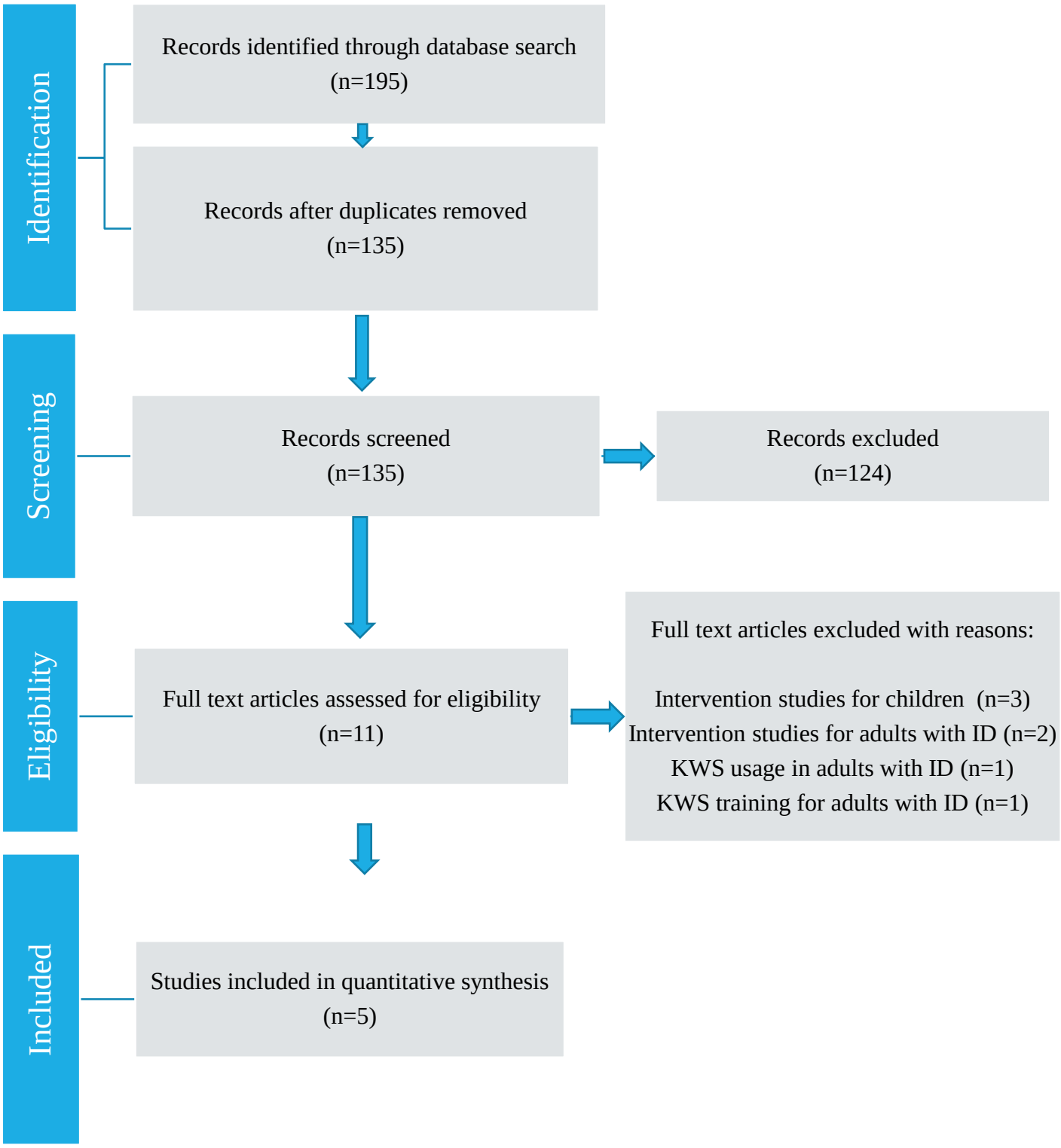


Figure 1 PRISMA diagram for studies included in the systematic search

Table 3 *Systematic search of studies related to key-word-signing as strategy*

Author	Aim	Participants	Procedure	Results	Implication of study
Budiyanto, Sheehy, Kaye, & Rofiah, 2018	To gain insight into the beliefs and experiences of teachers using Signalong Indonesia as a KWS approach in inclusive schools.	41 teachers from 4 inclusive schools.	• A mixed-method approach was adopted. • Questionnaire was used, followed by semi-structured interviews to explore issues arising from the questionnaire in depth. • Thematic analysis of data.	• All respondents felt that there were children in their school who could benefit from Signalong Indonesia. • 31% of teachers indicated that some colleagues in their school saw it as stigmatizing towards children. • The relationship between happiness and learning was identified as an essential feature of inclusive classroom pedagogy.	• The findings suggest that a new model of teacher training is needed to implement Signalong Indonesia, along with revised classroom materials, if the approach is to support inclusive practices within schools rather than developing isolated "signing teachers".
Norburn, Levin, Morgan, & Harding, 2016	To evaluate the usage of AAC forms such as manual signing, PECS and SGDs across a wide age range in a special school for learners with CCN.	72 teachers and support staff.	• Questionnaire with 13 items. • Questions pertaining to effectiveness, experience of and attitude of use, training received and understanding of the purpose of AAC.	• Makaton signing was the most frequently used mode of AAC across the whole school, with 99% (n=71). • Natural gesture was used by 60% of participants (n=43). • 89% (n=64) of teachers did not use SGDs. • Participants preferred mode of training was "training in class". • Non-usage of AAC was ascribed to the perceived difficulty of implementation, with	• Natural gestures and photographs were the easiest form of AAC to use across the school with PECS and SGDs more difficult to use. • Training of teachers is a key component in increasing teacher confidence and ensuring the effective usage of AAC across a school. • Training of teachers is important to increase knowledge and understanding with regard to the use and benefits of all forms of AAC.

Author	Aim	Participants	Procedure	Results	Implication of study
				natural gesture the least difficult (5.5%), followed by PECS (31%) and high tech SGDs (29%). • The biggest reason given why AAC presents difficulty was the lack of training, knowledge and experience. • The reason for not using AAC concerns the perceived level of need; either the learners were perceived to be too able or not able enough to access the identified form of communication.	
Rombouts et al., 2017a	To understand why professionals may not always realize the potential of KWS usage. To examine their attitude towards AAC.	5 teachers from 5 special education secondary schools. 5 direct support staff.	• Interviews were audio-recorded, questions focused on KWS instead of AAC. • Open-ended questions were pertaining to effectiveness, use, experience and support, interaction and collaboration. • Thematic analysis of data.	• Support staff use KWS primarily during communication breakdown. • Teachers use KWS consistently throughout the day. • Consistent use of KWS is motivated by perceived benefits. • Staff aimed to turn the use of KWS into habit.	• Consistency of using KWS was shaped by three behavioral components: effectiveness, self-monitoring and environmental barriers or facilitators.

Author	Aim	Participants	Procedure	Results	Implication of study
Rombouts, Maes, & Zink, 2018	To determine how teachers and direct support staff use KWS during various group activities.	4 special secondary and 4 day centres for adults were recruited.	• Staff's use of KWS was observed during communicative group activities, non-communicative group activities and mealtimes. • *In situ* partial interval coding was used to measure staff rate, semantic diversity of KWS, sign reinforcement and sign imitation.	• Staff used manual signs significantly more in adult services than special schools during communicative activities. • Staff seldom used or reinforced manual signs during non-communicative activities and mealtimes.	• Staff communicated frequently but did not model manual signs during daily activities.
Sheehy & Budiyanto, 2014	To understand issues that could be relevant in the development of a sign-supported communication method.	69 teachers completed a questionnaire. 20 teachers were interviewed.	• A questionnaire with 25 items derived from Sheehy and Duffy (2009). • Thematic analysis of interview data.	• Signing was seen as an enjoyable communication tool to use in schools. • Teachers were positive towards the training in how to use signing. • Stigmatization exists outside the classroom and impacts upon attitude within school environment.	• Teachers' overall perception towards the potential use of manual signing with children with CCN was positive. • Although attitude remain strongly influenced by perceptions of social stigma, (even in schools committed to its use), the training of teachers may result in positive attitude, and media exposure may reduce stigmatization among the public.

From the systematic review of the published papers it became clear that unaided AAC has a role to play in the education system (Sheehy & Budiyanto, 2014). It may improve communication skills and support language learning in children with CCN (Wilkinson & Hennig, 2007) and, in turn, enhance classroom participation (Beukelman & Mirenda, 2013) and interaction on the playground (Bornman & Tönsing, 2017). Rombouts, Maes, and Zink (2016b) suggested that unaided AAC may be used frequently in-service for individuals with intellectual disability. That said, while the effectiveness of aided AAC as a strategy in support of learners with CCN has been the focus of considerable previous research, limited research exists with regard to the usage and effectiveness of unaided AAC strategies in the school environment. This gap is even more pronounced in the South African context. To address this gap, the purpose of this study was to explore the perception of teachers towards the use of unaided AAC strategies in the classroom.

2. METHODOLOGY

2.1 Research aims

In order to address the gap in research, the following main aim and sub-aims were established.

2.1.1 Main aim

The main aim of the study was to determine the perceptions of teachers in South African schools for learners with special educational needs (LSEN) with regard to supporting education through the use of unaided AAC strategies.

2.1.2 Sub-aims

The sub-aims of the study were:

i. To determine how teachers regard the usefulness of employing unaided AAC strategies in the classroom
ii. To establish which unaided AAC strategies teachers currently employ in their classroom
iii. To determine how teachers view team support (collaboration) with regard to the use of unaided AAC
iv. To determine underlying challenges (factors) which may influence the use of unaided AAC in the classroom

v. To determine environmental barriers to the use of unaided AAC

2.2 Research design and phases

A quantitative, non-experimental survey design, involving a questionnaire with both closed and open-ended questions, was employed. Surveys are a useful way of gathering data, in particular where abstract ideas or concepts such as opinions, attitudes or beliefs are the objective and which are otherwise difficult to quantify (Rickards, Magee, & Artino, 2012). Furthermore, a questionnaire can reach a large number of participants simultaneously (Leedy & Ormrod, 2014), in this case teachers in a school environment. Confidentiality is another advantage as participants may respond to questions with greater assurance of the protection of their identity. Conversely from a negative perspective, misinterpretation of questions may occur, reading/writing skills may introduce bias and the researcher should take care not to influence perception in any way (Leedy & Ormrod, 2014; Rickards et al., 2012).

The research comprised three distinct phases as outlined in Figure 2, namely Phase 1: Instrument development, Phase 2: Pilot study and Phase 3: Main study. The purpose of Phase 1 was to develop and evaluate the questionnaire from an informed basis by using published literature. The purpose of the pilot study in Phase 2 was to ensure that the procedures and materials proposed for the main study were appropriate. Phase 3, the main study, involved data collection, analysis and interpretation.

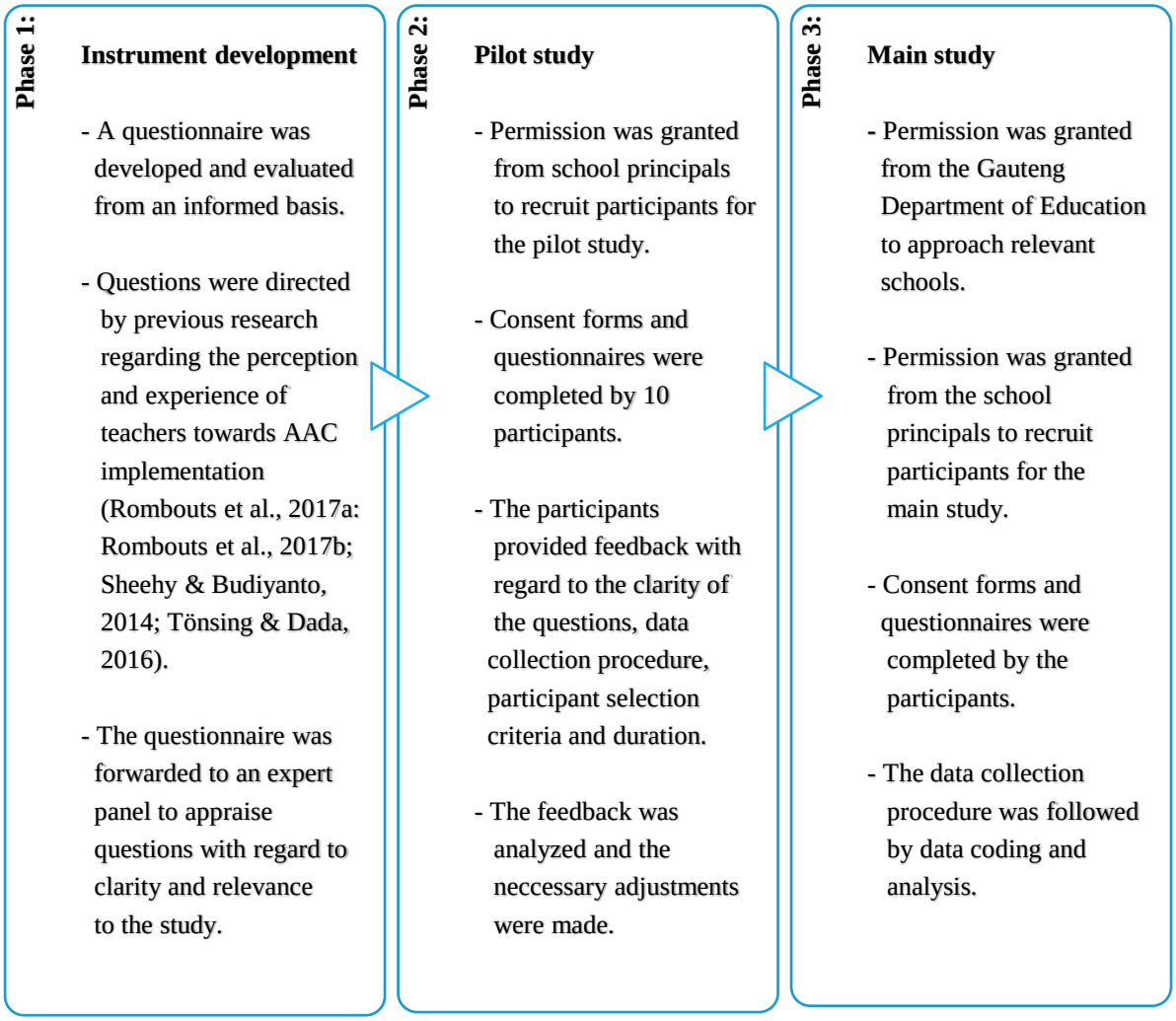


Figure 2 *Phases of the study*

2.3 Materials and equipment

Materials related to ethics, as well as materials related to data collection will be described in more detail below.

2.3.1 Materials related to ethics

2.3.1.1 *Permission letters: University of Pretoria and the Gauteng Department of Education*

Before the study commenced, permission was obtained from the Ethics Committee of the Faculty of Humanities at the University of Pretoria (Appendix A). Thereafter, permission was obtained from the Gauteng Department of Education to allow the research to be conducted at public schools for LSEN (Appendix B).

2.3.1.2 *Information and permission letter for principals*

An information and permission letter was sent to the principals (Appendix C) to obtain permission to recruit participants for the study. The letter provided information regarding the purpose of the study, as well as access to the findings of and benefits involved in participation in the research.

2.3.1.3 *Information and permission letter for the Governing Body and/or committee*

For private schools, an information and permission letter was sent to the School Governing Body (SGB) or relevant committee (Appendix D), followed by a letter to the principal (Appendix C) with a view to recruit teachers from these schools to participate in the study. The letter for the SGB and/or committee of private schools provided information regarding the purpose of the study, as well as access to the findings of and risks and benefits involved in participation in the research.

2.3.1.4 *Information and consent letter for teachers*

The information and consent letter for teachers was distributed among the participants to obtain consent (Appendix E). The letter provided potential participants with information regarding the purpose of the study, what would be expected of them should they choose to participate in the study, their rights pertaining to the study, as well as access to the findings of and risks and benefits involved in participation in the research.

2.3.1.5 *Expert panel consent letter*

Each member of the expert panel completed a consent letter (Appendix F), after which a discussion took place with regard to the clarity of the questions and statements.

2.3.2 Materials related to the study

2.3.2.1 *Other material*

A stopwatch was used to record an estimate time for the recruitment strategy and completion of the questionnaire, in order to allocate sufficient time for completion.

2.3.2.2 *The questionnaire*

The questionnaire (Appendix F) was developed from an informed basis and then evaluated. Questions were directed by previous research regarding the perception and experience of teachers towards unaided AAC implementation (Rombouts et al., 2017a; Rombouts et al., 2017b; Sheehy & Budiyanto, 2014; Tönsing & Dada, 2016). Content validity was confirmed by forwarding the preliminary questionnaire to experts in the field of AAC to appraise questions with regard to clarity and relevance of the study (Leedy & Ormrod, 2014). Response validity was obtained from a special needs teacher in order to confirm that the questions were clear and not open to misinterpretation or bias.

Section A of the questionnaire included biographical questions such as the participant's age, gender, experience in teaching learners with CCN, class size and highest qualifications. Section B of the questionnaire included closed and three open-ended questions relating to the perception of teachers as per the sub aims with regard to: i) classroom strategies employed to date, ii) usefulness, iii) collaboration, iii) challenging factors, and iv) barriers to the use of unaided AAC as a strategy to support the educational needs of learners with CCN. The development of the questionnaire is set out in Table 4.

Table 4 *Development of the questionnaire*

Question number	Aspect	Type of question	Reason for inclusion	Theoretical justification
Section A: Background information of participant completing the questionnaire				
1.1	Age	Open-ended question	To determine age	Age may be related to experience and is a factor which may influence perceptions (Donohue & Bornman, 2014).
1.2	Gender	Open-ended question	To determine the participants' gender	Gender and culture play a role in people's responses to certain types of questions (Leedy & Ormrod., 2014).
1.3	Teaching experience	Open-ended question	To determine the professionals' teaching experience	Teacher attitudes may change over time as a function of experience and expertise developed through a process of implementation (Avramidis et al., 2000).
1.4	Teaching experience	Open-ended question	To determine the professionals' teaching experience with specific regard to LSEN	Experienced teachers may be better resources with respect to the functional performance of their learners (Alant, 1999).
1.5	Registered class	Open-ended question	To determine which school grades make use of unaided AAC as a learning strategy	Learners using manual signing are part of a heterogeneous group (Meuris, Maes, De Meyer, & Zink, 2014).
1.6	Class size	Open-ended question	To determine how many children are present in a class	Class size is a factor which may influence inclusive education and has been identified as a stress factor (Avramidis et al., 2000; Engelbrecht, Oswald, Swart, & Eloff, 2003).
1.7	Total learners in class with CCN	Open-ended question	To determine how many children may benefit from manual signing as support strategy	Learners using manual signing are part of a heterogeneous group (Meuris et al., 2014).
1.8	Learners' age group	Open-ended question	To determine which age groups are using manual signing	Learners using manual signing are part of a heterogeneous group (Meuris et al., 2014).

Question number	Aspect	Type of question	Reason for inclusion	Theoretical justification
1.9	Curriculum	Open-ended question	To determine which curriculum is followed at school	Curriculum implementation should be flexible with regard to teaching methods, assessments, pace of teaching and development of teaching material (Department of Education, 2001).
1.10	Qualification	Open-ended question	To determine the qualification of the participant	According to South African Council for Educators Act (2011), all teachers should have an appropriate qualification and should be registered at the Department of Education.
Section B: Perceptions				
2.1	Manual sign usage	Closed question	To determine in which environment teachers employ manual signing as a support strategy	Consistent use of AAC/KWS skills may be extended to other environments (Rombouts et al., 2017a).
2.2 **2.3**	Teaching strategies	Closed question Open-ended question	To determine which strategies are used to support learning	Teachers may use AAC more intensively during structured activities such as the morning welcome and less during individual conversations (DiCarlo, Banajee, & Stricklin, 2000; Norburn et al., 2016; Rombouts et al., 2018).
2.4	Usefulness of manual signing in the classroom	Closed question Open-ended question	To determine the usefulness of manual signing within the classroom	The augmented input of signs may support receptive language skills, expressive language skills and language learning, and enhance participation and interactions within the classroom (Clibbens, 2001; Dada & Alant, 2002; Light & McNaughton, 2012; Rombouts et al., 2017a).
2.5 **2.6**	Motivation	Open-ended questions	To determine what motivates teachers to use and not use manual signing	Motivation of using manual signing is also related to response efficiency (Johnston, 2006).
2.7	Collaboration	Closed question Open-ended question	To determine whether participants collaboration with others for support	A support team may provide teachers the training, time and resources required to support students with CCN (Blackstone et al., 2007; Calculator & Black, 2009).

