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Teacher perspectives on the use of augmentative and alternative communication systems for learners with complex communication needs

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For learners with complex communication needs (CCN), teachers in special schools are encouraged to use a variety of communication techniques to help them participate in various classroom activities. Studies show limited data on the use of effective augmentative and alternative communication (AAC) strategies in special schools. The primary purpose of this study was to describe teacher perspectives on the use of AAC devices that they use in their classrooms in rural areas. We employed a qualitative methodology that included in-person interviews and focus groups. The focus group and face-to-face sessions each had 3 and 8 participants, respectively. Three main themes, namely modes of communication, training, and challenges and 12 subthemes were identified. We found that teachers employed pictures to improve communication of learners with CCN. We also discovered that since teachers didn't use speech generating devices (SGD) frequently, they had trouble using them. The use of SGDs, one of the assistive technology tools that could be used to improve communication of learners with CCN, requires extensive teacher training, according to research. Further research is required to establish the efficacy on the use of AAC devices in special schools in rural areas.

Keywords: AAC tools; augmentative and alternative communication; classroom practice; complex communication needs; qualitative; rural areas; special school; special school teachers; teacher perspectives; training

Introduction

Learners with complex communication needs (CCN) have challenges encompassing a wide range of physical, sensory, and environmental needs that restrict their individual independence in thoughts, feelings and needs (Da Fonte & Boesch, 2019). To enhance their communication, participation and socialisation, learners with CCN can benefit from the use of augmentative and alternative communication (AAC) (Da Fonte, Boesch, Papp & Mohler, n.d.). Teachers are positive towards the use of both low and high AAC technology devices (Aldabas, 2017), although there is limited data on the implementation of aided AAC (Tönsing & Dada, 2016). Research shows minimal levels of training as a challenge for not using the AAC devices despite the benefits that these have for learners with CCN (Da Fonte et al., n.d.). The lack of training special school teachers leaves learners with CCN without expert guided interventions (Simacek, Wattanawongwan, Reichle, Hyppa-Martin, Pierson & Dimian, 2021). With this research we attempted to address the knowledge gap in terms of the use of AAC devices by teachers with learners with CCN in special schools in rural areas.

Literature Review

The literature review outlines the following: learning difficulties typical of learners with CCN; communication difficulties that warrant the use of AAC devices; and existing research evidence of the effectiveness of different aided AAC devices for learners with CCN.

Learning difficulties typical of learners with CCN

Learners with CCN struggle with communication because their natural speech cannot meet their daily communication needs (Simacek et al., 2021). These challenges negatively affect proficiency in classroom participation, managing time, and interacting with peers (Meeks, 2017). If learners with CCN have access to AAC, they can use AAC to create and exchange communication with anyone (Manoharan, Jose & Saji, 2022) and can gain from the assistance provided by AAC devices (Dulay, 2022; Simacek et al., 2021).

Communication difficulties that warrant the use of AAC devices

Some learners with CCN find it difficult to make friends, to understand social cues, and to make eye contact during interpersonal communication with peers, teachers, parents, and caregivers (Louiza & Christopoulou, 2017). Communication of these learners can be enhanced using AAC, which can be described as any tool, device, picture, word, symbol or gesture of which the purpose is to either supplement or completely substitute the communication of the learner with CCN (Berenguer, Martínez, De Stasio & Baixauli, 2022; Boon, 2016; Singh, 2015). Learners with CCN may be well supported and benefit from assistive devices that use high-tech or low-tech AAC as well as unaided or aided AAC devices (Ganz, Hong, Goodwyn, Kite & Gilliland, 2015; Valentino, LeBlanc, Veazey, Weaver & Raetz, 2019).

Existing research evidence of the effectiveness of different aided AAC devices for learners with CCN

The use of unaided low-tech, aided AAC such as picture exchange communication system (PECS), and high-tech speech-generating devices (SGDs) prove to be successful in enhancing communication of learners with CCN

(Sennott, Crest, Fogarty, Hix-Small & Ferrari, 2017; Valentino et al., 2019). Through the use of PECS, some learners with CCN have increased their initiation of verbal behaviour, play and social functioning and this has fostered oral speech and language development (Louiza & Christopoulou, 2017), and has proven to enhance comprehension and expression of learners with CCN (Ganz et al., 2015).