Question number	Aspect	Type of question	Reason for inclusion	Theoretical justification
2.8	Challenges (factors)	Closed questions Open-ended question	To determine any underlying factors which may influence the use of manual signing	The relationship between belief in AAC and the use of AAC may be shaped by a complex interrelation of various personal and environmental factors (Meuris et al., 2014; Norburn et al., 2016; Rombouts et al., 2016; Soto, 1997; Tönsing & Dada, 2016).
2.9	Media awareness	Closed question	To determine whether the media has contributed to public awareness of signing.	Increased media awareness may reduce stigmatization and effect a change in attitude towards signing (Sheehy & Budiyanto, 2014).
2.10	Barriers	Closed question Open-ended question	To determine any barriers to the implementation of manual signing	The relationship between belief in AAC and the use of AAC may be shaped by a complex interrelation of various personal and environmental factors (Hornby, 2015; Kent, Peterson, & Deal, 1998; Norburn et al., 2016; Rombouts et al., 2016a; Soto, 1997; Tönsing & Dada, 2016).
2.11 **2.12**	Training	Closed questions	To determine the extent of appropriate training skills as acquired by participants	Staff training programs are a systematic attempt to bring about change in the classroom practices of teachers, in their beliefs and attitude and in the learning outcomes of learners (Chadwick, 2008; Guskey, 1986; Patel & Khamis-Dakwar, 2005).
2.13	General comments	Open-ended question	To determine additional factors which may influence the use of signing, not covered by the researcher	The relationship between belief in AAC and the use of AAC may be shaped by a complex interrelation of various personal and environmental factors (Hornby, 2015; Norburn et al., 2016; Kent et al., 1998; Rombouts et al., 2016a; Soto, 1997; Tönsing & Dada, 2016).

2.3.2.3 *Expert panel*

The first step towards finalizing the preliminary questionnaire was to present it to an expert panel for feedback to increase the face and content validity (Leedy & Ormrod, 2014). The

selection of individuals to review and critique the data collection instrument was based on their expertise and knowledge about the topic and also about special education (i.e. the context in which data will be collected). The expert panel was provided with a hard copy of the custom designed questionnaire and requested to provide input with regard to:

1. Clarity of the visual outline of the questions
2. Clarity of the wording of the statements and questions
3. Relevance of questions towards answering the sub-aims

The expert panel consisted of six speech - language pathologists with clinical experience ranging between 2 to 19 years in working with children with CCN. Four members of the expert panel actively employed total communication as intervention to support communication with some clients. Suggestions made by the expert panel are presented in Table 5.

Table 5 *Amendments to communication questionnaire*

Language changes	**Clarity of questions**
• To change "unaided AAC and key-word signing" to "manual signing" for the sake of brevity and to avoid confusion.	• To change question 1.1, Section A from "How old are you" to "Date of birth". • To amend statements in Section B, question 2.8 to begin all statements with the word(s) "I" or "I am" to increase clarity and consistency. • To rephrase questions in Section B, questions 2.8 and 2.10 to increase clarity.

Following the incorporation of the suggestions by the expert panel, the questionnaire was revised and a pilot study was conducted, as discussed in Section 2.5.

2.4 Participants

2.4.1 Selection criteria

A two-pronged approach was employed. First, the special needs schools were selected, after which all the teachers who met the teacher selection criteria were invited to participate. The selection criteria for the schools are presented in Table 6 and for the teachers in Table 7.

Table 6 *Selection criteria: Schools*

Criteria	Justification	Measure used
1) Schools for LSEN educational needs (LSEN)	These schools accommodate learners with CCN who will benefit from the implementation of unaided AAC (Rombouts et al., 2017a).	Information and permission letter, communication questionnaire
2) Both public and private schools were included	Education is a human right and therefore should be available for learners with CCN (Department of Education, 2001). However, because there is not a sufficient number of public schools which accommodate learners with CCN, private schools were included in the study.	Information and permission letter, communication questionnaire
3) Schools with knowledge or exposure to unaided AAC	Since school culture may play a role with regard to the use of unaided AAC (Sheehy & Budiyanto, 2014), not all special needs schools have been exposed to or have employed the use of unaided AAC.	
4) Geographic area: Ekurhuleni North, Johannesburg North, Johannesburg East and Tshwane South	From the List of Special Needs Schools (Department of Education, 2018), it was apparent that there was an insufficient number of schools within district in close proximity to the researcher, i.e. Ekurhuleni North. As such, the research was extended to include the districts of Johannesburg North, Johannesburg East and Tshwane South to achieve an acceptable sample population (Hill, 1998).	

Table 7 *Selection criteria: Teachers*

Criterion	Justification	Measure used
1) Special needs teachers	Teachers are frequent communication partners of learners with CCN and play an important role in the implementation of unaided AAC (Rombouts et al., 2018).	Information and consent letter

2) Special needs teachers in full-time employment (as opposed to part-time replacement teachers)	Full-time teachers may have more relevant experience and be more informed resources with regard to the functional performance of their learners (Alant, 1999).	Information and consent letter
3) At least one year of experience in teaching LSEN	As teachers' experience in relation to LSEN grows, usually their confidence in these learners grows (Avramidis et al., 2000).	Information and consent letter

2.4.2 Sampling and recruitment

Nonprobability purposive sampling was used (Leedy & Ormrod, 2013) as this sample were required to have knowledge of and experience in teaching in schools for LSEN (Avramidis et al., 2000). The sample focused on five urban school districts within the Gauteng province, namely Ekurhuleni North, Johannesburg North, Johannesburg East and Tshwane South, to achieve a representative and acceptable sample population (Hill, 1998). Throughout all four school districts, both public and private schools for LSEN were included, as these schools accommodate learners with a broad spectrum of disabilities and are likely to include learners with CCN (Department of Education, 2018). There are different schools for LSEN which focus on specific disabilities within the South African context. Schools for learners with hearing impairment were excluded as they use SASL (as opposed to KWS) to access the curriculum. Likewise, schools for learners with epilepsy and mild disability were also excluded as these learners are verbal, hence manual signing is not used to support learning.

Permission to conduct the study was obtained from the Gauteng Department of Education. The researcher contacted both public and private LSEN schools on the National Department of Education Special School List (Department of Education, 2018) telephonically and asked to speak to the principal or knowledgeable member of staff, e.g. the speech-language pathologist (SLP), about the use of manual signing at the school. This resulted in 10 government schools and eight private schools being contacted. Of the 18 schools contacted, five schools were not using unaided AAC to support learning at school. Of the remaining 13 schools, three schools declined the research request as they already had research students at their schools.

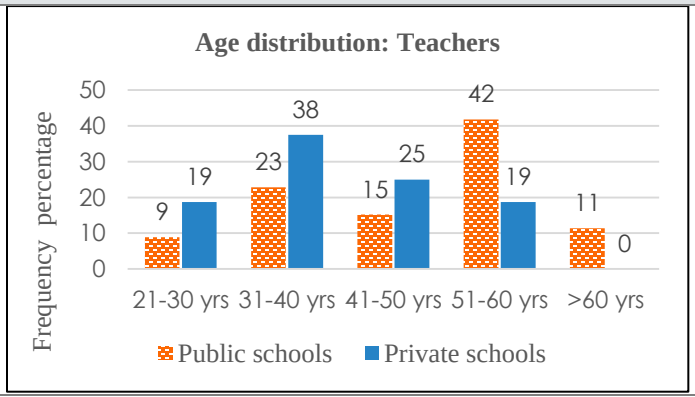
Consequently, 10 principals gave permission to recruit teachers from the schools: Six public schools that focused on learners with severe intellectual impairments (2 schools), cerebral palsy (2 schools) and autism spectrum disorder (2 schools) respectively, while all four private schools focused on learners with multiple impairments.

All the teachers from both, public or private schools who met the requirements as specified in Table 6 were recruited for the study. According to Hill (1998), there is seldom justification in behavioral research for sample sizes of less than 30 or more than 500 participants. Samples larger than 30 ensure the researcher the benefits of central limit theorem, and a sample size of 500 ensures that the sample error will not exceed 10% of standard deviation, about 99% of the time (Hill, 1998). Teachers reported that, of the 1 015 learners from the 101 classrooms included in the study, 500 (49%) had limited speech. This is higher than the estimated 39% originally reported in a South African prevalence study in schools for LSEN (Alant, 1999).

2.4.2 Description of participants

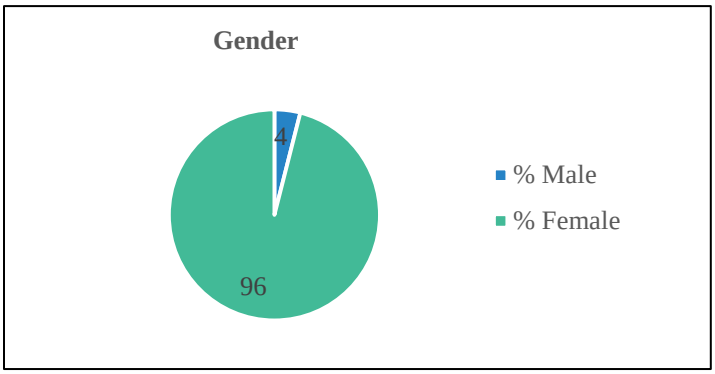
A total of 101 teachers participated in the main study. Descriptive information was obtained by means of the biographical questionnaire. Results showed that 96% of teachers were female with ages ranging from 24 to 65 years (M = 45*; SD* = 12).Their overall teaching experience ranged from 7 to 29 years (M = 18*; SD* = 11), and their experience in teaching learners with CCN ranged from 2 to 20 years (M = 11; SD = 9). They held a variety of formal qualifications, of whom the majority (70%) had a teaching diploma and/or degree. Please see Table 8 for detail.

Table 8 *Participant description for the main study: (n = 101)*

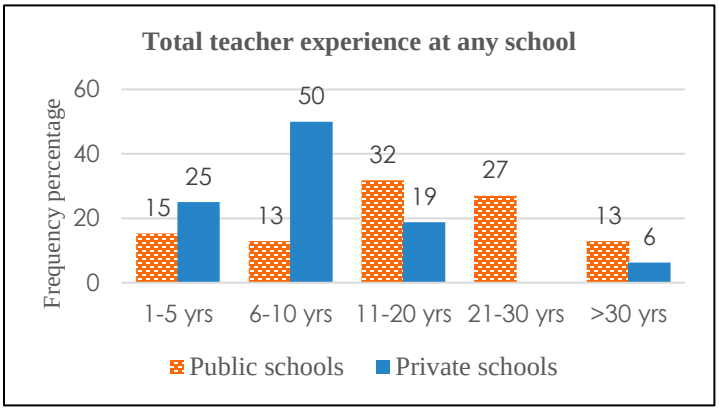
Description	**Data *(n = 101)***
Age The average age of the teachers (*n = 101*) was 45 years, with the youngest being 24 and the oldest 65 years. The majority of teachers at public schools (*n = 86*) were between ages 51 and 60 years (42%) as compared to private school teachers (*n = 15*) with the majority between ages 41 and 50 years (38%). These findings are supported by Donohue & Bornman (2014) stating that the South African teacher workforce is not only	

Description	Data *(n = 101)*
becoming older, but a large proportion of teachers are older than 50 years.	

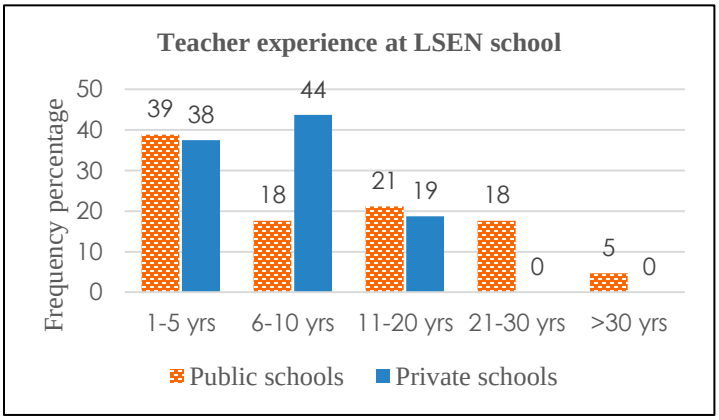
Gender
The graph represents gender (sex), consisting of female teachers being the majority at 96% compared to male teachers at 4%. The teacher workforce in South Africa is predominantly female and supported by a recent study conducted by Tönsing & Dada (2016) on South African teachers.

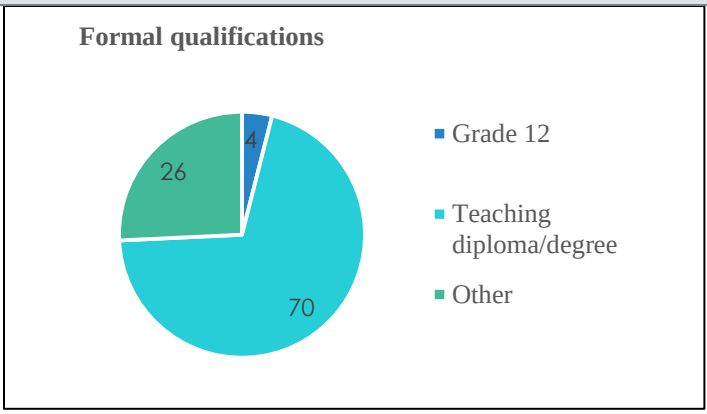


Total teaching experience.
The majority of public school teachers' experience (at any school) varied from 1-5 years (15%) to >30 years (13%), as compared to private school teacher experience (at any school), which varied from 1-5 years (25%) to >30 years (6%). It is evident that teachers from public schools have longer service than private school teachers.



Teaching experience: LSEN school.
Experience at LSEN schools were comparable with 39% of public school and 38% of private school teachers having between 1-5 years experiences. It is evident that teachers from public schools have longer service at LSEN schools than private school teachers. Five percent of teachers in public schools have > 30 years experiences.
Private schools catering for special needs are a relatively new concept in South Africa. This could be attributed to the implementation of Education White Paper 6 (Department of Education, 2001), which supports inclusive education.



Description	Data *(n = 101)*
Formal qualification The majority of teachers held a teaching diploma or degree (70%), followed by qualifications on honors or master's level (26%). The lowest qualified teachers held only a Grade 12 certificate (4%).	

2.5 Pilot study

The main reason for conducting a pilot study is to collect valid evidence based upon reliability of the measuring instrument and to determine relationships with other variables (Leedy & Ormrod, 2014; Rickards et al., 2012).

2.5.1 Aims of the study

The aims of the pilot study were to evaluate whether the survey instrument was too lengthy, whether there was clarity in both the instructions and questions, and to establish the relevant ease or difficulty involved in completing the survey. This was established using a process called cognitive interviewing, which involves reviewing survey items with a handful of participants who are representative of the target population (Sullivan & Artino, 2012). The advantage of this process is that it involves face-to-face interviews which increase validity. Furthermore, data obtained was assessed using descriptive and inferential statistics to formulate conclusions with regard to the main aim and sub-aims of the study and to determine whether the questionnaire was appropriate for the intended purpose. This confirmed the relevance of the study.

2.5.2 Participants

2.5.2.1 *Selection of participants*

A local private LSEN school was recruited for the pilot study. An information and permission letter (Appendix D) was sent by e-mail to the school governing body, followed by a letter to the principal (Appendix C) with a view to recruit teachers from the special needs school

to participate in the pilot study. The questionnaire was piloted on ten teachers, using cognitive interviewing. These teachers all met the same criteria as proposed for the main study (Table 7).

2.5.2.2 *Description of participants*

All ten participants met the same selection criteria as the participants in the main study (Table 7) and are described in Table 9.

Table 9 *Participant description for the pilot study: (n=10)*

Participant number	Age (years)	Gender	Highest qualification	Teaching experience, any school (years)	Teaching experience, LSEN school (years)	Registered class	Class size	Number of learners with CCN in registered class
P1	44	F	Grade 12	7	7	Lifestyle centre (young adults, 18-25 yrs)	6	4
P2	24	F	Diploma Educational Psychology	1	1	Lifestyle centre (young adults, 18-25 yrs)	6	4
P3	26	F	BEd (Hons in Psychology)	5	5	Seniors	4	0
P4	36	F	Lower than Grade 12	10	10	Seniors	4	0
P5	35	F	BEd (Foundation Phase)	4	4	Junior special	6	6
P6	36	F	MEd (Special Education)	13	13	Junior special	6	6
P7	53	F	Lower than Grade 12	1	1	Junior special	6	6
P8	27	F	Grade 12	2	2	Junior special	6	6
P9	30	F	Lower than Grade 12	3	3	Beginners	6	6
P10	46	F	Lower than Grade 12	7	7	Beginners	6	6

2.5.3 Aims, materials, procedures, results and recommendations

Table 9 gives an overview of the aims of the pilot study, the materials and procedures used, the results and the subsequent recommendations.

Table 10 *Pilot study, aims, materials, results and recommendations*

Aim: Procedure	Materials	Procedure	Results	Recommendations
1. To determine whether the selection criteria for LSEN schools were adequate and evaluate the feasibility of the recruitment strategy.	Information and permission letters. Research proposal	The principal was contacted telephonically. The same recruitment study as in the main study was used.	The principal confirmed the use of manual signing at school. Agreed on date for data collection.	Effective strategy to confirm use of manual signing and set date for data collection. Maintain for main study.
2. To determine whether the recruitment strategy was effective.	a) Principal information and permission letters b) Governing Body information and permission letter c) Copy of the proposal d) Copy of the ethics letter e) Copy of the letter from Gauteng Department of Education f) Questionnaire	• The study was thoroughly explained and discussed.	• The principal granted verbal permission. • The principal agreed to get letters signed by the SGB. • The principal phoned the researcher with a suitable time and date to recruit teachers and facilitators at the school. • It was decided that it was best to speak to teachers as a group after school.	No changes needed. Keep procedure exactly the same for main study.
3. To determine whether the teacher selection criteria were adequate.	Teacher information and consent forms.	• The same participant selection procedure as for the main study was used, (Section 2.4.1).	• One participant didn't meet the criteria, as she had less than 1 year teaching experience.	The researcher should be present when recruiting teachers to ensure that they meet the requirements.
4. To determine the clarity of the information and consent forms.	Teacher information and consent forms.	Teachers were asked to comment on clarity and wording.	All participants found the information and consent forms to be clear and understandable.	Maintain for main study.
Aim: Instrument	**Materials**	**Procedure**	**Results**	**Recommendations**
5. To determine the clarity of the questions on the questionnaire.	Questionnaire	• Teachers were asked to comment on clarity and wording with regard to the questionnaire.	**Biographical – Section A** • Q1.1 – One teacher suggested that the question regarding age should be	• Q1.1 – To be able to describe descriptive statistics in more

Aim: Procedure	Materials	Procedure	Results	Recommendations
		• This was done via an interview discussion after the completion of the questionnaire.	broken into brackets of 5 years to increase honesty of responses. • Q1.2 – The question related to gender (sex) was accidently excluded on the questionnaire. **Communication – Section B** Teachers suggested: • Q2.2 – Change statement "I only use signs with some learners" to "I use signs with all learners" as strategy. • Q2.7 – Include a line for comments. • Q2.8 – Add an extra column for comments. • Q2.10 – Clarify the word "barriers" by adding the word "challenges" in brackets to explain it. • Q2.10 – Clarify the word "stigmatization" by adding the words "negative reputation" in brackets to explain it.	detail, it was decided to keep to the original question. • Q1.2 – To be included under Biographical – Section A. • Q2.2 – The statement was reworded as suggested. • Q2.7 – Lines for comments were added. • Q2.8 – A column for comments was added. • Q2.10 – These statements were reworded as suggested.
6. To determine whether the format, including the font size and layout, is adequate, without pages appearing cluttered.	Questionnaire	Teachers were asked to comment on the clarity of the format, font size and layout.	• The teachers confirmed that the format, font size and layout of the questionnaire were clear. The questions didn't appear cluttered and were adequate. • It was suggested to print the questionnaire back to back.	• Maintain current format for main study. • It was decided not to print the questionnaire back to back. This is to increase the clarity of the

Aim: Procedure	Materials	Procedure	Results	Recommendations
				layout and to prevent possible skipping of questions.
7. To determine the response rate during completion of the questionnaire.	Questionnaire A stopwatch	The researcher timed how long it took to complete the questionnaire.	Teachers took 21–28 minutes to complete the questionnaire. They commented that time spent to complete it was adequate and not too long.	• The length of the questionnaire was adequate; thus, allowing 30 minutes to complete will be adequate.
8. To determine any missing data, after returning of questionnaires.	Questionnaire	The researcher made note of any missing data.	Some question-related statements from two questionnaires were not completed, namely: • Q2.2, Q2.4, Q2.8 and Q2.10. Reasons could be that these participants just didn't know how to answer these statements or didn't understand them. The formal qualifications of these participants were Grade 12 and lower than Grade 12 respectively.	• The researcher needs to be present at the school when questionnaires are returned. • The researcher needs to go through each page to identify missing responses on returned questionnaires.
9. To determine whether the response anchors are clear and understandable.	Questionnaire	Teachers were asked whether response anchors were understood.	• Teachers confirmed that the response anchors were understood. • Teachers liked the fact that the same response anchor names were used throughout the questionnaire.	• The researcher maintained the current response anchors.
10. To evaluate the effectiveness of the data capturing	Data capturing – Excel™ spreadsheet Pre-determined codes Raw data	• The researcher captured the raw data on an Excel™ .	• The data capturing process was effective.	• The researcher maintained the current data capturing and coding processes for data analysis.

Aim: Procedure	Materials	Procedure	Results	Recommendations
process, coding and data analysis.		• Likert-scale data obtained for questions Q2.8 and Q2.10 was converted to percentages. Data was graphically displayed using bar graphs.	• Descriptive statistics such as frequency distribution was effective. Bar graphs adequate. • The coding of the Likert-scale data to numeric data was effective. Bar graphs adequate.	• Inferential statistics will be decided upon when data collection is finalized.
11. To evaluate the effectiveness of capturing open-ended questions and analyzing data.	Data capturing – Word spreadsheet Raw data	Responses to open-ended questions were tabulated on a Word spreadsheet.	Open-ended questions yielded relevant answers which could be grouped together using thematic analysis principals. All open-ended questions were grouped and should therefore be relevant. Q2.3 yielded 7 different strategies: • Aided AAC methods such as objects, pictures and SGDs (I-pad and Grid player). • Unaided AAC methods such as facial expressions, pointing and guessing with eyes. • Singing and signing during storytelling • Sign instructions • Sign questions • Prompting and signing • Talking slowly, while signing to allow child to lip read.	• After scrutinizing these answers, all comments provided were relevant and indicated understanding. • It was also possible to categorize some responses together. The responses obtained in Q2.13 were categorized under “challenges” and “barriers”. •

2.6 Procedures

Approval for conducting the study was obtained from the Ethics Committee of the Faculty of Humanities at the University of Pretoria (UP). Formal permission was also obtained from the Gauteng Department of Education. Teachers were either seen individually or in groups, varying from three to 40 teachers per group. Teachers were recruited by addressing them in the staff tearoom or classroom. The researcher addressed ethical issues by providing all potential participants with information regarding the study. Teachers were issued with an information and consent letter (Appendix E). The study was explained to them and after they agreed to participate, written consent was obtained and they proceeded with the completion of the questionnaire (Appendix F). The researcher was present at most schools in order to provide clarification of questions as required. The researcher reminded the participants that they were free to withdraw at any point should they not feel comfortable, without any negative consequence. The completed questionnaires were collected by the researcher, and all participants were thanked for their contribution. The original documents will be stored for 15 years in both hard copy and electronic format at the University of Pretoria's Centre for Augmentative and Alternative Communication.

2.7 Data analysis

The data collection, analysis and discussion were conducted in an ethical manner. Descriptive statistics was used to interpret biographical information and included frequency distribution, average, standard deviation and range. Items of a particular construct as identified under the sub- aims of this research were assessed using a five-point Likert scale (Sullivan & Artino, 2013; Chyung, Roberts, Swanson & Hankinson, 2017). Non-parametric, inferential statistics such as Pearson's correlation was used to draw correlations between data obtained from public and private schools. Data was visually represented using bar graphs and tables (Anderson, Sweeney,Williams, Camm & Cochran, 2018; Leedy & Ormrod., 2014).

Data obtained from the four open-ended questions was coded using thematic analysis (Braun & Clarke, 2006). In addition, teachers were given the opportunity to write clarifying comments for some closed questions, including a question related to the use of manual signing, usefulness, media awareness, support, challenges, barriers, and two questions on training. These comments were also qualitatively analyzed. Teachers' written comments were retyped per teacher and per question into an Excel™ spreadsheet. The researcher then coded the comments using thematic analysis and grouped the codes into themes and subthemes (Braun & Clarke, 2006). The

codes were assigned to text segments and reviewed by a second assessor who was a speech and language pathologist.

2.8 Reliability and validity

Data collection reliability was captured by calculating the percentage (%) of agreement between two independent assessors for the transferring of data to an Excel™ spreadsheet. A student enrolled for an honors degree in Accountancy independently coded and captured 20% of the data onto an Excel™ spreadsheet. Percentage agreement (Leedy & Ormrod., 2014) to increase the reliability of the data was calculated using the following formula:
number of agreements / number of agreements + disagreements * 100

$$\frac{300}{(300) + (0)} * 100 = 100\%$$

The reliability of the data collection was found to be 100%. According to Lombard, Snyder-Duch, and Bracken (2002), an agreement over 90% are considered acceptable for all research designs

2.9 Ethical issues

Ethics are aimed at ensuring the safety of people within society, and researchers are required to adhere to these principles in order to protect participants involved in their studies. The basic ethical principles as laid down in the Belmont Report, also referred to as the Common Rule, were adhered to in this study, namely: i) *respect for persons*, ii) *beneficence* and, iii) *justice* (Flynn & Goldsmith, 2013; Leedy & Ormrod, 2014).

Regarding the *respect for persons* principle, in the first instance permission was obtained from the Ethics Committee of the Faculty of Humanities at the University of Pretoria (UP) and the Gauteng Department of Education. Written informed consent was obtained from principals and potential participants, as discussed in Section 2.6.1. While, in this case, the participants were either principals of or teachers within special needs schools, in order to provide informed consent, they were given clear and unambiguous information regarding the rationale for the study, the risks and benefits of participating in the research and how their confidentiality would be protected (Flynn & Goldsmith, 2013). The participants gave consent freely, fully voluntarily, and no form of coercion was used. It was also made clear to them that they were free to withdraw at any point during the research without any negative consequences, regardless of having signed the consent form.

With regard to *beneficence*, and in this case also *justice*, the researcher not only protected the participants from harm, but also maximized the benefit to the participants (Flynn & Goldsmith, 2013; Naudé & Bornman, 2016). For this research, the ideal was that principals, teachers and their respective schools gain insight or learning from the peer group survey and the collated data from all participating special needs schools. As a result, in the longer term, this may lead to an effective use of unaided AAC strategies in the classroom and assist the common goal of ensuring the optimal participation of learners with CCN in educational processes.

In such respect, the research will be stored in both hard copy and electronic format at the Centre of AAC for 15 years to keep the data confidential. The data obtained from the research was used for a scientific article and conference presentation. Participants also consented to the fact that the data may be used for further analyses. Results were made available to the Gauteng Department of Education and to any participating principal and teacher from participating schools who express an interest.

3. RESULTS

Quantitative and qualitative results are presented according to the sub-aims of the research study. Teacher perceptions are described as they pertain to: a) the use and usefulness of manual signing in different environments, b) the manual signing strategies currently employed, c) the extent to which other team members provided them with support, d) the challenging factors they experienced using manual signing, e) the possible barriers to the implementation of manual signing, and d) further training needs.

3.1 Teachers' perceptions regarding the use and usefulness of manual signing

Teachers from public and private schools who completed the questionnaire reported that, of the 1015 learners they taught from the 101 classrooms, 500 (49%) had complex communication needs. This ratio (49:51) was expected and is in line with recent research conducted at LSEN schools, at ratio (45:55) (Tönsing & Dada, 2016), but much higher than previous research by Alant (1999). The following bar graphs visually represents the frequency data for the use of manual signing within the classroom (Figure 3) and outside the classroom (Figure 4) to support learners with CCN in an educational environment.

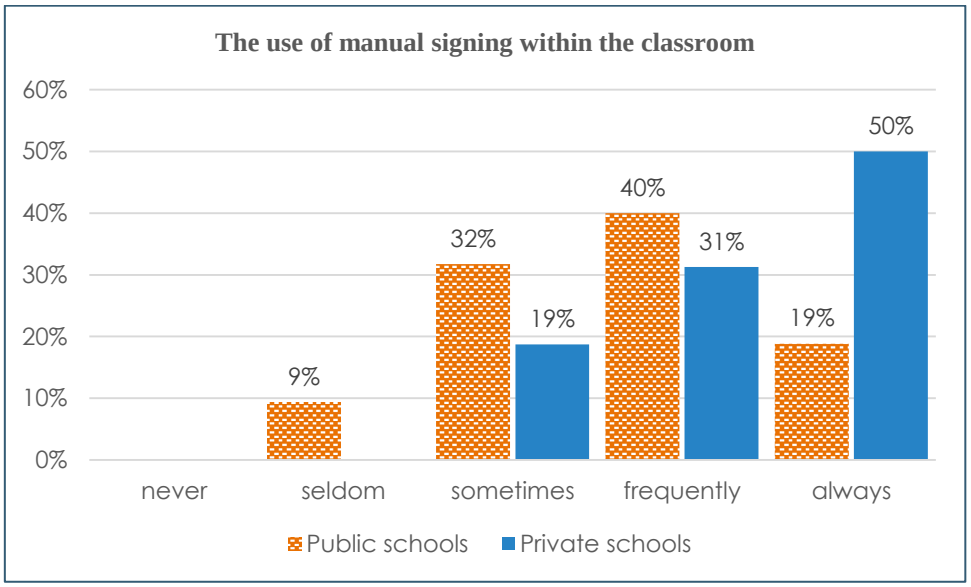


Figure 3. Teachers' perception regarding the use of manual signing within the classroom.

Although the frequency of use of manual signing within the classroom varied from seldom (9%) to always (50%), the majority of public school teachers used it sometimes (32%) and frequently (40%) compared to private school teachers of whom half stated that they always used it within the classroom (50%). As expected, in line with how recruitment was done (only including schools that reported that they used manual signing), no teachers reported that they "never" use signing.

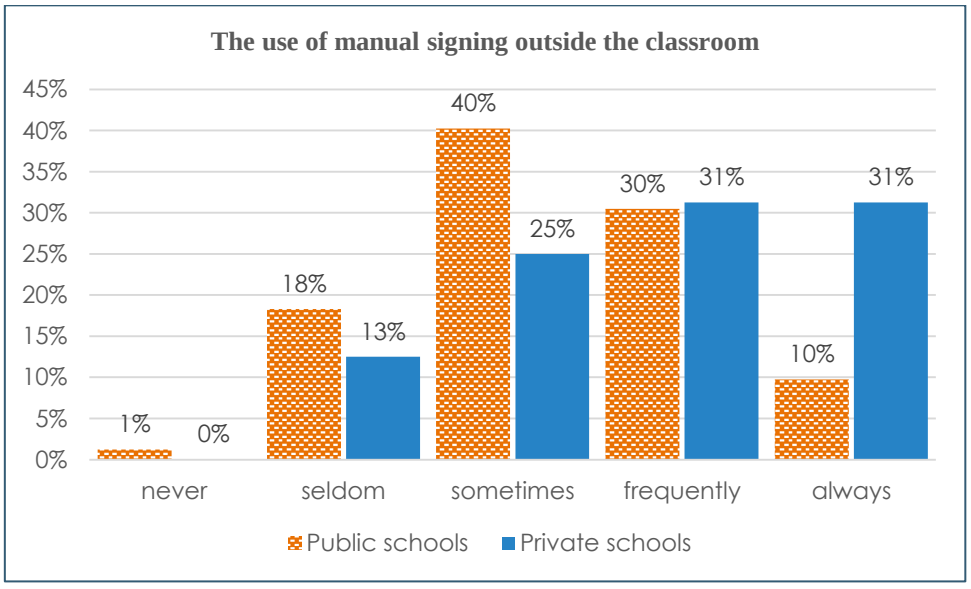


Figure 4. Teachers' perception regarding the use of manual signing outside the classroom.

Most teachers at special schools also interact with learners with CCN outside the classrooms which include the school corridors and playground and it is therefore not surprisingly that the

frequency of use of manual signing outside the classroom varied from never (1%) to always (31%), with the majority of public school teachers who use it sometimes (40%) and frequently (30%) compared to public school teachers using it frequently (30%) and always (31%) outside the classroom.

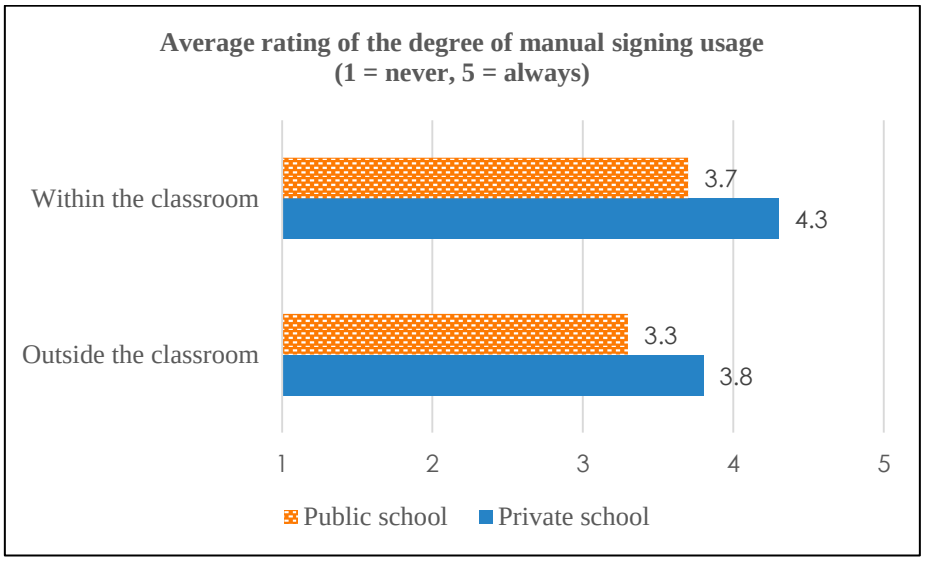


Figure 5. Teachers' perception regarding the use of manual signing.

Therefore, as displayed by Figure 5, both public and private school teachers indicated that manual signing are mostly used within the classroom as opposed to outside the classroom. Private school teachers are using manual signing more often within the classroom (*M = 4.3)* and outside the classroom (*M* = 3.8) as compared to public school teachers who use manual signing within (*M = 3.7)* or outside the classroom (*M = 3.3)* respectively.

The following bar graph (Figure 6) represents data with regard to how useful teachers perceive the use manual signing within an educational context. Teacher rated the usefulness of manual signing on a 5-point rating scale ranging from 1 (*never)* to 5 (*always).* Teachers at public and private schools, on average, rated the usefulness of employing manual signing strategies in the classroom highest for supporting speech (*M* =3.98*)* and the least for preparing learners for future transitions (*M* = 3.38).

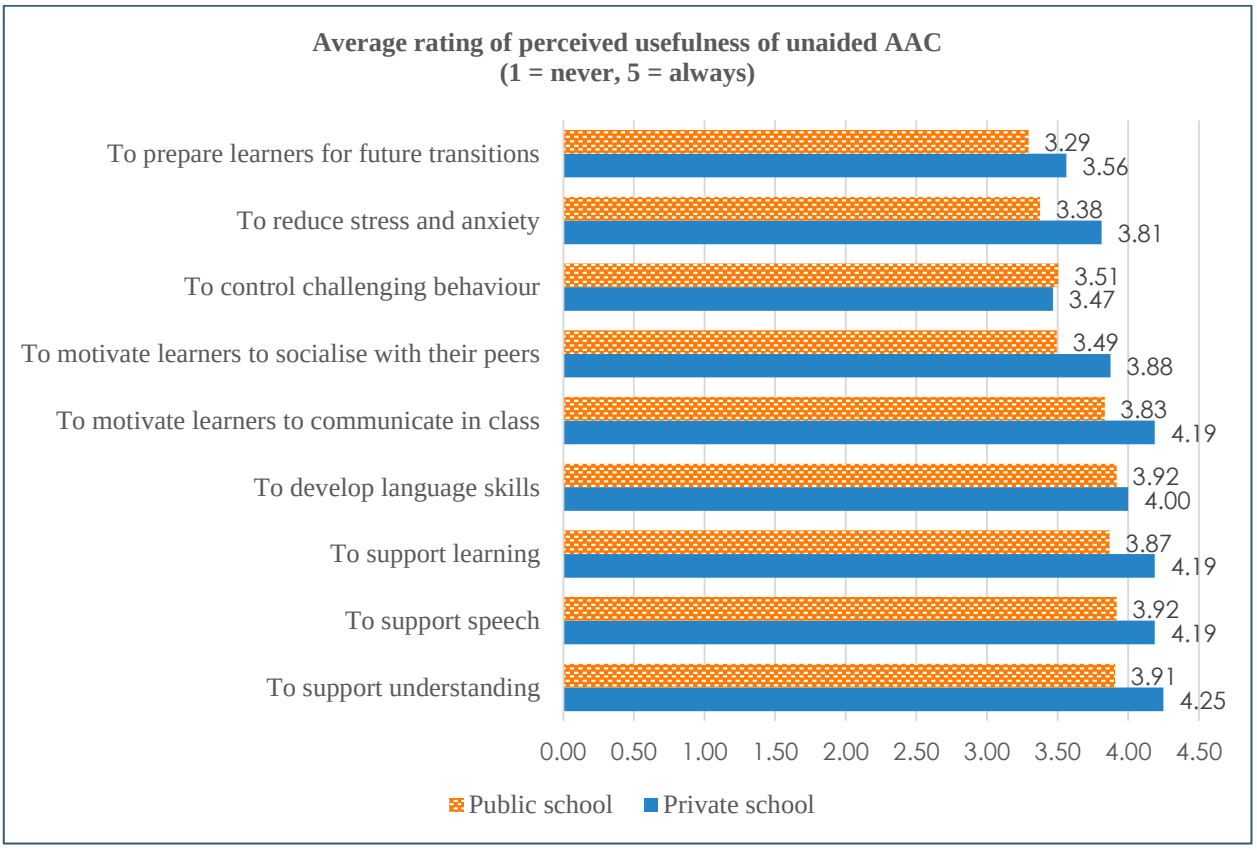


Figure 6. Teachers' perception regarding useful unaided AAC strategies employed.

Further, public and private school teachers (Figure 6) have different perceptions' with regard to highest and least useful manual signing strategies employed. Teachers at public schools, on average, rated the usefulness of employing unaided AAC strategies highest for supporting speech (*M* =3.94*),* followed by developing language skills (*M* = 3.93), to support understanding (*M* = 3.92) and then to support learning (*M* = 3.89). Teachers rated the least useful manual signing strategy for preparing learner for future transitions (*M* = 3.35).

Teachers at private schools on the other hand, on average, rated the usefulness of employing manual signing strategies highest for supporting understanding (*M* =4.25*),* followed by motivation of learners to communicate in class, to support learning and to support speech (*M* = 4.19). Teachers rated the least useful manual signing strategy for controlling challenging behavior (*M* = 3.47).

Further, thematic analysis as shown in Table 11, contain additional information regarding the usefulness of manual signing in an educational context. It was also decided when conducting a thematic analysis, not to make a distinction between public and private schools in order not to fragment the data unnecessarily. Table 11, contains examples of teachers' perceived usefulness

when using manual signing. These subthemes included: perceived benefits, enhanced self-efficacy and enhanced enjoyment/satisfaction when using manual signing within an educational contexts.

Table 11 *Other useful functions*: *Themes, Subthemes and Examples mentioned by participants*

Themes	**Subthemes**	**No of statements**	**Examples of functions mentioned by participants**
Usefulness: learner related	Perceived benefits	58	• To increase understanding of concepts • To help learners express their feelings • To aids child's communication with his/her teacher and peers • To manage transitions and changes in daily activities • To allow expression of what they want • To increase confidence in what they want to say or communicate to others • To expand vocabulary • To reduce stress and anxiety • To aid language comprehension where language barriers or linguistic diversity exists • To aid the learning process and reinforce the spoken word • To make communication and learning more successful • To encourage participation • To increase the welcoming atmosphere in the classroom • You can use signs anywhere anytime • Sing and sign with music make learners relax. • It is fun for them to learn new things and remember the signs
	Assist with language barriers	4	• Language barriers are a big concern and the use of sign language often helps with communication • Language barriers are a big concern and the use of sign language often helps the way of communication
Usefulness: teacher related	Enhanced self-efficacy	22	• To make it easier for communication and understanding • The learners like the manual signing and remind me to teach other kids and do revision • To make myself understandable and clear • The progress learners gain whilst in the classroom motivates me to continue using manual signing in the classroom • I have a few non-verbal learners in my class I have to teach them a different way to communicate • To effectively communicate with speech impaired learners, to cross the barriers between learning and teaching • Individualize each learners capabilities • It motivates me because I am able to communicate with children who can't speak
	Enhanced enjoyment/satisfaction	4	• I enjoy being able to help children without speech to communicate • It motivates me when children understand me • Personal experience to see the enjoyment communication brings the special needs learners

3.2 Teachers' perceptions regarding currently employed unaided AAC strategies

Teachers have to be creative and innovative when teaching learners at special schools and even more so when teaching learners with CCN to support learning. It is therefore important to understand which classroom strategies teachers employ when using manual signing to support learning. Public and private school teachers indicated similar responses for the highest and least employed manual signing strategies.