Methodology

Research Design

A phenomenological qualitative research design was used to gain a rich understanding of teachers'

perspectives on the use of AAC devices for learners with CCN in special schools in rural areas.

Participants

Participants were purposively sampled from the teaching staff of four special schools in rural areas. The special schools were in two districts of the Limpopo province, South Africa. The participants in the study (seven female and one male) taught, among others, learners with CCN. For access to conduct research in special schools in the rural areas, written permission was sought from the District Directors of Capricorn and Lebogakomo in the Limpopo province.

Table 1 Participants' ages, qualifications and teaching from highest to lowest number of years of teaching (pseudonyms used)

| Participant | Age group | Qualifications | Teaching experience | Focus group participant codes |
|-------------|-----------|---|---------------------|---|
| Ms Maepa | 56–60 | Junior Primary Teachers Diploma (JPTD), Diploma in Special Needs Education | 26–30 | Focus group male Participant 1 (FGM1) |
| Ms Mashao | 51–55 | Senior Primary Teachers Diploma (SPTD), Bachelor of Education Honours degree (BED Hons) | 26–30 | Focus group female Participant 1 (FGF1) |
| Ms Sonti | 51–55 | JPTD | 21–25 | Focus group female Participant 2 (FGF2) |
| Ms Letebele | 51–55 | JPTD, Bachelor of Arts (BA) | 21–25 | |
| Ms Lebeko | 51–55 | SPTD, BED, Advanced Certificate in Education (ACE) (Education Management) | 21–25 | |
| Mr Booi | 46–50 | SPTD, BED Hons | 15–20 | |
| Ms Maala | 46–50 | BED Hons, Higher Diploma in Education and Training (HDET) | 11–15 | |
| Ms Maphutha | 41–45 | SPTD, ACE in Inclusive Education | 11–15 | |

Data Collection Tools

The same interview guide was used to collect data from the face-to-face and focus-group discussions. Five semi-structured open-ended questions which allowed probing participants' perspectives on the use of AAC with learners with CCN were asked: 1) What role do you play in enhancing communication of learners with CCN? 2) What strategies do you use to implement augmentative and alternative communication? 3) How do you use these strategies to implement augmentative and alternative communication? 4) In your opinion, how are learners with CCN benefitting from the AAC assistive devices? 5) How do you deal with challenges that you experience when using the AAC assistive devices?

Unstructured classroom observations and a free description of what transpired in the classrooms using field notes were also used to gather a wide range of information. One classroom observation of 30 minutes each was conducted in eight classrooms.

A digital audio recorder was used to capture participants' perspectives during the observations.

Data Analysis

Data collected were transcribed verbatim and analysed using thematic analysis (Braun & Clarke, 2006). During the analysis, six themes were identified: modes of communication, making requests, training, stakeholder involvement, reason for success, and challenges. These were based on the frequencies of participants' responses to the questions posed. Based on the frequencies of the initial datasets, AAC modes, making requests, challenges experienced, and training were regarded as major themes (cf. Figure 1). Stakeholder involvement and reasons for success that emerged from one participant's response to Question 1 were regarded as minor themes. To arrive at the final refinement (cf. Figure 2), visual representation in sorting different codes into themes during a recursive process to fit codes and data segments was used.