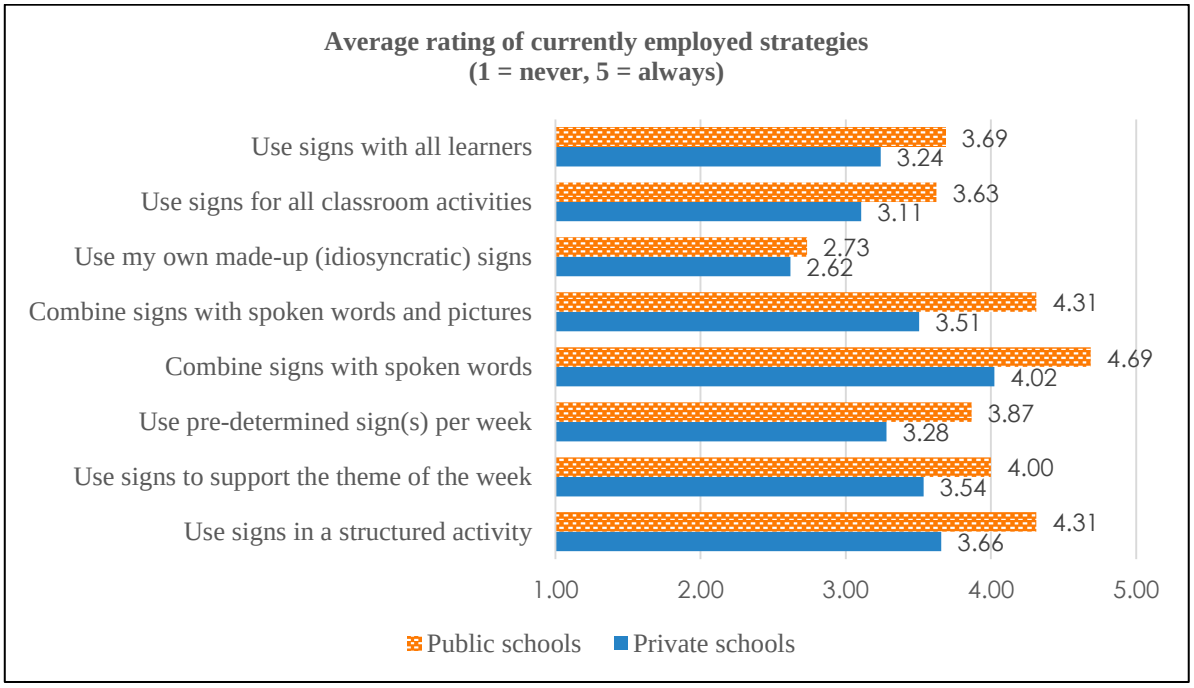


Figure 7. Teachers' perception regarding currently employed unaided AAC strategies.

Public schools, on average, rated the top three most employed manual signing strategies as being combining signs with spoken words (*M* = 4.02), followed by using signs in a structured activity (*M* = 3.65*)* and using signs to support the theme of the week (*M* = 3.53). The least rated was using their own made-up (idiosyncratic) signs (*M* = 2.65).Whereas, private school teachers on average, rated combining signs with spoken words (*M* = 4.69) as the most frequently employed strategy, followed by combining signs with spoken words and pictures (*M* = 4.31 *)* and using signs in a structured activity (*M* = 4.31). Similar to the teachers from the public school teachers also rated using their own made-up (idiosyncratic) signs (*M* = 2.73) as the least used strategy.

Table 12, contains examples of teacher's teaching strategies employed, which included themes unaided AAC and aided AAC. Unaided AAC can be divided into subthemes: structured activities, teaching methods, reinforcement strategies and adapted strategies when using manual signing within an educational contexts.

Table 12 *Other Teaching Strategies*: *Themes, Subthemes and Examples of strategies mentioned by participants*

Theme	Subtheme	No of statements	Examples of teaching strategies mentioned
Unaided AAC	Structured activities in which unaided AAC can be used	25	• Story- telling and signing • Songs, rhymes and signing • Group signing as a game • Singing and signing • Singing, dancing and signing • Role play and signing
	Teaching methods	19	• Using facial expressions to show emotions • Use physical guidance • Use learners own made-up signs (idiosyncratic) as everyone already know what it means • Introduce signs in teaching mathematics (numeracy) and the alphabet (literacy) • Match pictures with words • Use You-tube Makaton (UK) videos • Use TV screens and music videos to aid learning
	Reinforcement strategies	14	• Through repetition • Through movement • Through dramatization • Through music • Through making it fun • Through play
	Adapted strategies	8	• Adapt signs according to the needs and abilities of learners with multiple disabilities • Teach learners in smaller groups • Teach learners individually and adapt to specific needs
Aided AAC *	Teaching methods	34	• Use voice output devices • Use AAC communication boards • Use E-Trans • Use real items • Use photos of items • Use graphic pictures • Use adapted books • Use textured boards • Use daily schedules • Use PODD books • Use PECS • Use multi-level visuals
	Characteristics of visual aids	2	• Big bright pictures • Simple aids without too much detail
	Teaching purpose	1	• To teach colours, greetings, requests, etc., by using signs in conjunction with speech

* Although the focus of the study is on unaided AAC, teachers specifically mentioned aided AAC strategies, indicating their awareness of multimodal communication.

3.3 Teachers' perceptions of team support with regard to manual signing

All six public schools included occupational therapists (OT) and speech-and language pathologists (SLP) employed through the Gauteng Department of Education based at the school. This also indicated that teachers received support from above team members. Most teachers, especially in the Early Child

Development Phase (ECD), Foundation Phase and Junior Autism Phase had full-time or part-time classroom assistants helping in class. Although classroom assistants typically have minimal training and employed to assist teachers in personal care of learners, assistants at one school were also observed to be using manual signing.

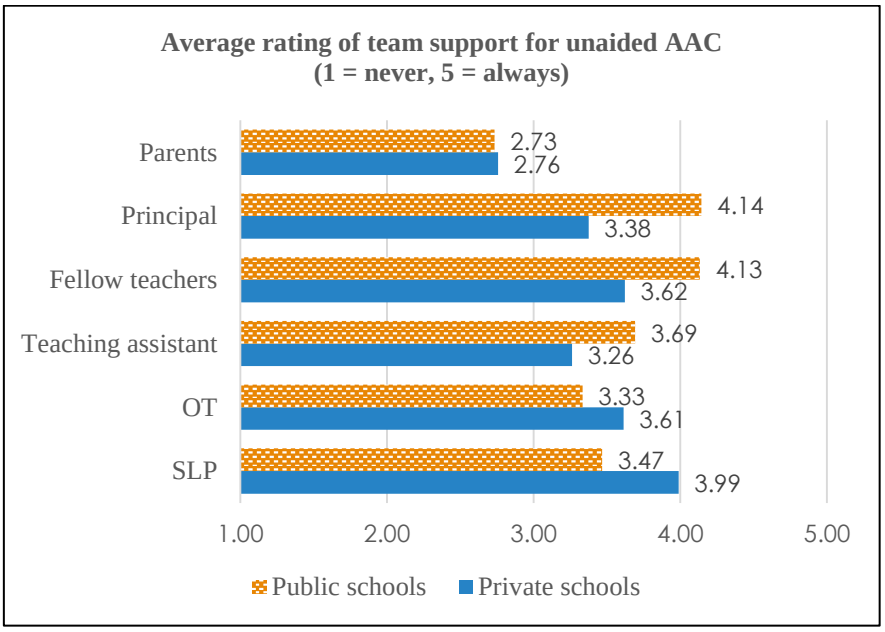


Figure 8. Teachers' perception with regard to team support

At public schools, SLPs were perceived to provide the most support with regard to the use of unaided AAC, with an average rating of 4 on a 5-point scale ranging from 1 (never) to 5 (always), followed by OTs (*M* = 3.62) and fellow teachers (*M* = 3.62) . Parents were perceived to provide the least amount of support (*M* = 2.70). These responses are displayed in Figure 8.

Whereas, SLPs and OTs are not directly employed by private school management and are therefore not based at these schools. Most therapies are scheduled on a weekly basis at private schools. Therapists are employed by the parents to provide intervention services to specific learners at school. It is therefore not surprisingly, that teachers perceived the principal (*M* = 4.14) and fellow teachers (*M* = 4.14) to provide the most support with regard to the use of unaided AAC. One private school did not employ teaching assistants or facilitators. Three of the private schools employed facilitators of whom some were trained in using manual signing at school. As with public schools, parents were perceived to provide the least amount of support (*M* = 2.70).

According to thematic analysis, as indicated in Table 13, only four of the 101 teachers included in this study teachers made an attempt to facilitate the use of manual signing by educating and empowering parents.

Table 13 *Facilitators*: *Themes, Subtheme, and Examples of facilitators by participants*

Themes	Subthemes	No of statements	Examples of facilitators mentioned
Role of parents	Teacher-parent training attempts	4	• Parents are encouraged to learn to sign at a signing parents evening • Weekly, signs are given in print with a photo of each sign to parents to help them learn signs with their children • Whatsapp – video clips are sent to parents to help them learn to sign easier • Send the information about signs home for the parents

3.3.1 Media awareness and unaided AAC

The media plays a very important role in society and this happens through means of television, Internet, social media (e.g. Facebook or Twitter), printed media and radio. The media can also be used as a tool to create awareness among the public with regard to the use of manual signing. The public in general forms part of the direct communities who can play an important role in supporting schools for LSEN and be educated through awareness campaigns.

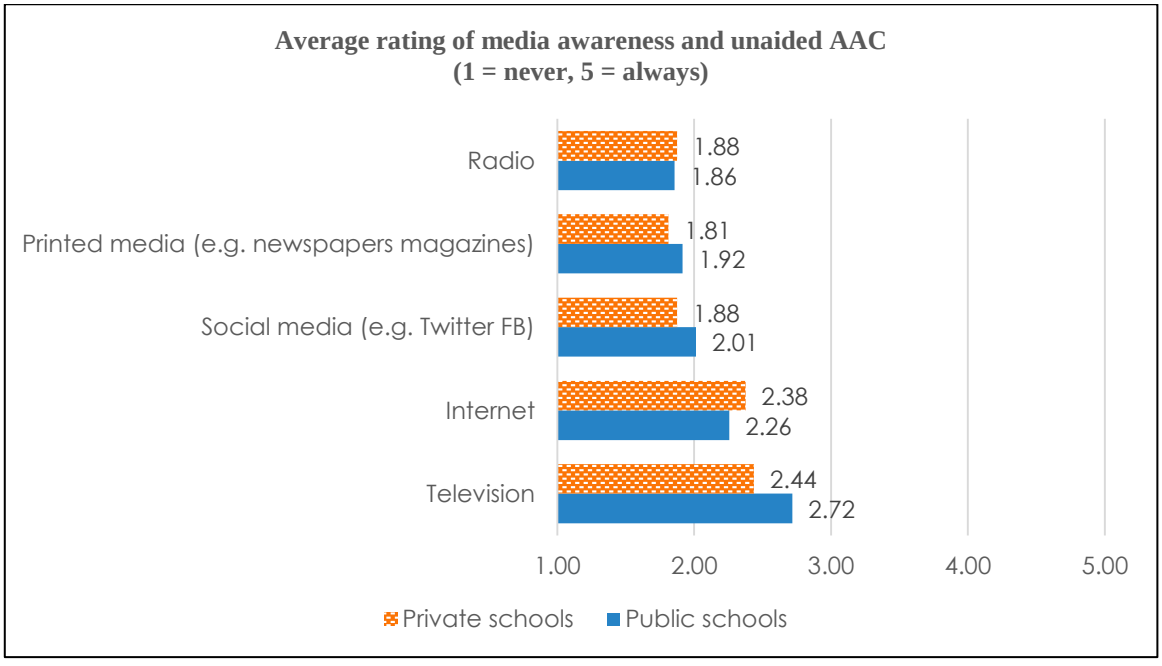


Figure 9. Teachers' perception with regard to media awareness among the public

As displayed in Figure 9, teachers at public and private schools had similar opinions as their specific school contexts did not impact directly on this variable. Teachers' perceive television to create the highest awareness among the public, yet it is of no significance (*M* = 2.67*)* bordering scores seldom (2)

to sometimes (3). It is followed by the internet (*M* = 2.28) and with radio creating the least awareness among the public with regards to manual signing. This means that the majority of teachers believe that the media never or seldom creates awareness among the public with regards to manual signing.

3.4 Perception of teacher – related factors when that challenge the use of manual signing

Teachers experienced a variety of challenging factors when using manual signing in the educational context. Public school teachers (Figure 10) rated communication partners (e.g. teachers, therapists, assistants or parents) not encouraging the use of manual signing, as the most challenging, on a 5-point scale ranging from 1 (never) to 5 (always).

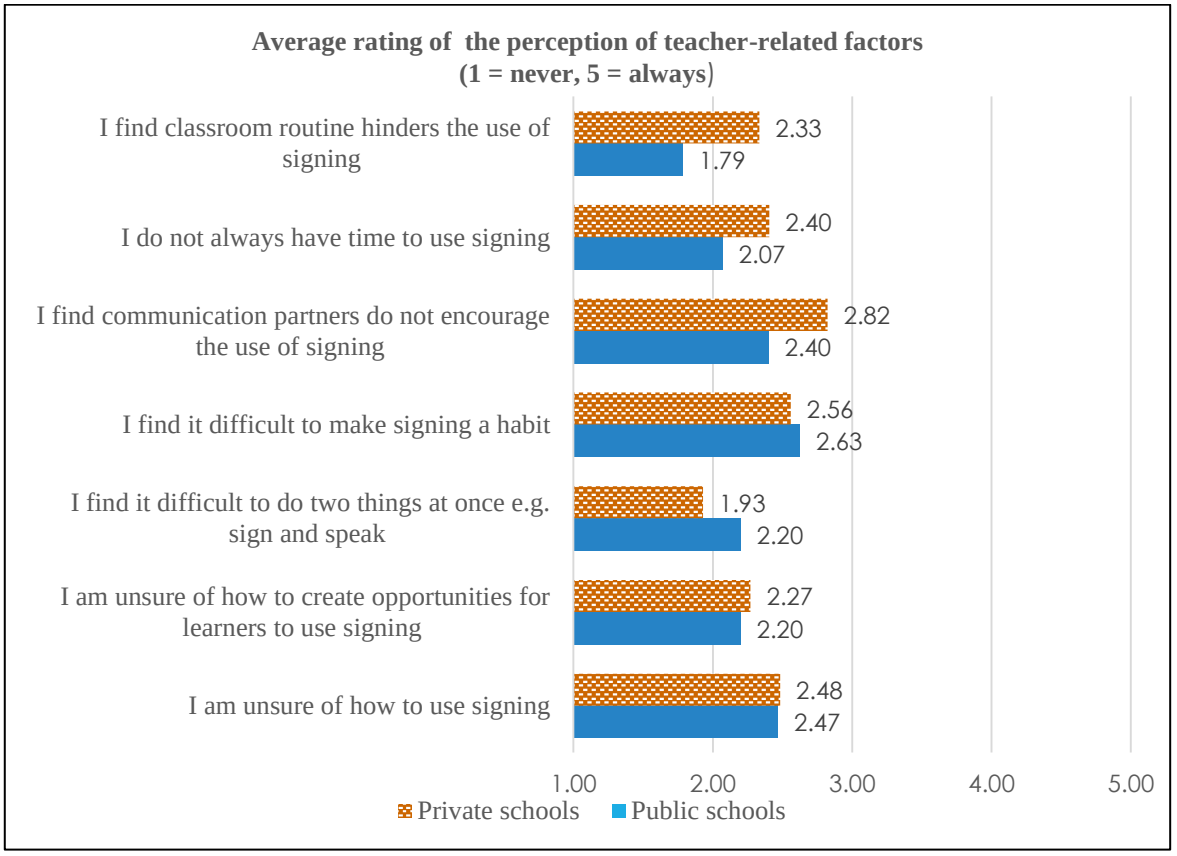


Figure 10. Perception of teacher – related factors with regard to the use of manual signing.

Also, factors related to classroom context (classroom routines, not enough time) and teacher knowledge and skill (unsure as how to use manual signs in the classroom, unsure as how to create opportunity in the classroom, difficult to do two things at once i.e. sign and speak) were found less challenging overall (average ratings ranged from 2.48 to 1.93).

Whereas, private school teachers rated teacher skills, such as: difficult making manual signing a habit, as most challenging (M = 2.63). Factors related to classroom context (classroom routines, not enough time) and teacher knowledge and skill (unsure as how to use manual signs in the classroom, unsure as how to create opportunity in the classroom, difficult to do two things at once i.e. sign and speak) were found less challenging overall (average ratings ranged from 2.47 to 1.79).

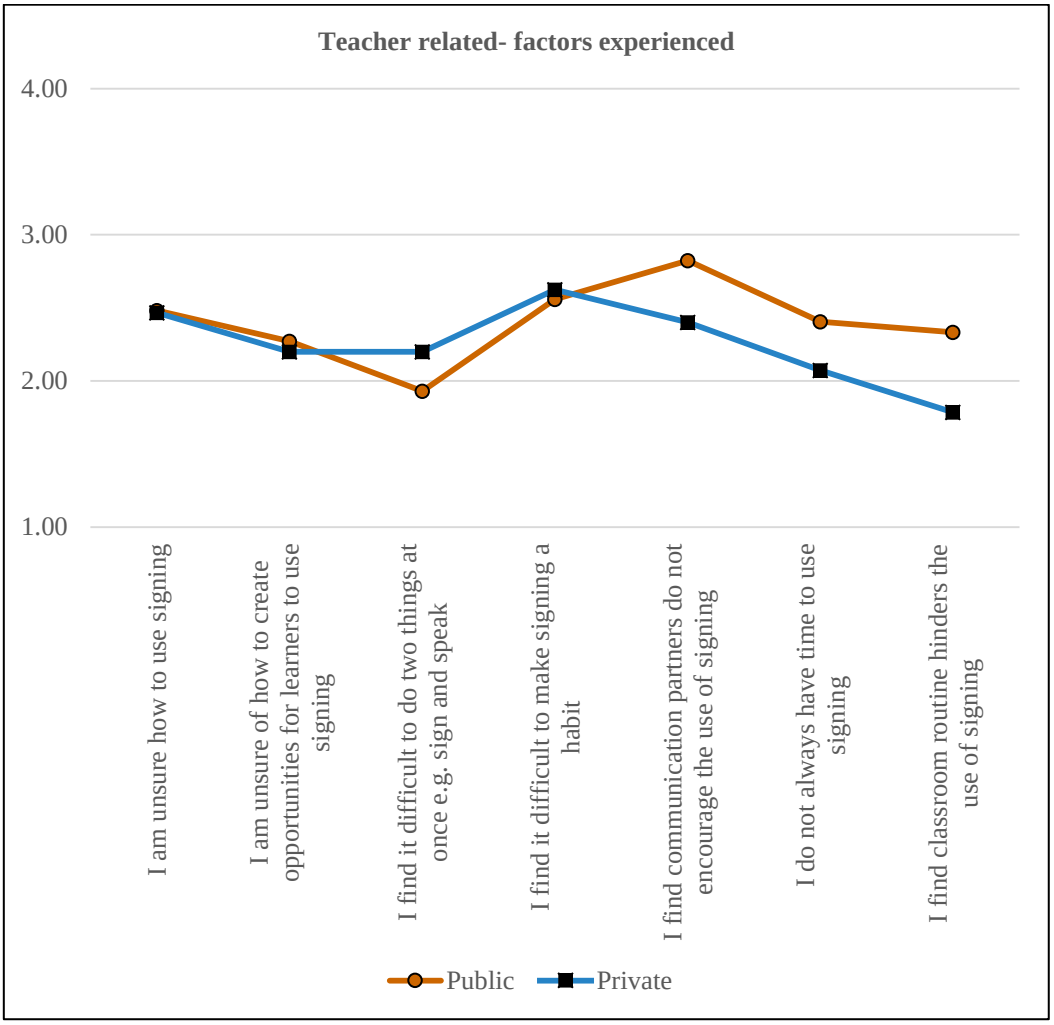


Figure 11. Relationship between public and private school teacher-related factors experienced

Figure 11, graphically displays a weak positive relationship between public and private school, teacher-related factors with regard to the use of manual signing, r (5) = 0.44, p = 0.32 (Pearson's correlation). The results follows the same trend and direction. There is good agreement for challenging factors such as teacher knowledge and skills (unsure as to use manual signs, unsure as how to create opportunities for learners to use manual signs, find it difficult to make signing a habit).

3.5 Teachers' perception of barriers hindering the use of manual signing

Teachers experienced a variety of barriers which hinders the use of manual signing (Figure 12). Public school teachers' rated untrained staff as the most significant barrier hindering the use of manual signing at schools.