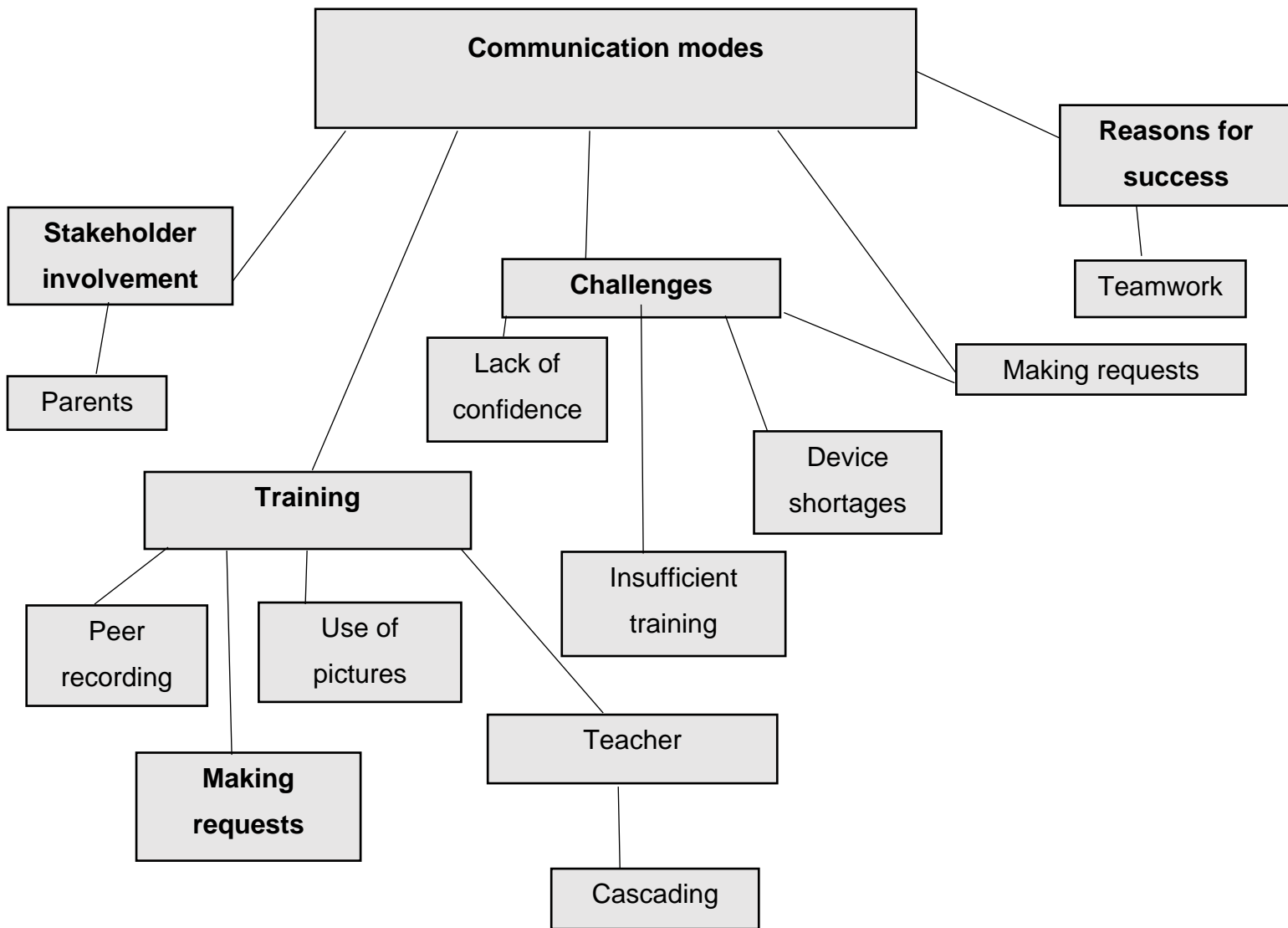


Figure 1 Thematic map showing six initial themes of the study (adapted from Braun & Clarke, 2006)

After refinement of the themes using a thematic map, three main themes emerged: AAC

modes, training, and challenges – each theme with sub-themes.

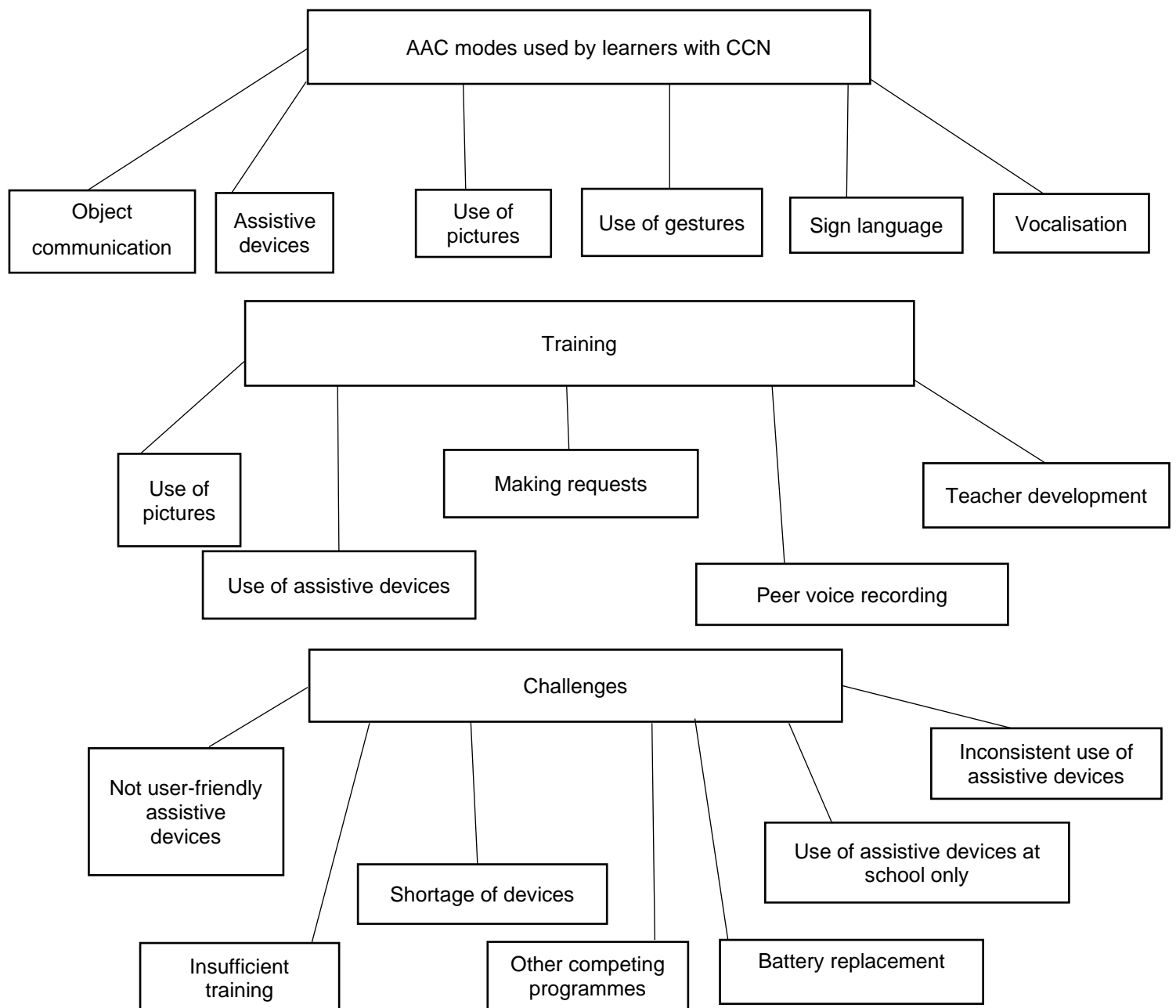


Figure 2 Refined thematic map showing three main themes of the study (adapted from Braun & Clarke, 2006)

Ethical Consideration

An ethical clearance certificate was granted by the University of Zululand Research Ethics Committee (UZREC). Letters were written to gatekeepers to seek permission to conduct the research. Participants signed voluntary informed consent forms to take part in the study. Pseudonyms were used to protect participants' identity and they were guaranteed confidentiality of information provided. Participants were assured of the absence of non-physical, emotional, and social harm in the study. Participants were not in any way deceived to participate in the study.

Findings

The findings of our study are presented and discussed under the three main themes as indicated above.

AAC Modes Used by Learners with CCN

Different modes of communication were repeatedly mentioned by the participants during the interviews. Modes of communication included the use of SGDs, pictures, manual sign language, symbols, and vocalisation.