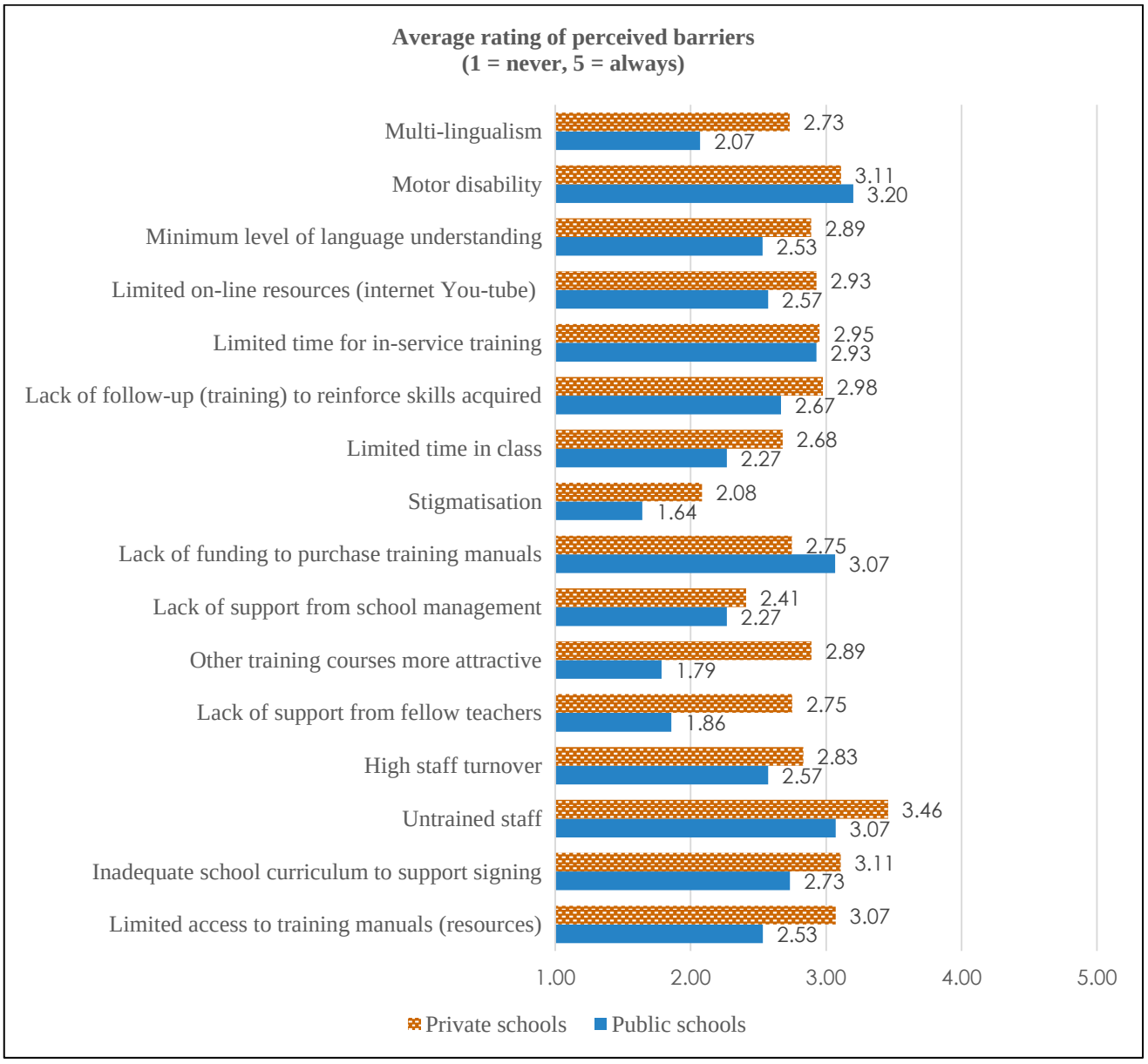


Figure 12. Teachers' perception of barriers hindering the use of manual signing

Public school teachers rated untrained staff highest , assigning this factor an average rating of 3.46 on a 5-point scale ranging from 1 (never) to 5 (significant challenges). Factors relating to motor disability as well as the adequacy of the school curriculum to support manual signing were rated second highest (M = 3.11). Also, factors related to resources (limited access to training manuals/resources) and training (lack of follow-up (training) to reinforce skills acquired, limited

time for in-service training) were also perceived as significant at 3.07 and 2.98 respectively. Stigmatization was rated on average as the least perceived barrier at 2.10.

Private school teachers rated motor disability highest, assigning this factor an average rating 3.20. Factors relating to untrained staff as well as the lack of funding to purchase training manuals were rated second highest, with both factors assigning an average rating of 3.07. As with public school teachers, stigmatization was also rated on average the least perceived barrier at 1.64.

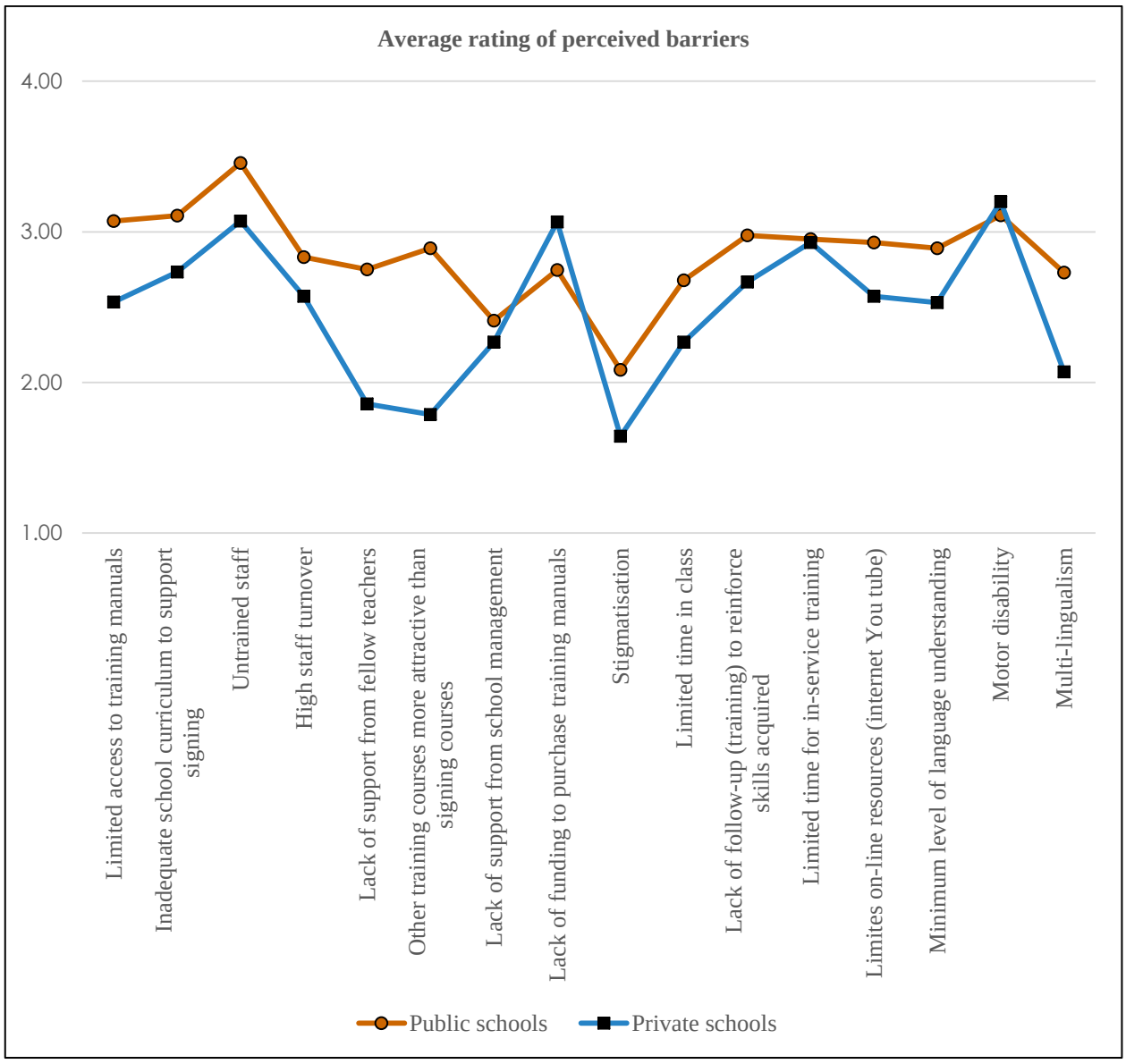


Figure 13. Relationship between public and private schools for barriers experienced

Figure 13, graphically displays a mild positive relationship between public and private schools with regard to barriers hindering the use of unaided AAC, r (11) = 0.68, $p < 0.05$ (Pearson's

correlation). There is good agreement for perceived barriers such as lack of support from school management, limited time for in-service training and motor disability.

Thematic analysis as displayed in Table 14, contains examples of perceived barriers experienced by teachers when using manual signing at special schools, which included themes: teacher related factors, school and classroom context, other team members, community awareness learner related factors and training.

Table 14 *Barriers*: *Themes, Subthemes, and Examples of barriers mentioned by participants*

Themes	Subthemes	No of statements	Examples of barriers mentioned
Teacher related factors	Time is limited	7	• Incorporating signs in the classroom require a lot more weekly planning • There is NO time to learn the "extern" (sign) language to the learners
	Human resources are limited/lacking	7	• Working without assistance
	Lack of knowledge	7	• Not enough knowledge to use manual signs within the classroom
	Habit formation is difficult	6	• To make manual signing part of daily routine
	Self-confidence is lacking	4	• I do not always feel competent enough to combine sign language with class activities (because I do not feel competent in sign language specifically)
School and classroom context	School culture	8	• Frustrations due to the lack of teamwork • Lack of enthusiasm with fellow employees • Sadly, signing is not emphasized in our school, previously it was
Other team members	Lack of parent involvement	6	• Struggle to motivate parents to attend training or come to education sessions where training is provided in SASL
	Lack of parent education	5	• When parents come to school, they say they know what their child wants but the child cannot even point. • Some parents will not allow it.
	Lack of school-home reinforcement	3	• Parents do not always reinforce signs at home
	Therapists intervention preference	2	• Therapists mainly use PECS • Teachers don't know to what extend therapists use signs during therapy
	Role of parents	1	• Parents don't see themselves as having a role to play in their children's development
Community awareness	Lack of signing awareness	11	• I've never heard anyone talking about Makaton • Have not seen Makaton on television • We are working in isolation with the community
	Lack of knowledge	1	• Nobody understands the signing language of learners with autism outside school. It is only us who understand
Learner related factors	Specific diagnoses/etiology	20 11	• Learners with physical disability • Learners with intellectual disability

		4 1 1 1	• Learners with multiple disability • Learners with ADHD • Learners with hearing impairment • Learners with visual impairment
	Not preferred method of communication	4	• A child prefers to vocalize – need to be "normal", regardless of how poor or limited his vocab is, he is determined to be heard and refuses alternatives to aid/support his communication • Learners use sounds and facial expressions to communicate • Not all the learners use the same manual signing
	Lack of motivation	1	• Learners are not motivated to use signing thus teachers do not enforce signing in class or the school
Training	High cost of training	7	• SASL courses and training very expensive. • Tiny Handz program but it is very expensive and the school is not always able to sponsor us (Tiny Handz is a South African based signing program)
	Lack of availability of SA resources	4	• Most of the manual signing that is online is not South African • Not enough resources available in SASL mostly in ASL • Internet not supportive of SASL materials
	Lack of uniformity among signing courses	4	• The many different types of sign language complicates the process • I prefer Tiny Handz to Makaton
	Lack of funding	3	• Funds to buy manuals
	Lack of access to resources	1	• The Makaton manual - we do not have all the words with their signs
	Limited time-off at school	1	• Training can be a whole (week) and the principle is not comfortable with us to leave the school for long periods of time.

3.6 Teacher knowledge, training skills and needs with regard to manual signing

Teacher training is critical for the successful use of unaided AAC at school. It is therefore necessary to understand the training needs of teacher in the educational context as displayed in Figure 14.

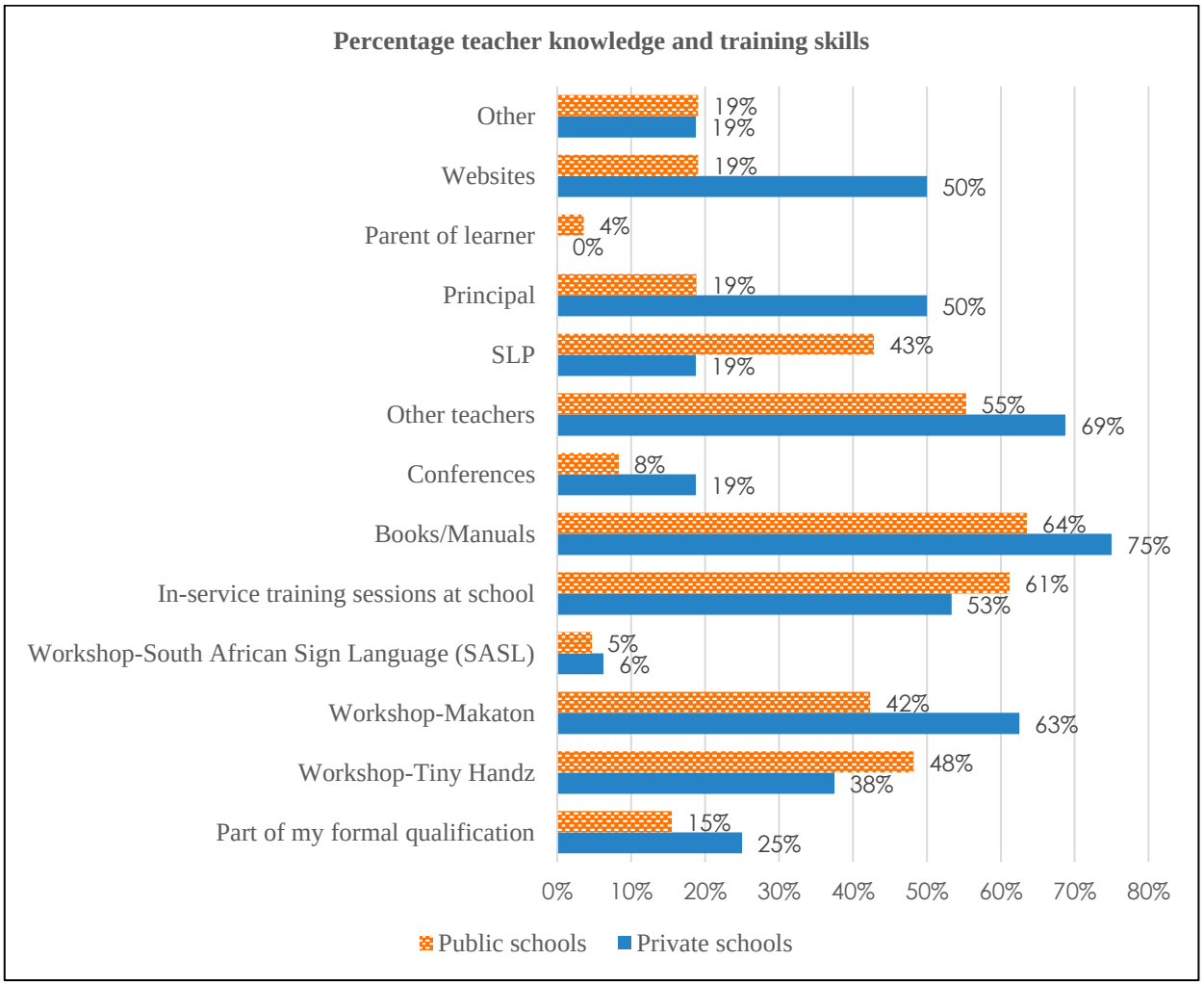


Figure 14. An illustration of public and private school teachers' knowledge and training skills with regard to manual signing.

As for public school teachers, teachers at private schools rated obtaining knowledge from books/manuals as their most important source, followed by the least important source which is workshops in South African Sign Language (SASL).

Public school teachers gained 64% of their manual signing knowledge from books/manuals, followed by 61% from in-service training at school, 55 % from other teachers, 48% through Tiny Handz training courses, 43% from SLPs and 42% through attending Makaton workshops. Teachers indicated that < 20% of their manual signing knowledge was obtained from the principal, websites, formal qualification, other, conferences, SASL workshops and parents.

Private school teachers (Figure 14) perceived to obtain 75% of their manual signing knowledge from books/manuals, followed by 69% from other teachers, 63 % through Makaton workshops, 53% from in-service training at school, 50% each from the principal and websites.

Teachers indicated that < 25% of their manual signing knowledge was obtained as part of their formal qualification, other, SLP, conferences, SASL workshops and parents.

Table 15 *Additional training information with regard to unaided AAC*

Additional resources	**Percentage (%) of teacher usage**
Books: SLED, SASL Dictionary	3
Apps: eDeaf, Talking Handz	3
Website: https:www.realsasl.com	1
Duration	**Days**
Makaton and Tiny Handz	1-4
Other courses	>5
How often are courses scheduled?	**Responses**
Makaton and Tiny Handz	Once-off sessions
Other courses	Longer sessions

According to Table 15, Makaton Beginner Stages (1-4) and Tiny Handz training courses involved, 1 to 4 days, once-off sessions. Other training courses mentioned, were 5 days and longer sessions, which included: SASL training courses: St Vincent, B.A. (Hons) in AAC, WITS: SASL Program and Makaton- intermediate to advance. Overall, public and private school teachers indicated 88 % interest in receiving additional training in the use of manual signing to support learning at special school, with 12 % of teachers not interested in additional training.

3.7 Perceived training needs supporting the use of manual signing

Thematic analysis as displayed in Table 16, contains examples of perceived training and support needs as mentioned by teachers with regard to the use of manual signing at special schools, which included subthemes: training/empowerment of parents, reinforce skills obtained, encourage socialization of peers, focus on functional communication, need of community awareness campaigns, need of uniformed sign applications, signing to be part of the school curriculum, signing to be part of the tertiary qualification.

Table 16 *Possible solutions and support needs: Themes, Subthemes, and Examples of needs mentioned by participants*

Themes	Subthemes	No of statements	Examples of solutions and support needs mentioned
Possible solutions and support needs	Training/empowerment of parents	10	• Parents need to be informed and educated • Parents need training in Makaton • Parents must learn to use sign language to use it at home

			• Parents need to be encouraged through learners to show them what they have learnt • More parents need training to be done to empower them to empower the child • Do the same in home as in school • When the child is non-verbal the parents must commit to a communication program • We do parents training in a group but individual training needs to be done
	Reinforce skills obtained	5	• Being taught more Makaton to become more confident • Repeat training • Would like to do the intermediate (more advanced) Tiny Handz course
	Encouragement of socialization of peers with and without disability	4	• So that verbal learners can learn manual signing and communicate with learners with CCN • I want all my learners to be able to take part and to understand and to be able to communicate with each other • Friends got more patience with non-verbal learners
	Focus on functional communication as part of school curriculum for learners with SID	3	• The development of education is focusing of the academies of the learners and forget that we must prepare our SID learners for the "adult" world • Communication is very important and must be focused on • Training to better our teaching methods
	Need of community awareness campaigns	1	• The community needs to help and understand the learners
	Need of uniformed signing Application "App" for SA	1	• All the different types of training available e.g. Tiny Handz, Makaton, SASL make it confusing. An easy accessible "app" could be very helpful
	Signing to be part of school curriculum	1	• Manual signing should be incorporated in our schools to make our learners who are SID to understand more since most of them are having behavioral issues
	Signing to be part of tertiary qualifications	1	• Not part of a program at tertiary level, should be included in a curriculum of teaching

4. DISCUSSION

Although inclusive education remains an idealistic goal in South Africa, in practice, learners with disabilities, specifically those with autism spectrum disorder, cerebral palsy or intellectual challenges, are almost exclusively attended to by special schools (Tönsing & Dada 2016). Special schools are advocated for based on the motor, language, cognition and/or sensory needs of these learners brought on by their specific disabilities (Light & Drager, 2007). Special needs teachers are therefore challenged to provide these learners with access to communication strategies such as

manual signing at the earliest possible age, which should provide optimal support to their educational needs (Light & Drager, 2007).

4.1 Teacher perceptions regarding the use and usefulness of manual signing as unaided AAC strategy

While the main aim of the study was to establish the considerations of teachers with regard to the use of manual signing in the classroom, an element of bias was introduced, since only special schools that were using manual signing were included in the study. Because public schools have larger school populations than private schools, they naturally employ a larger number of teachers. As a result, many more teachers from public schools (n = 86) participated in the study as compared to teachers from private schools (n = 15). It was, however, decided to separate these two school contexts (despite the over-representation of public schools) to establish whether they would present different outcomes with regard to the use of manual signing. Also, private schools catered for the specific needs of learners with a broad spectrum of disabilities as well as learners with multiple disabilities as compared to public schools which catered only for learners with specific disabilities. The severity of the learners in public schools typically range from mild to moderate while learners in private schools varied mostly from severe to profound.

The study found that the majority of teachers at public and private schools use manual signing to some extent within the classroom, as well as outside the classroom environment (e.g., school corridors or playground). This concurs with the fact that manual signing is accepted as common in some special schools and regarded as an example of good classroom practice in several countries all over the world (Rombouts, Sheehy, Buchanan-Mellon, & Grove, 2019). In the current study, teachers' use of manual signing is thus regarded as a positive finding, since learners with CCN are a heterogeneous group which clearly require different forms and degrees of educational support (Blackstone et al., 2007) and would benefit from such unaided AAC strategy (Norburn et al., 2016).

However, the mere use of signing at these schools does not necessarily imply that teachers use it intensively as emphasized by Rombouts et al. (2019). This is indicated by the wide spread of the frequency data with regard to manual sign usage at the different schools. Previous studies (Grove & McDougall, 1988; Rombouts et al., 2019) introduced the concept of low and high signing environments. This concept can also be applied to the South African educational context to explain the spread of manual sign usage at schools. Schools for learners with autism spectrum disorder and

private schools for learners with multiple disabilities would be classified as high signing environments. This implies that teachers are more inclined to use manual signing to support communication and learning. The Makaton program has proven to be successful for learners with autism spectrum disorder in the UK (Rombouts et al., 2019) and has similarly influenced South African school practices. Also, the multi-modality features (Launonen & Grove, 2019) of such an approach has proven to be successful for learners with multiple disabilities. Schools that accommodate learners with physical disability and severe intellectual disability would be classified as a mixture of low and high signing environments, as manual signing are mostly used in the Early Child Development Phase, Foundation Phase and Junior Autism Phase as compared to the Senior School Phase. The Senior School Phase include mostly speaking children, and the use of manual signing to support learning is therefore not a priority as such. Also, data indicated that nearly half of the population of learners at special schools included in the current study had some form of speech.

Further, teachers appeared to hold positive attitudes towards the use of manual signing within different school environments. Similarly, previous studies have shown positive attitudes among special education teachers towards the use of AAC strategies in general (Soto, 1997; Tönsing & Dada, 2016). This is supported by Rombouts et al. (2017b) who stated that, when special education teachers are convinced that manual signing can improve communication skills, they may be more likely to take a positive attitude towards the use of such a strategy in the educational context. Also, unaided AAC has a definite role to play in the educational system (Sheehy et al., 2014), for example, it enhances both classroom participation and interaction on the playground (Beukelman & Mirenda, 2013; Bornman & Tönsing, 2017). This was confirmed by the findings of the current study.

The study further found that the teachers who use manual signing have a good understanding of the usefulness of this strategy. In this regard, Rombouts et al. (2016a) point to the fact that teachers' perceptions towards AAC may impede or facilitate AAC use. Clearly, for teachers to then employ AAC, or more specifically unaided AAC, they need to understand why this strategy is essential for the educational development of learners with CCN and how it may facilitate interaction with these learners to ensure sustainability. This understanding among the participating teachers was confirmed by the quantitative data in the current study, which indicated that both public and private school teachers had similar perceptions about the usefulness of manual signing. The top four most useful functions include: 1) supporting speech, 2) supporting understanding, 3) developing language skills, and 4) supporting learning. These findings were further supported by fifty-eight qualitative

written comments from teachers which reflected their understanding on the perceived benefits of using manual signing with learners with CCN.

Another critical point that emerged is the fact that special school environments are linguistically and culturally diverse (Tönsing & Dada, 2016). In the current study, four teachers identified manual signing to be useful in assisting with language barriers within the classrooms. Such benefit could be useful in the South African educational context. For example, one teacher commented on language barriers:

"Language barriers are a big concern and the use of sign language often helps the way of communication."

This benefit was explored in a study where Makaton was used in teaching foreign languages to English speakers (Mistry & Barnes, 2013; Walker, Mitha, & Riddington, 2019), which appeared to be particularly useful to students who have language difficulties.

Also, teachers using manual signing seemed motivated and demonstrated high self-efficacy. Previous studies have shown that teachers with a high level of self-efficacy are likely to commit to an innovative approach such as the use of manual signing, as well as attempt new instructional approaches and even persist with complex teaching strategies while remaining positive about their effectiveness even in negative situations (Schmitt & Justice, 2011; Soto, 1997). This is supported by qualitative data from the study, which include twenty-one comments reflecting teachers' self-efficacy and four comments reflecting their enjoyment and satisfaction in using manual signing. One teacher explained the use of manual signing as follows:

"First it was very challenging and it looked impossible, but with frequent practice it gets enjoyable and easy to use."

4.2 Teachers' perceptions regarding currently employed unaided AAC strategies to support the use of manual signing

To realize the benefits discussed earlier, it is critical that teachers employ appropriate educational strategies to communicate effectively and efficiently with all learners, including those with CCN. Not surprisingly, both public and private school teachers employed similar strategies supporting the use of manual signing to enhance their learners' knowledge and skills through meaningful instruction, as suggested by Tönsing and Dada, (2016). Quantitative data indicated the four most frequently employed strategies as: 1) combining signs with spoken words, 2) using signs

with spoken words and pictures, 3) using signs in a structured activity and, 4) using signs to support the theme of the week. This is positive since one of the key principles of manual signing is to employ it alongside other communication modes (e.g. speech, aided AAC) as part of a multi-modal approach to communication (Dark, Brownlie & Bloomberg, 2019).

In addition, the qualitative data which expanded on different educational strategies to support learning showed that teachers prefer to use manual signing in structured activities, such as story-telling, singing, rhymes, role play and in group activities. This concurs with findings from Rombouts et al. (2018), namely that teachers use signing more easily during structured activities such as direct teaching when communication or language development is concerned. In a later study Rombouts et al. (2019) further suggested that learners find it easier to focus on signing during structured activities, as signing is given higher priority during these activities.

4.3 Perceptions of teachers with regard to team support and unaided AAC

The public school teachers in the study felt that SLPs provided the most support, while the private school teachers felt that fellow teachers or the principal provided the most support with regard to the use of manual signing. However, both public and private school teachers generally perceived parents to provide the least amount of support. Qualitative data supported this finding, with comments referring to a lack of parent education and involvement and school–home reinforcement. Although current “best practices” in AAC and special education have indeed moved towards incorporating a more family-focused approach (Parette, Huer, & Brotherson, 2001), which emphasizes diversity and cultural sensitivity, a lack of parent involvement as part of collaboration has been reported in various studies as a concern by both teachers and SLPs (De Bortoli, Arthur-Kelly, Foreman, Balandin, & Mathisen, 2011; Kent-Walsh & Light, 2003; Tönsing & Dada, 2016). This is further confirmed by the research of Geldenhuys and Wevers (2013), stating that parents seldom provide effective stimulation to their children at home and perceive the provision of such educational support and development to be the role of the school.

However, Dark et al. (2019) referred to the knowledge, skills and attitudes of communication partners (e.g., parents) and the facilitation of communication opportunities as most influential in the home environment. This means that, if parents are reluctant to use manual signing regularly, or if they believe that alternative forms of communication may hinder the development of speech, the child will have limited opportunity to signing input. Also, manual signing is still believed to have lower status than speech in spite of successful implementation of unaided AAC strategies such as Makaton in some countries (Von Tetzchner & Martinsen, 1992).

The current study emphasized the significant role that the lack of parent education plays in their children's communication development. Parent training in AAC has shown to facilitate the provision of communication opportunities by parents, as well as child communication and parent responses to their child's communication attempts (Senner, Post, Baud, Patterson, Bolin, Lopez, & Williams, 2019). According to the qualitative data of the current study, only four of the 101 teachers attempted to educate parents through parent training initiatives with regard to unaided AAC strategies.

4.4 Media awareness and unaided AAC strategies

South African Sign Language (SASL) was adopted as the official Sign Language of South Africa in 2015 and it is occasionally used during television news casts (Walker et al., 2019). Although some teachers in the study recognized the fact that television has created some awareness among the general public with regard to SASL, the majority felt that television exposure was not effective in creating a broader public awareness regarding unaided AAC strategies. This finding is supported by the teachers' qualitative comments indicating the lack of signing awareness among the public. One of the teachers commented: *"I have not seen Makaton on television"*, while another stated *"We are working in isolation with the community"*.

This finding might be ascribed to the fact that teachers perceive the media to play an important role in educating society through television, the internet, social media platforms (e.g., Facebook, Twitter), printed media and radio. For example, the media reported in 2014 about the fake sign language interpreter at Nelson Mandela's memorial service (Duggan, 2014) and, in this way, gave publicity to sign language, albeit negative publicity. Thus, local television can be used to educate the broader society on unaided AAC. As expected, teachers rated the influence of radio as a form of media low given the fact that signing is a visual strategy.

In a low and middle income country such as South Africa, involvement of the broader media could create an opportunity for greater awareness among the public. In turn, whole communities could become educated in this regard, which may influence their perceptions about disability in general and, ultimately, minimize stigmatization (Sheehy & Budiyanto, 2014).

Besides the profound impact that the rapid advancements in technology brought about by the so called Fourth Industrial Revolution, especially mobile technologies with apps, has had on people's daily lives, it is generally acknowledged that these technologies can facilitate learning, including the teaching of children with disability (Brownell, Sindelar, Kiely, & Danielson, 2010;

Light & McNaughton, 2013). Considering the high cost of training, as supported by the quantitative and qualitative results of the study, a need, as well as a possible solution, was identified, namely to develop a mobile application specifically for teachers using manual signing. This could be similar to the existing application used by the Deaf communities, named eDeaf, which was launched in 2018 to support persons with hearing impairment and their employers in the workplace. In addition, a website was developed for further support and includes https://www.sasl.com.

4.5 Teachers' perceptions of external barriers hindering the implementation of unaided AAC

Both public and private school teachers experienced and identified a variety of external barriers to the use of manual signing in the educational context. According to previous studies, the relationship between belief in AAC and the use of AAC, such as unaided AAC, may be shaped by a complex set of interrelation of personal and environmental factors (Hornby, 2015; Norburn et al., 2016; Kent, et al., 1998; Rombouts et al., 2016a; Tönsing & Dada., 2016).

Although unaided AAC systems such as manual signing have proven to be successful for learners with disabilities, including learners with CCN (Launonen, 1996; Meuris et al., 2014; Tan et al.,, 2014), some of the teachers from both public and private schools still perceived motor disability as the most common problem in teaching learners manual signing. Grove, Dark and Brownlie (2019) also mentioned this as the most common challenge, as co-morbidity of impairments is a characteristic of developmental disability, and manual signing involves different motor skills. According to Grove et al. (2019) and Meuris et al. (2014), these signing characteristics include locations, handshapes, movements and orientation which all form part of the building blocks of sign parameters and require complex integration of fine motor skills.

However, some teachers from both public and private schools, who indicated high levels of self-efficacy and motivation, seemed to continue to bring about change in their learners' learning and development, driven by the belief that they could use manual signing with learners with motor disability to support understanding and learning in the educational context. For example, one teacher commented on motor disability and explained:

[Comment: I find motor disability hinders the use of manual signing] *"They still understand, even if they can't sign back."*

It is also the function and not the articulation of the sign that should be emphasized (Von Tetzchner & Martinsen, 1992). Although learners with physical disability cannot express themselves

clearly due to their physical disability, they may make approximations to signs (Walker et al., 2019), which are sometimes overlooked.

Overall, teachers felt that untrained staff, an inadequate curriculum and a lack of funding to purchase signing manuals are hindering the use of manual signing in the educational context. This is supported by the quantitative data which referred to teachers' perceptions about training (*"limited time for in-service training"*, *"lack of follow-up training to reinforce signing skills acquired"* and *"other training courses more attractive"*) as overall significant. In addition, factors such as a lack of knowledge, the difficulties of forming new habits and a lack of self-confidence confirmed teachers' knowledge and skill needs with regard to additional training in manual signing. This can be accounted for by the fact that just over a third of the teaching population had only between one and five years of teaching experience, given the influx of new teachers at special schools as shown by frequency data. Also, teachers indicated that training courses usually involved once-off sessions of one to four days, without regular training to reinforce their newly acquired signing skills.

Educational authorities seem to be moving towards addressing shortcomings in school policies. For example, the Curriculum and Assessment Policy Statement (CAPS) was recently released for Grade R-5 learners with Severe Intellectual Disability (Department of Education, 2019). This policy makes provision for augmentative and alternative communication, yet it only refers to aided AAC strategies (objects, photos and pictures), while unaided AAC strategies such as manual signing to support learning are excluded. As highlighted in previous studies (Grove & McDougall, 1988; Rombouts et al., 2019), certain factors appear to be associated with the success of introducing manual signing and creating a quality signing environment, namely the use of a signing coordinator to drive the innovation, regular training for the majority of teachers, training opportunities for parents, providing continuous support from school management and ensuring support through school policies.

Inevitably, the majority of teachers in the study felt that they would benefit from additional training and that they would be more likely to employ AAC strategies when they become more knowledgeable and confident about signing. This view concurs with that of Rombouts et al. (2017a), namely that teachers' skills and beliefs may affect their use of AAC in the classroom. Teacher training is therefore central to improving skills and bringing about change in the classroom, the practice of teachers, and teachers' beliefs and attitudes, which would, ultimately, lead to improved learning outcomes (Bornman & Donohue, 2013; Chadwick, 2008; Dalton et al., 2012; Hay, Paulsen, & Smit, 2001; Patel & Khamis-Dakwar, 2005).

Therefore, as stated by Rombouts et al. (2019) and Bundiyanto et al. (2018), the decision to introduce signing should be viewed as an organizational initiative rather than an individualized compensatory strategy. Further, it is important to acknowledge the dynamic and complex relationship between the sign environment, staff use and use by learners with CCN, otherwise the quality of the signing environment as such will not be realized and will depend solely on teacher preferences. Teachers' with a high level of self-efficacy do need support, as mentioned above, to create a supportive AAC environment (Rombouts et al., 2017a). With any new innovation, perceptions may change with time as a function of both experience and the expertise which develops through the process of implementation (Avramidis et al., 2000; Bornman & Donohue, 2013).

5. CRITICAL EVALUATION, IMPLICATIONS AND CONCLUSION

5.1 Critical evaluation of the study

This study represents a first attempt to establish the perceptions of South African teachers with regard to the use of manual signing in special schools. The results were broadly consistent with previous universal literature in this regard (Norburn, et al., 2014). It was clear that South African teachers thought that the heterogeneous group of learners would benefit from different forms and degrees of educational support (Blackstone et al., 2007) and that such should and could incorporate the use of manual signing as unaided AAC strategy.

The reliability of the results was consolidated due to the substantial number of teachers whom participated in the study (n = 101) (Leedy & Ormrod., 2014) and the wide variety of schools involved to include public schools for learners autism spectrum disorder, schools for learners with cerebral palsy, schools for learners with severe intellectual disability as well as private schools which accommodate learners with multiple disability. However, only urban schools within the Gauteng province were included. It is generally accepted that these schools tend to be better resourced schools (Tönsing & Dada, 2016). As such, the results may not necessarily be fully representative of teachers and schools throughout the greater South African region, as some provinces may have less resources than Gauteng.

In addition, sampling bias may be evident since only schools with knowledge or exposure to unaided AAC participated in the study in order to answer the research aim. Special needs schools that do not employ manual signing as unaided AAC strategy were excluded as this study did not aim to report on the percentage of schools that employed signing, but rather to report on the perceptions

of teachers who already used signing. This limits the generalization of the results across different school environments within South Africa. Sampling was conducted in such a manner, since the purpose of the study was to establish how teachers use manual signing.

An expert panel involving authorities in the field of AAC was engaged to appraise a preliminary questionnaire and to confirm the relevance of the study (Leedy & Ormrod, 2014). Together with findings from a pilot study performed by a limited number of teachers at a private special school and feedback from the expert panel were used to fine tune the final questionnaire used for data collection. Ultimately this ensured that the validity of the results was increased and that the research findings were clearly focused with regard to the objective of the research. The research questionnaire was deliberately structured to include both closed and open-ended questions, thereby allowing the participants to be more expansive in their responses which enriched the quality of data accumulated.

The majority of teachers who participated in the research did not employ English as their primary language. To the extent that the questionnaire was presented in English, it is therefore possible that this may have had influence upon the individual responses. That said, a previous study (Pae, 2014) concluded that for respondents to English questionnaires and whom employ English as second language (ESL), challenges were only manifest when summarized responses were required. In the context of the research questionnaire therefor this is unlikely to have had any influence upon responses to the closed questions and only limited influence upon what constituted relatively short open-ended questions.

Leedy and Ormrod, (2014) and Pae (2014), also explored potential for gender differences to influence response. In this research however since the majority of the respondents were female, gender difference is unlikely to have had influence.

Also, the presence of the researcher during completion of the survey could have compromised teacher' anonymity, which would have resulted questions to be answered in a socially desirable way, thereby producing the so called "Hawthorne effect" (Leedy & Ormrod, 2014). In addition, although the researcher reminded teachers to complete all the questions, a few missing responses were evident. Given that the sample size (n = 101) was large enough to benefit from central limit theorem (Hill, 1998) and that descriptive statistics were used to interpret the majority of the results, the absence of a few responses was not statistically significant.

5.2 Clinical implications

The results from the present study have several important implications for special needs schools. Firstly, the results provide evidence that teachers at special schools in both the public and private sector use manual signing to some extent within and outside the classroom environment. In addition, teachers experience its use as positive, useful and even enjoyable in the long term, which is consistent with previous literature (Sheehy & Budiyanto, 2014).

Further, the study identified a variety of environmental factors, which act as facilitators and barriers and may influence the use of manual signing. Although, the specific environmental factors may differ in school environments, the broad themes identified in the study may be useful to guide the focus of both intervention and further research in employing such strategy across other school environments.

The study also identified the lack of parent involvement which was reported in various studies as a concern by both teachers and SLPs (De Bortoli, et al., 2014; Kent-Walsh & Light, 2003; Tönsing & Dada, 2016). This is further confirmed by Geldenhuys and Wevers (2013), stating that parents seldom provide effective stimulation to their children at home and perceive the provision of such educational support and development to be the role of the school. It is therefore important for schools to make an attempt to involve parents during school activities and encourage them to participate in training initiatives such as in the use of manual signing. This will not only educate parents about the approach but will also enhance the quality of the signing environment that these learners are exposed to whether at home or school.

Also, educational authorities should consider for the inclusion of manual signing as part of the school's curriculum or program, given the demonstrated benefits of signing as reported by teachers in this study. This could facilitate the implementation of such strategy to support leaning. In addition, it would provide teachers with the flexibility of multi-modal approaches which could enable them to choose the appropriate modality since these preferences may differ across situations as well as developmental stages of these learners (Norburn et al., 2016). The benefit of such inclusion would be to provide support and sustain the signing environment as a whole, which in return could be more sufficiently and effectively maintained at special schools.

The results also imply the need to sustain the signing environment through the establishment of best training practices within school environments. For example considering signing as an

organizational approach rather than individualized compensatory strategy (Rombouts et al., 2019; Budiyanto et al., 2018).

5.3 Recommendations for further studies

The following recommendations are important for future studies and include:

- The same study could be replicated at special schools situated in other provinces (especially less resourced provinces such as the Eastern Cape) who use manual signing to support the educational needs of learners with CCN. This will increase empirical data for future meta-analysis, which would strengthen the reliability of the overall outcome.
- Research is needed to better understand the views of school management, SLPs and teachers about the implementation of manual signing as unaided AAC strategy at special schools which do not currently employ manual signing. This is important since its use and effectiveness are influenced by the culture, beliefs and existing practices within the school environment and community (Sheehy et al., 2019).
- Alternative forms of support regarding the use of manual signing should be investigated such as the development of a mobile application specifically for teachers similar to the existing application used by the Deaf communities, named eDeaf which was launched in 2018 to support individuals with hearing impairment and their employers in the workplace. This could be beneficial to teachers who are new to signing practices, who need refreshers now and then or to increase access to limited signing resources at special schools.
- Research is needed to better understand the concept of co-collaboration which exists between public and private special schools within the South African context. Schools and teachers can strengthen relationships and share resources, knowledge and experiences with regard to teaching practices such as for example manual signing to support learning.

5.4 Conclusion

This study provides preliminary information about teachers' perception on the use of unaided AAC strategies such as manual signing to support the educational needs of learners in South African special schools. The study suggests that the majority of public and private school teachers use manual signing to some extent within and outside the classroom environment. These teachers not only appear to have a positive attitude towards the use of manual signing, but demonstrate a good understanding of the benefits of such use in the educational system. Teachers identified manual signing to be most useful for supporting speech, understanding and learning, and for

developing language skills. The most frequently employed unaided AAC strategies identified are to combine signs with spoken words and combine signs with spoken words and pictures. Teachers' with high levels of self-efficacy seem to be very innovative and use manual signing in a variety of structured activities such as story-telling, singing, rhymes, role play and in group activities, which in return provide enjoyment and satisfaction. Teachers also identified a variety of factors which influence manual signing within the educational system. These factors are related to the teachers' school and classroom context (e.g., school culture), the team members involved (e.g., parents), community awareness, learner-related factors (e.g., specific diagnoses/etiology), and training needs. The sustainability of an innovation such as manual signing is important and depends on the quality of training, as well as the reinforcement of signing skills acquired to maintain a high signing environment in the South African educational system. This section concluded with a critical evaluation of the study (focussed on both strengths and weaknesses) and also discussed the clinical implications before providing some recommendations for further studies.

6. REFERENCES

Alant, E. (1999). Students with little or no functional speech in schools for students with severe mental retardation in South Africa. *Augmentative and Alternative Communication,* 15(2), 83-94. doi: 10.1080/07434619912331278595.