The use of GoTalk (SGD) as an AAC tool was mentioned several times. GoTalk was used

interchangeably with devices and assistive devices with messages being recorded in the message locations of the devices. Some of the participants appreciated the use of GoTalk, as indicated below.

Ms Maala: *If it was not for a GoTalk, it was going to be difficult teaching through problem learners.*

Ms Sonti: *Eh, we use pictures, the message block, and when they, let's say we put a toilet paper there, a toilet paper ... the teacher with toilet, then she, the learner will press [on] the thing that they see. ("The message blocks" mentioned in this study refer to the message locations of the speech-generating devices.)*

Ms Maepa: *Hmm, for me to be able to go teach with learners with autism, I use different methods ... some methods I'm using devices, AAC devices.*

Assistive technology devices were also considered during classroom activities.

Mr Boo: *Like if you are teaching them transport, and you put a picture of a car on the board ... and then you say what is this? What is this? The learner will just press at the car.*

Ms Lebeko: *I'm going to give the learner a device [so] that the learner will take part during the lesson.*

Ms Lebeko: *Isn't that this device is made to, to, to help the learner communicate ... for instance, if I take the chart and I say good morning, the learner cannot say good morning ... I give him the devices and show him you need to press this and, ... so that you partake in that particular lesson.*

The use of pictures to enhance communication when using speech-generating devices also surfaced. Some of the participants indicated that it would be difficult to identify what was recorded in the message locations without the use of pictures.

Ms Maala: *If you record without pictures, they won't know what is in that block.*

FGF2: *We must use pictures, for you to know this message, you must use the pictures ... without pictures I cannot recognise where I did record 'how are you.'*

FGF1: *Pictures, the learner is able to, to know that block is for 'good morning', this one is for 'thank you', to help the learner.*

Some of the participants indicated the use of pictures without linking them to the use of speech-generating devices. Learners were said to be able to use pictures when making requests to visit the bathroom. This shows that it was easier and more efficient to use picture communication in certain circumstances. However, learners with CCN were also able to use SGDs.

Ms Maphutha: *O kgona o tla a chuza ... mo la bathroom go re ke nyaka go ya bathroom. (The learner comes and chooses the bathroom for him to be allowed to visit the bathroom).*

FGM1: *To add to what they are saying ... even when we don't use the assistive devices, we can still use pictures. As long as there is a picture there, then, the learner will come and point to the picture. If he wants to sleep, he will point to a picture of someone sleeping.*

This shows that not only assistive technology devices can be used, but other means of communication as well. To ease learning with

pictures, Velcro was used during story reading to attach pictures to the communication apron worn by the teacher.

Some learners resorted to gestures and manual sign language due to diverse challenges that included difficulty in fine motor skills.

To touch here, I know they need a tissue ... and again to touch here ... I know they don't need a tissue. (Ms Mashao, demonstrating the touching of the bum and the inside part of the thigh respectively).

Understanding the use of gestures, which are often unique ways of communication not necessarily understood by other people, enhanced communication and understanding between teachers and learners. Gestures were also used to agree or disagree: *"Hmmm ... for yes or no answers, sometimes they use head nodding, they shake the head when saying 'no' and again they shake head when saying 'yes.'"*

Ms Sonti: *Hmmm, I'm using gestures (long pause) ... gestures and (long pause) devices, communication devices.*

Teachers also used Makaton (making gesture while speaking) to enhance communication with learners with CCN.

FGF2: *Even sign language when talking to them ... basics from sign language, not sign language as a whole. (The participant referred to gestures when saying "not sign language as a whole.")*

Some of the learners did not use any of these AAC, but just did what they desired to do.

Ms Lebeko: *When they need to get some water or to, to the bathroom ... maybe once or twice a day ... she can use the device ... but most of the time she just stand up and leave to the bathroom.*

Real objects were also used to make learners understand what was being communicated.

Ms Letebele: *They help them a lot because, if I'm teaching them about the fruit, I will come with the fruit and show this is an apple. If I teach by using something like a picture, I always show them, this is a cat, this is a pen ... and then he, you show them in the picture, maybe you have a real object of a cat.*

FGF1: *I will bring, I will bring the, let's say apple, and bring them an apple, and can bring oranges and bring whatever, as long as whatever [is] available ... when the speaking learners give answers, then that one or those who are not [speaking] will take the, the object and show.*

Training Learners to Make Requests

Training by their teachers was key to enable learners to communicate using the AAC device tools. Training was said to have enabled learners with CCN to make requests from people around them. Training was based on messages recorded by peers.

Ms Maala: *You just record it 'wash your hands, wash your hands' and then the learner will just, you show the learner, you train the learner to press that button ... Let's say you ask them a question in class ... good morning learners, and they answer you, good morning teacher. The other one who doesn't have speech ... is going to press when they are going to answer.*

Ms Lebeko: *First of all, I train the learner ... yeah, I say you see, this is your way of communicating ... yeah, then when you sing, you have to press this, then the voice will come out for you to participate.*

The trained learner was given the opportunity to listen to the voice before the lesson started.

Ms Lebeko: *'So, before we can start with the lesson, I even give her a chance to listen to the voice.'* Peer voice recording was emphasised by most of the participants.

Ms Sonti: *I (long pause), I record, I record voices for other learners more or less their age, then that's the one that speak on their behalf ... yeah, then when it comes to them, ... they're able to communicate.*

Recording of peer voices was supplemented by using pictures.

Ms Maala: *Eh, in recording, you must make sure that even the requesting is there ... if you record without pictures, they won't know what is in that block.*

Drilling of learners in that regard was critical, as Ms Maala maintained: *"More ways or more teaching ... again, again I teach that thing."*

There was some discussion about whose voice should be recorded for the voice output from the speech-generating devices in order to enhance communication of learners with CCN.

FGF1: *I cannot record those, those who do not have speech because they don't speak at all. I can't record them. I use the one[s] who have speech to record on behalf of those who do not have speech.*

FGM1: *You know when you take them by groups ... it also teaches these learners that they must share ... for 3 minutes the gadget will be used by this learner ... if 3 minutes lapses, it must go to another one.*

However, during all classroom observations, the use of the SGDs was not effectively demonstrated by the few who tried to use them. This depicted a serious gap in the purpose of the use of the speech-generating devices, because teachers were only able to explain verbally how the devices should be used.

Challenges

In contrast to the account of speech-generating devices as tools to enhance communication of learners with CCN, some of the participants described their dissatisfaction with the tools.

Ms Sonti: *They are not user-friendly. Even, even GoTalk 20 plus ... GoTalk plus is not user-friendly to our, our children.*

In some instances, the devices were complex to use. *"The only one we have is top that is why they say they don't correlate with, with their kids"* (Ms Sonti). The same idea of assistive devices not being user-friendly was shared, coupled with a misunderstanding on the use of the SGD provided for use by learners in special schools in rural areas.

Ms Mashao: *I thought the Go Talk is the same as the braille machine. In braille machine, that machine doesn't allow the, the teacher ... to do anything ... to type or do anything.*

This was a clear indication that some of the devices were unknown to the teachers, so the devices

remained unused. When the teacher was unclear on how to use the device, it was clear that it would be impossible for him/her to train the learner with CCN to use the device. Teachers were also not using the devices often because of the administration difficulties they experienced when they needed to replace the batteries, which resulted in having to abandon the devices.

Mr Boo: *Yeah, we don't use them more often because they are still new to us but, yeah (long pause) is like they need batteries every now and then and we have to do requisition for batteries, and you know the process ... yeah, will take very long time.*

A lack of skills and limited training on the use of assistive devices were also serious challenges.

Ms Letebele: *Hai, we have it, we didn't use it. I don't have enough knowledge about them ... to go to the workshop, they just teach us while running ... they are looking for time, so when we come back we forgotten.*

FGF1: *They did workshop us on using assistive devices, but I don't think it was enough ... yeah, because the, they will just pick few educators, maybe two per school to attend the workshop, the rest will just remain in the school.*

Ms Letebele: *Some electronic and non-electronic devices are difficult to operate, as one [is] not well conversant with [them].*

FGM1: *Like I said, is only few educators that have attended the workshop ... the rest didn't attend, and cannot operate these gadgets.*

A shortage of assistive devices created a negative impact on the use of devices to enhance communication.