Alant, E., Lloyd, L.L., & Tönsing, K. M. (2005). Augmentative and alternative communication. In E.Alant and L.L. Lloyd (Eds). *Augmentative and alternative communication and severe disabilities: Beyond poverty*.(pp.30-67). London:Whurr. Retrieved from http://education.indiana.edu/graduate/programs/specialed/aac/docs/Alant%20Chapter%20Three.pdf

Anderson, D.R., Sweeney, D.J., Williams, T.A., Camm, J.D., & Cochran, J.J. (2018). *Modern Business Statistics with Microsoft ® Office Excel®*. Boston, MA: Cengage Learning.

Avramidis, E., Bayliss, P., & Burden, R. (2000). A survey into mainstream teachers' attitude towards the inclusion of children with special educational needs in the ordinary school in one Education Authority. *Educational Psychology*, 20(2), 191-211. doi: 10.1080/713663717.

Beukelman, D.R., & Mirenda, P. (2013). *Augmentative and alternative communication: Supporting children & adults with complex communication needs* (4th ed.). Baltimore, MD: Paul H. Brookes.

Blackstone, S.W., & Williams, M.B, & Wilkins, D.P. (2007). Key principles underlying research and practice in AAC. *Augmentative and Alternative Communication.* 23:3, 191-203, doi: 10.1080/07434610701553684.

Bornman, J., & Donohue, D.K. (2013). South African teachers' attitudes towards learners with barriers to learning: Attention-deficit and hyperactivity disorder and little or no functional speech. *International Journal of Disability, Development and Education*, 60(2), 85-104. doi: 10.1080/1034912x.2013.786554.

Bornman, J., & Rose, J. (2017). *Believe all can achieve: Increasing classroom participation in learners with special support needs.* Pretoria: Van Schaik.

Bornman, J., & Tönsing, K. (2017). Augmentative and alternative communication. In E. Landsberg, D. Kruger & E. Swart (Eds.), *Addressing barriers to learning: A South African perspective* (3rd ed.). Pretoria: Van Schaik.

Branson, D., & Demchak, D. (2009). The use of augmentative and alternative communication methods with infants and toddlers with disabilities: A research review. *Augmentative and Alternative Communication*, 25(4), 274-286. doi: 10.3109/07434610903384529.

Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative research in Psychology*, 3, 77-101.

Brownell, M.T., Sindelar, P.T., Kiely, M.T., Danielson, L. C. (2010). Special education teacher quality and preparation: Exposing foundations, constructing a new model. *Council of Exceptional Children,* 76(3), 357-377.

Budiyanto, Sheehy, K., Kaye, H., & Rofiah, K. (2018). Developing Signalong Indonesia: issues of happiness and pedagogy, training and stigmatisation. *International Journal of Inclusive Education,* 22(5), 543-559. doi: 10.1080/13603116.2017.1390000.

Calculator, S.N., & Black, T. (2009). Validation of an inventory of best practice in the provision of augmentative and alternative communication services to students with severe disabilities in general education Classrooms. *American Journal of Speech-Language Pathology,* 15, 329-342.

Carrington, S. (1999). Inclusion needs a different school culture. *International Journal of Inclusive Education,* 3(3), 257-268. doi: 10.1080/136031199285039.

Chadwick, D. (2008). A pilot investigation into the efficacy of a signing training strategy for staff working with adults with intellectual disabilities. *British Journal of Learning Disabilities,* 37, 34-42. doi: 10.1111/j.1468-3156.2008.00503.x

Chyung, S.Y., Roberts, C., Swanson, I., & Hankinson, A. (2017). Evidence-based survey design: The use of a midpoint on the Likert scale. *Performance Improvement,* 56(10), 15-23. doi: 10.1002/pfi.21727.

Clibbens, J. (2001). Signing and lexical development in children with Down Syndrome. *Down Syndrome research and practice,* 7(3), 101-105. Retrieved from http://down-syndrome.net/library/periodicals/dsrp/07/03.

Cravotta, A., Busă, M. G., & Prieto, P. (2019). Effects of encouraging the use of gestures on Speech. *Journal of Speech, Language, and Hearing Research,* 62, 3204 – 3219.

Dada, S., & Alant (2002). A comparative study of the attitudes of teachers at special and educationally inclusive schools towards learners with little or no functional speech using communication devices. *South African Journal of Education,* 23, 213-218.

Dada, S., Kathard, H., Tönsing, K. M., & Harty, M. (2017). Severe communication difficulties in South Africa: challenges and enablers. *Inclusion, Disability and Culture*. doi: 10.1007/978-3-319-55224-8.

Dalton, E.M., McKenzie, J.A., & Kahonde, C. (2012). The implementation of inclusive education in South Africa: Reflections arising from a workshop for teachers and therapists to introduce Universal Design for Learning. *African Journal of Disability,* 1(1), 1-7. doi:10.4102/ajod.v.1i1.13.

Dark, L., Brownlie, E., & Bloomberg, K. (2019). Selecting, Developing and supporting Key Word Sign vocabularies for children with developmental disabilities. In N. Grove, & K. Launonen (Eds.),

Manual Sign Acquisition in children with Developmental Disabilities. New York: Nova Science Publishers, Inc.

De Bortoli, T., Arthur-Kelly, M., Foreman, P., Balandin, S., & Mathisen, B (2011). Complex contextual influences on the communicative interactions of students with multiple and severe disabilities. *International Journal of Speech-Language Pathology*, 13,422-435. doi: 10.3109/17549507.2011.550691.

Department of Education (2001). *Education White Paper 6 on special needs education: Building an inclusive education and training system.* Pretoria, South Africa: Author.

Department of Education (2019). *English home language. Curriculum and Assessment Policy Statement: Grades R-5 for learners with severe intellectual disability, 2018 Orientation Learning Program.* Pretoria, South Africa: Author.

Department of Education (2018). List of Special Schools. Retrieved from https://www.gauteng.gov.za/Education/List%20of%20special%20schools.pdf

Department of Education (2018). *South African sign language, Home Language. Curriculum and Assessment Policy Statement: Foundation Phase Grades R-3.* Pretoria, South Africa: Author.

DiCarlo, C., Banajee, M.S., & Stricklin, S.B. (2000). Embedding Augmentative Communication Within: Early Childhood Classroom. *Young Exceptional Children,* 3(3), 18-26.

Donohue, D.K., & Bornman, J. (2014). The challenges of realising inclusive education in South Africa. *South African Journal of Education,* 34(2), 1-14. doi: 10.15700/201412071114.

Donohue, D.K., & Bornman, J. (2015). South African teachers' attitudes toward the inclusion of learners with different abilities in mainstream classrooms. *International Journal of Disability, Development and Education*, 62(1), 42-59.

Duggan, O. (2014). What happened to the fake Nelson Mandela interpreter? [Web log post]. Retrieved from telegraph.co.uk/news/worldnews/nelson-mandela/11274963/What – happened-to-the-fake-Nelson-Mandela-interpreter.html.

Engelbrecht, P. (2006). The implementation of inclusive education in South Africa after ten years of democracy. *European Journal of Psychology of Education,* XXI: 3, 253-264.

Engelbrecht, P., Eloff, I., Pettipher, R., & Swart, E. (2002). Implementing inclusive education in South Africa: Teachers' attitudes and experiences. *Academia,* 34(1), 175-189.

Engelbrecht, P., Oswald, M., Swart, E., & Eloff, I. (2003). Including learners with intellectual disabilities: Stressful for teachers? *International Journal of Disability, Development and Education,* 50(3), 293-308. doi: 10.1080/1034912033000120462.

Flynn, L.R., & Goldsmith, R.E. (2013). *Case study for ethics in academia research in the social sciences.* Thousand Oaks, CA: Sage Publications Inc. doi: 10.4135/9781452269986.

Geldenhuys, J.L., & Wevers, N.E.J. (2013). Ecological aspects in mainstream primary schools in the Eastern Cape, South Africa. *South African Journal of Education,* 33(3), 1-18.

Grove, N., Dark, L., & Brownlie, E. (2019). Assessment and Intervention for Problems in Sign Production. In N. Grove, & K. Launonen (Eds.), *Manual Sign Acquisition in children with Developmental Disabilities* (pp. 247-270). New York: Nova Science Publishers, Inc.

Grove, N. & McDougall, S. (1989). *An exploration of the communication skills of Makaton students: Part 2 Interviews with teachers and speech therapists.* Final Report to the Leverhulme Trust, London: St George's Hospital Medical School.

Guskey, T.R. (1986). Staff development and the process of teacher change. *Educational Researcher,* 15, 5-12.

Hay, J.F., Paulsen, M., & Smit J. (2001). Teacher preparedness for inclusive education. *South African Journal of Education,* 21(4), 213-218.

Hill, R. (1998). What sample size is "enough" in internet survey research? *Interpersonal Computing and Technology: An Electronic Journal for the 21st Century,* 6(3-4), 1-10.

Hornby, G. (2015). Inclusive special education: development of a new theory for the education of children with special educational needs and disabilities. *British Journal of Special Education,* 42(3), 234-256. doi: 10.1111/1467-8578.12101.

Johnston, S. (2006). Considering response efficiency in the selection and use of AAC systems. *The Journal of Speech and Language Pathology - Journal of Applied Behaviour Analysis,* 1(3), 193-206. doi:10.1037/h0100195.

Kent, D., Peterson, K.D., & Deal, T.E. (1998). How leaders influence the culture of schools. *Educational Leadership.* San Francisco, CA: Jossey-Bass.

Kent-Walsh, J., & Light, J. (2003). General education teachers' experiences with inclusion of students who use augmentative and alternative communication. *Augmentative and Alternative Communication,* 19, 104-124. doi: 10.1080/0743461031000112043.

Launonen, K. (1996). Enhancing communication skills of children with Down Syndrome: Early use of manual signs. In S. Von Tetzchener and M.H. Jensen (Eds.). *Augmentative and Alternative Communication: European perspective*. London: Whurr.

Launonen, K., & Grove, N. (2019). Looking back, looking forward: Conclusion. In N. Grove, & K. Launonen (Eds.), *Manual Sign Acquisition in children with Developmental Disabilities* (pp. 427-437). New York: Nova Science Publishers, Inc.

Leedy, P.D., & Ormrod, J.E. (2014). *Practical research: Planning and design (10th ed.).* Harlow, England: Pearson Education Limited.

Light, J., & Drager, K. (2007). AAC Technology for young children with complex communication needs: State of the science and Future Research Directions. *Augmentative and Alternative Communication.* 23(3), 204-216. doi: 10.1080/07434610701553635.

Light, J., & McNaughton, D. (2012). Supporting the communication, language and literacy development of children with complex communication needs: State of the science and future research priorities. *Assistive Technologies*, 24, 34-44. doi: 10.1080/10400435.2011.648717

Lombard, M., Snyder-Duch, J., & Bracken, C.C. (2002). Content analysis in mass communication, *Human Communication Research*, 28(4), 587-604.

Loncke, F.T., Campbell, J., England, M., & Haley, T. (2006). Multimodality: A basis for augmentative and alternative communication-psycholinguistic, cognitive, and Clinical/educational aspects. *Disability and Rehabilitation,* 28(3), 169-174. doi: 10.1080/09638280500384168.

Makaton Charity (2018). "Makaton." Retrieved from http://www.makaton.com.

Meuris, K., Maes, B., De Meyer, A., & Zink, I. (2014). Manual signing in adults with intellectual Disability: Influence of sign characteristics on functional sign vocabulary. *Journal of Speech, Language, and Hearing Research*, 57, 990-1010. doi: 10.1044/2014_JSLHR-L-12-0402.

Mistry, M. & Barnes, D. (2013). The use of Makaton, through talk, through play, for pupils who have English as an additional language (EAL) in the Foundation Stage. *International Journal of Primary, Elementary and Early Years Education*, 41, 603-616.

Murray, J., & Goldbart, J. (2009). Augmentative and alternative communication: A review of current issues. *Pediatrics and Child Health*, 19(10), 464-468.

Muthukrisna, N., & Schoeman, M. (2000). From 'Special Needs' to 'Quality Education for All': a participatory, problem-centred approach to policy development in South Africa. *International Journal of Inclusive Education*, 4(4), 315-335. doi: 10.1080/13603110050168023.

Naudé, A., & Bornman, J. (2016). Editorial: Ethical sensitivity – a multidisciplinary approach. *Humanities and Social Sciences*, 4(2-1), 1-4. doi: 10.11648/j.hss.s.2016040201.11

Norburn, K., Levin, A., Morgan, S., & Harding, C. (2016). A survey of augmentative and alternative communication used in an inner city special school. *British Journal of Special Education,* 43(3), 289-306. doi: 10.1111/1467-8578.12142.

Pae, H.K., (2014). Forced choice or free choice? The role of question formats in predicting speaking and writing skills of non-native speakers of English. *Educational Assessment*, 19(2), 97-115. doi: 10.1080.10627197.2014.903651.

Parette, H.P., Huer, M.B., & Brotherson, M.J. (2001). Related service personnel's perceptions of team AAC decision-making across cultures. *Education and Training in Mental Retardation and Developmental Disabilities*, 36(1), 69-82.

Patel, P., & Khamis-Dakwar, R. (2005). An AAC training program for special education teachers: A case study of Palestinian Arab Teachers in Israel. *Augmentative and Alternative Communication.* 21(3), 205-217. doi: 10.1080/07434610400011638.

Rickards, G., Magee, C., & Artino, A.R. (2012). You can't fix by analysis what you've spoiled by design: Developing survey instruments and collecting validity evidence. *Journal of Graduate Medical Education,* 4(4), 407-410. doi: 10.4300/JGME-D-12-00239.1.

Rombouts, E., Maes, B., & Zink, I. (2016a). Attitude and key word signing usage in support staff. *Research in Developmental Disability*, 55, 77-87. doi:10.1016/j.ridd.2016.03.016.

Rombouts, E., Maes, B., & Zink, I. (2016b). The behaviour process underlying augmentative and alternative communication usage in direct support staff. *Journal of Intellectual and Developmental Disability.* 42, 101-113. doi:10.3109/13668250.2016.1219023.

Rombouts, E., Maes, B., & Zink, I. (2017a). Beliefs and habits: Staff experiences with key word signing in special schools and group residential homes. *Augmentative and Alternative Communication,* 33(2), 87-96. doi: 10.1080/07434618.2017.1301550.

Rombouts, E., & Maes, B., & Zink, I. (2017b). The behavioural process underlying augmentative and alternative communication usage in direct support staff. *Journal of Intellectual and Developmental Disability,* 42(2), 101-113. doi: 10.3109/13668250.2016.1219023.

Rombouts, E., Maes, B., & Zink, I. (2018). Use of key word signing by staff in special schools and in day centres for adults with intellectual disabilities. *Journal of Intellectual Disability Research,* 3(1), 21-29. doi: 10.1111/jir.12444.

Rombouts, E., Sheehy, K., Buchanan-Mellon, J., & Grove, N. (2019). Signing in school. In N. Grove, & K. Launonen (Eds.), *Manual Sign Acquisition in children with Developmental Disabilities* (pp.359-377). New York: Nova Science Publishers, Inc.

Senner, J.E., Post, K.A., Baud, M.R., Patterson, B., Bolin, B., Lopez, J., & William, E. (2019). Effects of parent instruction in partner-augmented input on parent and child speech generating device use. *Technology and Disability,* 31, 27-38. doi: 10.3233/TAD-190228.

Schmitt, M.B., & Justice, L. (2011). Schools as complex host environments: Understanding aspects of schools that may influence clinical practice and research. *The ASHA Leader,* 16(6), 8-11. doi: 10.1044/leader.FTR1.16072011.8.

South African Council for Educators Act (SACE) (2011). Retrieved from https://www.sace.org.za

Sheehy, K., & Budiyanto (2014). Teachers' attitudes to signing for children with severe learning disability in Indonesia. *International journal of Special Education.* 18(11), 1143-1161. doi: 10.1080/13603116.2013.879216.

Sigafoos, J., & Drasgow, E. (2001). Conditional use of aided and unaided AAC: A review and clinical case demonstration. *Focus on autism and other developmental disabilities.* 16(3), 152-161.

Soto, G. (1997). Special education teacher attitude toward AAC: Preliminary survey. *Augmentative and Alternative Communication,* 13(3), 186-197, doi: 10.1080.07434619712331278008.

South Africa (Republic) (1996). South African Schools Act, Act 84 of 96, Pretoria, South Africa: Government Press.

South Africa (Republic) (1997). The Constitution of the Republic South Africa, Act 29 of 1997. Retrieved from http://www.justice.gov.za/legislation/constitution/SAConstitution-web-eng.pdf

Sullivan, G.M., & Artino, A.R. (2013). Analyzing and interpreting data from Likert-Type Scales. *Journal of Graduate Medical Education,* 5(4), 541-542. doi: 10/4300/JGME-5-4-18.

Tan, X.Y., Trembach, D., Bloomberg, K., Iacono, T., & Caithness, T. (2014). Acquisition and generalization of key word signing by three children with autism. *Developmental Neurorehabilitation,* 17(2), 125-136. doi: 10.3109/17518423.2013.863236.

Tönsing, K.M., Dada, S. (2016). Teachers' perceptions of implementation of aided AAC to support expressive communication in South African special schools: a pilot investigation. *Augmentative and Alternative Communication.* 32(4), 282-304. doi:10.1080/07434618.2016.1246609.

Twachtman-Cullen, D., (2008). Manual signs: Examining the 'Goodness of the Fit' for individuals with ASD. Retrieved from 'The Cutting Edge - From research to Practice'. Autism Spectrum Quarterly, Winter 2008.

United Nations (1989) Convention on the Rights of the Child (CRC). Retrieved from http://www.hrweb.org/legal/child.html

United Nations (2006) Convention on the Rights of Persons with Disabilities (CRDP). Retrieved from http://www.un.org/disabilities/documents/convention/convoptprot-e.pdf

Von Tetzchner, S., & Martinsen, H. (1992). *Introduction to symbolic and augmentative communication.* San Diego: Singular.

Walker, M., Mitha, S., & Riddington, C. (2019). Cultural issues in developing and using signs within the Makaton language programme in Different Countries. In N. Grove, & K. Launonen (Eds.), *Manual Sign Acquisition in children with Developmental Disabilities*. New York: Nova Science Publishers Inc.

Wilkinson, K. M., & Hennig, S. (2007). The state of research and practice in augmentative and alternative communication for children with developmental/intellectual disabilities. *Mental Retardation and Developmental Research Reviews,* 69, 58-69. doi: 10.1002/mrdd.20

APPENDIX A

A1 Permission letter: Ethics Committee of the Faculty of Humanities at the University of Pretoria

Faculty of Humanities
Research Ethics Committee

5 December 2018

Dear Ms McDowell

Project:	Implementation of unaided augmentative and alternative communication strategies to support learners in South African special schools: A study of teacher's perspectives
Researcher:	ACM McDowell
Supervisor:	Prof J Bornman
Department:	Centre for Augmentative and Alternative Communication 15391061
Reference Number:	(GW0181102HS)

Thank you for the well written application that was submitted for ethical consideration.

I am pleased to inform you that the above application was approved by the Research Ethics Committee on 29 November 2018, conditional to the submission of the following information:

- Written permission from the Department of Education

Please note that data collection may not commence prior to the above permissions being submitted and subject to final approval by this committee. To facilitate the administrative process, please respond to Ms Tracey Andrew at PGHumanities@up.ac.za or Room HB 7-27, at your earliest possible convenience.

Sincerely

Prof Maxi Schoeman
Deputy Dean: Postgraduate
Research and Ethics Faculty of
Humanities
UNIVERSITY OF PRETORIA

APPENDIX B

B1 Permission letter: Gauteng Department of Education

GAUTENG PROVINCE

REPUBLIC OF SOUTH AFRICA

8/4/4/1/2

GDE RESEARCH APPROVAL LETTER

Date: Validity of Research Approval:	**29 January 2019** **05 February 2019- 30 September 2019** **2018/379**
Name of Researcher: **Address of Researcher:**	**McDowell ACM**
Telephone Number:	
Email address:	
Research Topic: **Type of qualification** **Number and type of schools:**	**Implementation of unaided augmentative and alternative communication strategies to support learners in South African special schools: A study of teachers' perceptions.** **Masters** **Seven Primary and LSEN Schools.**
District/s/HO	**Tshwane South, Johannesburg North, Johannesburg East and Ekurhuleni North**

Re: Approval in Respect of Request to Conduct Research

This letter serves to indicate that approval is hereby granted to the above-mentioned researcher to proceed with research in respect of the study indicated above. The onus rests with the researcher to negotiate appropriate and relevant time schedules with the school/s and/or offices involved to conduct the research. A separate copy of this letter must be presented to both the School (both Principal and SGB) and the District/Head Office Senior Manager confirming that permission has been granted for the research to be conducted.

The following conditions apply to GDE **rch. The researcher may proceed with the**

Office of the Director: Education Research and Knowledge Management
7th Floor, 17 Simmonds Street, Johannesburg, 2001
Tel: (011) 355 0488
Email: Faith.Tshabalala@gauteng.gov.za
Website: www.education.gpg.gov.za

1. *The District/Head Office Senior Manager/s concerned must be presented with a copy of this letter that would indicate that the said researcher/s has/have been granted permission from the Gauteng Department of Education to conduct the research study.*
2. *The District/Head Office Senior Manager/s must be approached separately, and in writing, for permission to involve District/Head Office Officials in the project.*
3. *A copy of this letter must be forwarded to the school principal and the chairperson of the School Governing Body (SGB) that would indicate that the researcher/s have been granted permission from the Gauteng Department of Education to conduct the research study.*
4. *A letter / document that outline the purpose of the research and the anticipated outcomes of such research must be made available to the principals, SGBs and District/Head Office Senior Managers of the schools and districts/offices concerned, respectively.*
5. *The Researcher will make every effort obtain the goodwill and co-operation of all the GDE officials, principals, and chairpersons of the SGBs, teachers and learners involved. Persons who offer their co-operation will not receive additional remuneration from the Department while those that opt not to participate will not be penalised in any way.*
6. *Research may only be conducted after school hours so that the normal school programme is not interrupted. The Principal (if at a school) and/or Director (if at a district/head office) must be consulted about an appropriate time when the researcher/s may carry out their research at the sites that they manage.*
7. *Research may only commence from the second week of February and must be concluded before the beginning of the last quarter of the academic year. If incomplete, an amended Research Approval letter may be requested to conduct research in the following year.*
8. *Items 6 and 7 will not apply to any research effort being undertaken on behalf of the GDE. Such research will have been commissioned and be paid for by the Gauteng Department of Education.*
9. *It is the researcher's responsibility to obtain written parental consent of all learners that are expected to participate in the study.*
10. *The researcher is responsible for supplying and utilising his/her own research resources, such as stationery, photocopies, transport, faxes and telephones and should not depend on the goodwill of the institutions and/or the offices visited for supplying such resources.*
11. *The names of the GDE officials, schools, principals, parents, teachers and learners that participate in the study may not appear in the research report without the written consent of each of these individuals and/or organisations.*
12. *On completion of the study the researcher/s must supply the Director: Knowledge Management & Research with one Hard Cover bound and an electronic copy of the research.*
13. *The researcher may be expected to provide short presentations on the purpose, findings and recommendations of his/her research to both GDE officials and the schools concerned.*
14. *Should the researcher have been involved with research at a school and/or a district/head office level, the Director concerned must also be supplied with a brief summary of the purpose, findings and recommendations of the research study.*

The Gauteng Department of Education wishes you well in this important undertaking and looks forward to examining the findings of your research study.

egards

.

Mr Gumani Enos Mukatuni
Acting CES: Education Research and Knowledge Management

DATE: ...04/02/2019.....

Office of the Director: Education Research and Knowledge Management
7th Floor, 17 Simmonds Street, Johannesburg, 2001
Tel: (011) 355 0488
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Website: www.education.gpg.gov.za

APPENDIX C

C1 Information and Permission letter for Principals

C2 Reply slip for Principals

The Principal

Date _____

Dear _____

Re: Permission to conduct a research study at your school

My name is Anél McDowell. I am currently enrolled for a Master's degree in Augmentative and Alternative Communication (AAC) at the University of Pretoria. As part of this degree requirements I need to complete an independent research study. The title of my study is *"Implementation of unaided augmentative and alternative communication strategies to support learners in South African special schools: A study of teachers' perceptions."*

Upon permission granted by the Gauteng Department of Education to access schools for learners with educational needs (LSEN) to recruit participants for this research. I would be grateful if you could also grant permission to access your school.

Rationale for the study

It is believed that unaided augmentative and alternative communication (AAC) such as key-word-signing or manual signing has a role to play in the educational system and may improve communication skills and support language learning in children with complex communication needs (CCN). Typically, learners with CCN cannot use speech adequately either because it is completely absent or so limited that it cannot meet all of their communicational needs. It is therefore important that teachers can communicate effectively and efficiently with all learners, including those with CCN to provide education through meaningful instructions thereby enhancing the learner's knowledge and skills. However, little research exists with regard to the usage and effectiveness of unaided AAC strategies in the South African school environment. To address such a gap in research, the purpose of this study is to determine the perceptions of teachers towards the use of unaided AAC strategies in the classroom.

What will be expected of the school?

Permission to recruit teachers from your school to participate in the study, will be sought. The teachers will be asked to complete a Communication Questionnaire which include biographical questions and questions regarding the use of unaided AAC strategies to support the educational needs of learners at your school. I will schedule an appointment with the teachers at a time which is convenient for them and which shall not hamper their teaching schedule. It is estimated that it will not take more than 25 minutes to complete the questionnaire.

The following ethical principles will be upheld within this study

- Written consent from all teachers themselves will be obtained prior to conducting the study.
- All teachers will be made aware of their right to withdraw from the study at any point in time without any negative consequences to themselves.

- All information will be kept confidential from those external to the study. No individual or school names will be mentioned in any published data.
- Anonymity of the teachers will be obtained with greater assurance of the protection of their identity, since the researcher is not conducting an interview.
- At no time during participation in the research will the teachers be at risk of any harm.

Who will have access to the results of the study?

The research will be stored in both hard copy and electronic format at the University of Pretoria in the Centre for Augmentative and Alternative Communication for 15 years. The data obtained from the research will be used for writing a Master's dissertation and reused in future analysis. I will provide you with feedback of the findings of the study which you can share with your staff as you see fit, so that they can benefit from their efforts.

What are the benefits of participating in the study?

The benefit of this study is to extend research within the field of AAC and providing empirical evidence towards the perceptions of teachers with regards to the use of unaided AAC strategies in the classroom.

I would appreciate your consideration of this request. Please feel free to contact me or my supervisors if you have any questions about this study. I look forwards to receiving your response.

Kind regards,

Anél McDowell (Researcher)

Prof. Bornman (Supervisor)
Email: juan.bornman@up.ac.za
Tel: 012-4202001

Principal permission: Reply Slip

Name of principal: _____

Name of School: _____

Project title: Implementation of unaided augmentative and alternative communication strategies to support learners in South African special schools: A study of teachers' perceptions

Researcher: Anél McDowell
Master's student
Centre for AAC

Supervisor: Prof. Juan Bornman
Centre for AAC
email:juan.bornman@up.ac.za
Tel: 012-4202001

I, _____
Name and surname

(Please tick box that applies)

☐ Give permission to Anél McDowell to recruit teachers from the school named above for possible participation in the study. This permission is voluntary and I understand that the school may withdraw from the study at any time. We understand that the data will be stored for 15 years at the CAAC and that all data will be treated confidentially and no identifiable information will be reported. We understand that the data may be re-used for analysis.

OR

☐ Do not give permission to Anél McDowell to recruit teachers from the school named above for possible participation in the study.

_____
Principal Signature

_____
Date

Please include school stamp

APPENDIX D

D1 Information and Permission letter for School Governing Body (in case of private schools)

D2 Reply slip: School Governing Body

Governing Body,

(School name and address)

(Date)

To whom it may concern,

Re: Permission to conduct a research study at your school

My name is Anél McDowell. I am currently enrolled for a Master's degree in Augmentative and Alternative Communication (AAC) at the University of Pretoria. As part of this degree requirements I need to complete an independent research study. The title of my study is *"Implementation of unaided augmentative and alternative communication strategies to support learners in South African special schools: A study of teachers' perceptions."*

Rationale for the study

It is believed that unaided augmentative and alternative communication (AAC) such as key-word-signing or manual signing has a role to play in the educational system and may improve communication skills and support language learning in children with complex communication needs (CCN). Typically, learners with CCN cannot use speech adequately either because it is completely absent or so limited that it cannot meet all of their communicational needs. It is therefore important that teachers can communicate effectively and efficiently with all learners, including those with CCN to provide education through meaningful instructions thereby enhancing the learner's knowledge and skills. However, little research exists with regard to the usage and effectiveness of unaided AAC strategies in the South African school environment. To address such a gap in research, the purpose of this study is to determine the perceptions of teachers towards the use of unaided AAC strategies in the classroom.

What will be expected of the school?

Permission to recruit teachers from your school to participate in the study, will be sought. The teachers will be asked to complete a Communication Questionnaire which include biographical questions and questions regarding the use of unaided AAC strategies to support the educational needs of learners at your school. I will schedule an appointment with the teachers at a time which is convenient for them and which shall not hamper their teaching schedule. It is estimated that it will not take more than 25 minutes to complete the questionnaire.

The following ethical principles will be upheld within this study

- Written consent from all teachers themselves will be obtained prior to conducting the study.
- All teachers will be made aware of their right to withdraw from the study at any point in time without any negative consequences to themselves.
- All information will be kept confidential from those external to the study. No individual or school names will be mentioned in any published data.

- Anonymity of the teachers will be obtained with greater assurance of the protection of their identity, since the researcher is not conducting an interview.
- At no time during participation in the research will the teachers be at risk of any harm.

Who will have access to the results of the study?

The research will be stored in both hard copy and electronic format at the University of Pretoria in the Centre for Augmentative and Alternative Communication for 15 years. The data obtained from the research will be used for writing a Master's dissertation and reused in future analysis. I will provide you with feedback of the findings of the study which you can share with your staff as you see fit, so that they can benefit from their efforts.

What are the benefits of participating in the study?

The benefit of this study is to extend research within the field of AAC and providing empirical evidence towards the perceptions of teachers with regards to the use of unaided AAC strategies in the classroom.

I would appreciate your consideration of this request. Please feel free to contact me or my supervisors if you have any questions about this study. I look forwards to receiving your response.

Kind regards,

Anél McDowell (Researcher)

Prof. Bornman (Supervisor)
Email: juan.bornman@up.ac.za
Tel: 012-4202001

School Governing Body Permission: Reply Slip

Name: _____

Name of School, (private): _____

Project title: Implementation of unaided augmentative and alternative communication strategies to support learners in South African special schools: A study of teachers' perceptions

Researcher: Anél McDowell
Master's student
Centre for AAC

Supervisor: Prof. Juan Bornman
Centre for AAC
email:juan.bornman@up.ac.za
Tel: 012-4202001

I, _____
Name and surname

(Please tick box that applies)

☐ Give permission to Anél McDowell to recruit teachers from the school named above for possible participation in the study. This permission is voluntary and I understand that the school may withdraw from the study at any time. We understand that the data will be stored for 15 years at the CAAC and that all data will be treated confidentially and no identifiable information will be reported. We understand that the data may be re-used for analysis.

OR

☐ Do not give permission to Anél McDowell to recruit teachers from the school named above for possible participation in the study.

_____
Principal Signature

_____
Date

Please include school stamp.

APPENDIX E

E1 Information and Permission letter for teachers

E2 Reply slip for teachers

Dear Teacher,

Re: Participation in a survey regarding the use of unaided AAC strategies (manual signing) to support the educational needs of learners in South African schools.

My name is Anél McDowell. I am currently enrolled for a Master's degree in Augmentative and Alternative Communication (AAC) at the University of Pretoria. As part of this degree requirements I need to complete an independent research study. The title of my study is *"Implementation of unaided augmentative and alternative communication strategies to support learners in South African special schools: A study of teachers' perceptions."*

Rationale for the study

It is believed that unaided augmentative and alternative communication (AAC) such as key-word-signing or manual signing has a role to play in the educational system and may improve communication skills and support language learning in children with complex communication needs (CCN). It is therefore important that teachers can communicate effectively and efficiently with all learners, including those with CCN to provide education through meaningful instructions thereby enhancing the learner's knowledge and skills. However, little research exists with regard to the usage and effectiveness of unaided AAC strategies in the South African school environment. To address such a gap in research, the purpose of this study is to determine the perceptions of teachers towards the use of unaided AAC strategies in the classroom. The information gathered in this study will help us gain a better understanding of how teachers use unaided AAC in a school environment, and will also help us understand teachers' challenges and needs thereof.

What will be expected of me should I participate?

The study is aimed at teachers who:

- are teaching at a school for LSEN on a permanent basis
- have at least one year experience teaching learners with special educational needs

Should this apply to you and should you consent to take part in the study, I would like to schedule a meeting with you and other participants at your school. The venue and time will be arranged in consultation with your principal. You will be requested to complete a questionnaire of 20 questions presented to you in a hard copy. It is estimated that it will not take more than 25 minutes. I will be present during the completion of the questionnaire to clarify any questions.

What are my rights as a participant?

Participants in the study is voluntary. You may withdraw from the study at any point in time and all data you contributed will be immediately destroyed.

The responses to the survey will be anonymous, meaning that your name will not appear on the questionnaire. All data will be reported in a way that neither you nor the school's name will be made known.

Who will have access to the results of the study?

The research will be stored in both hard copy and electronic format at the University of Pretoria in the Centre for Augmentative and Alternative Communication for 15 years. The data obtained from the research will be used for writing a Master's dissertation and reused in future analysis. I will provide the school and teachers with feedback of the findings of the study.

What are the risks and benefits of the study?

Kindly note that the questionnaire does not contain any potentially uncomfortable questions and is not aimed at testing your knowledge. Questions are purely based on your experiences and perceptions. The study does not pose any threats or potential harm to you.

The benefit of this study is to extend research within the field of AAC and providing empirical evidence towards the perceptions of teachers with regards to the use of unaided AAC strategies in the classroom.

I would appreciate your consideration of this request. Should you be willing to participate in the study, I would appreciate if you could complete the attached reply slip. Please contact me should you have further questions.

Kind regards,

Anél McDowell (Researcher)

Prof. Bornman (Supervisor)
Email: juan.bornman@up.ac.za
Tel: 012-4202001

Teacher informed Consent: Consent Reply Slip

Name: _____

Name of School: _____

Project title: Implementation of unaided augmentative and alternative communication strategies to support learners in South African special schools: A study of teachers' perceptions

Researcher: Anél McDowell
Master's student
Centre for AAC

Supervisor: Prof. Juan Bornman
Centre for AAC
email:juan.bornman@up.ac.za
Tel: 012-4202001

I, _____
Name and surname

(Please tick box that applies)

☐ Give consent to participate in the study entitled *'Implementation of unaided and alternative communication strategies to support learners in South African special schools: A study of teachers' perceptions",* conducted by Anél McDowell. The consent is voluntary and I understand that I may withdraw from the study at any time. I understand that the data will be stored for 15 years at the CAAC and that all data will be treated confidentially and no identifiable information will be reported. I understand that the data may be re-used for analysis.

OR

☐ Do not give consent to participate in the study entitled *'Implementation of unaided and alternative communication strategies to support learners in South African special schools: A study of teachers' perceptions",* conducted by Anél McDowell.

_____ _____
Teacher Signature Date

APPENDIX F

F1 Expert panel consent letter

Expert panel consent letter

Project title: Implementation of unaided augmentative and alternative communication strategies to support learners in South African special schools: A study of teachers' perceptions.

Thank you for agreeing to provide feedback on my questionnaire as part of my expert panel.

Please complete the following questions with regard to your expertise and experience:

1. What is your role as a communication partner in the support of children/learners with CCN? (i.e. in capacity as speech-language therapist, AAC interventionist or teacher)

_____

2. For what period of time have you been employed in this role? (e.g. 2 years)

_____

3. Please detail your expertise with regard to the topic concerned (e.g. As a speech-language therapist I employ total communication as an intervention in support of children/learners with CCN or alternatively, as a teacher who employ KWS to support learners with CCN within the classroom etc.)

_____

_____

Please confirm through signature that you have granted me, Anél McDowell, permission to apply the comments provided in ordr to make relevant changes to my proposed questionnaire.

_____ _____

Signature Date

APPENDIX G

G1 Questionnaire: Perceptions

QUESTIONNAIRE: COMMUNICATION

The following questions are about the use of manual signing for learners who have learning and language difficulties.
All questionnaires are **completely anonymous**.

Thank you for taking the time to complete this questionnaire.

Please feel free to ask questions for further clarification.

Section 1: Background information

1.1 Date of birth: _____

1.2 Please indicate your gender.

Male		Female	

1.3 How many years (in total) have you been teaching (at any school)?

1.4 How many years (in total) have you been teaching learners with special educational needs at a school?

1.5 Which class are you currently teaching? (e.g. junior special, foundation phase 1, Seniors, etc. any description used at your school)

_____

1.6 How many learners are there in your class?

1.7 How many learners in your register class have complex communicational needs (CCN)? (i.e. their speech is too limited or unintelligible for them to express everything they want to say).

1.8 What is the age group of the learners in your class?

_____

1.9 What curriculum/ program is followed at our school?

_____

1.10 Please indicate your highest formal qualification. Please tick the appropriate block.

Lower than matric	**Matric**	**Teaching diploma/degree**	**Other**

Other, please specify: _____

Section 2: Communication: manual signing

2.1 To what degree do you **use manual signing** within a **school environment**?

	Never	**Seldom**	**Sometimes**	**Frequently**	**Always**
Within the classroom					
Outside the classroom					

Other, please specify? _____

2.2 To what degree do you **use the following strategies,** when using manual signing within your classroom?

	Never	**Seldom**	**Sometimes**	**Frequently**	**Always**
I use signing in a structured activity (e.g. during morning circle time)					
I use signing to support the theme of the week					
I use pre-determined sign(s) per week					
I combine signs with spoken words					
I combine signs with spoken words and pictures					
I use my own made-up signs or gestures					
I use signs for all classroom activities					
I use signs with all learners					

2.3 Please specify any **other strategies** you find useful in the classroom (e.g. sing and sign etc.)?

_____

_____

_____

2.4 Please rate how **<u>useful</u>** you find manual signing to support the following functions at school.

	Never	**Seldom**	**Sometimes**	**Frequently**	**Always**
To support understanding					
To support speech					
To support learning					
To develop language skills					
To motivate learners to communicate in class					
To motivate learners to socialise with their peers					
To control challenging behaviour					
To reduce stress and anxiety					
To prepare learners for future changes (e.g. transition from foundation phase to intermediate phase)					

Any other comments, please specify? _____

_____

_____

_____

_____

2.5 What **motivates** you as a teacher to use manual signing in the classroom?

_____

_____

_____

_____

2.6 Are there any other reasons why you **do not use** manual signing at school?

_____

_____

_____

_____

2.7 Please rate to what extent each of the people in the table below **support** the use of manual signing for learners within your school.

	Never	**Seldom**	**Sometimes**	**Frequently**	**Always**	**Not applicable: Not employed at school**
Speech therapist						
Occupational therapist						
Teaching assistant						
Fellow teachers						
Principal						
Parents						

Comments: _____

_____

_____

2.8 To what degree do you find the following factors a **challenge,** with regard to the use of manual signing at school ?

	Never	**Seldom**	**Sometimes**	**Frequently**	**Always**	**Comments**
I am unsure how to use manual signs within the classroom						
I am unsure of how to create opportunities for learners to use manual signs in the classroom						
I find it difficult to do two things at once e.g. sign and speak						
I find it difficult to make manual signing a habit						
I find other adult communication partners (e.g. teachers, therapists, assistants or parents) do not encourage the use of manual signing						
I do not always have time to use manual signing in the classroom						
I find that the classroom routine hinders the use of manual signing						
I find learners require a minimum level of language understanding to benefit from manual signing						
I find a motor disability hinders the use of manual signing						
I find multi-lingualism hinders the use of manual signing						

Other challenging **factors**, please specify? _____

_____

_____

_____

2.9 To what extent do you think the **media** creates **awareness among the general public** with regard to manual signing?

	Never	**Seldom**	**Sometimes**	**Frequently**	**Always**
Television					
Internet					
Social media (e.g. Twitter)					
Printed media (e.g. newspapers, magazines)					
Radio					

Other, please specify? _____

_____

_____

2.10 To what extent do you think the following **barriers (challenges) hinder the use** of manual signing?

	Never	**Seldom**	**Sometimes**	**Frequently**	**Always**
Limited access to training manuals (resources)					
Inadequate school curriculum/program to support the use of manual signing					
Untrained staff					
High staff turnover					
Lack of support from fellow teachers					
Other training courses more attractive than signing courses					
Lack of support from school management					
Lack of funding to purchase training manuals (resources)					
Stigmatisation (negative reputation) of learners who use manual signing					
Limited time to apply manual signing as strategy in class					
Lack of follow-up (training) to reinforce signing skills acquired					
Limited time for in-service training with regard to manual signing					
Limited on-line resources (internet, u-tube) with regard to manual signing					

Other **barriers**, please specify? _____

_____

_____

2.11 Have you received **training** regarding the use of manual signing to support learning?

Please provide details below.

	YES	**NO**	**Name of course/ program**	**Duration of course/program (How many days?)**	**How often? (Once off, yearly etc.)**
As part of my formal qualification					
Workshop - Tiny Handz					
Workshop – Makaton					
Workshop - South African Sign Language (SASL)					
In-service training sessions at school					
Books/Manuals					
Conferences					
Other teachers					
Speech Therapist					
Principal					
Parent of learner					
Websites					
Other					

2.12 Would you like **further training** in the use of manual signing to support learners in your classroom?

YES	NO

2.13 Are there any **further comments** which may help me to understand your experiences and perceptions regarding the use of manual signing?

_____

_____

_____

_____

_____

_____

_____