FGM1: *They are not enough, that is why I say the school cannot afford to buy them, so we just relying on those ones the suppliers from the department; if they give you, sometimes they give you three....*

Peer learner voice recording posed a further challenge to some of the participants.

Ms Lebeko: *When coming to recording, when as a teacher I'm not supposed to record that, I'm not of the age of that particular learner ... it becomes problematic to find a, a learner who can, of justice to record that.*

The inability of learners with CCN to communicate using assistive technology devices added to the challenges experienced in the classroom instructional practices, as well as social communication in the school environment.

Ms Letebele: *Sometimes I'm frustrated when I, when I look at them, I don't know where to start with her.*

FGF2: *Is so frustrating when the learner doesn't know how to communicate to you, as a teacher doesn't know how to communicate with the learner.*

The level of the assistive devices also posed serious challenges.

FGM1: *It differs with the age group of learners because learners who are 6 to 9 years, they won't be able to use Go Talk 64 ... it is too big for our learners, taking into account their level of understanding.*

FGF1: *I remember in the beginning I used Go Talk 20 plus...it was difficult for the learner since they are many blocks.*

There was lack of continuity between the school and home environment as the learners were not allowed to take the assistive devices home.

Ms Maala: *The parents of these learners or family of these learners...must know these devices.*

FGM1: *We encourage them to do what we are doing at school except when we are talking AAC devices, we cannot, we can't ... no, we can't. They must know that their learners are using these gadgets, but the problem is that we cannot give the gadgets to the parents to use at home.*

A suggestion was made to have parents buy the gadgets on their own so that their children could continue using the devices even after school to alleviate the challenges of having to start afresh every time learners had to use the devices.

FGF2: *Eish, it's not good. We start afresh every time when they came back from holidays. Is unfortunate that the parents cannot afford to buy them. Even if they can afford, according to the information I have, these devices are only bought by the person who is having a licence.*

Other learning activities, besides learning language, were regarded as competing activities that contributed to failure in using the assistive devices.

Mr Booi: *Yeah, remember, remember, this is a school ... there are other things to do beside learners' education ... instead of teaching them languages, we still have to teach them maths. They have to go to the ground and do sorting activities and the like.*

Learners with multiple disabilities in the same class added to the challenges experienced by special-school teachers in rural areas.

Mr Booi: *Their level of disability is not the same ... there are those learners who cannot even utter a word ... you know they just say 'ahaha, ahaha' and you cannot even understand what this learner is saying.*

Ms Lebeko: *Eh, according to me ... if possible, these learners were supposed to be in their own class alone ... so that when facilitating lessons, you know exactly where to. You see in our classes we have multi-disabilities ... for others you need to write, others can communicate, others cannot, others are hyperactive ... and it becomes problematic for you to offer the lesson considering ... accommodating all the conditions.*

Challenges were dealt with in different ways.

Ms Maala: *You must repeat the same thing every time.*

Ms Lebeko: *Most of the time I just try to remediate that learner on the unknown ... just ask the teacher-aide to teach the other learners so that I can attend this one alone.*

Ms Mashao: *Uh ... I invite the principal and also other teachers ... in operating the Go Talk 20.*

Ms Sonti: *Eh, sometimes I ask the other one ... and say how do you operate this thing ... then we work as a team, we help each other.*

Discussion

The purpose of this study was to describe teacher perspectives on the use of AAC devices in their classrooms in rural areas. Teachers play an integral part in enhancing communication of learners with CCN as well as the development of learners in their day-to-day lives during classroom instructional practices.

AAC Modes Used by Learners with CCN

The findings of this study describe different AAC modes used by learners with CCN. These modes were revealed during classroom observations: some tried to use pictures, vocalisation and gestures while a few used the SGD. This is consistent with previous work showing the use of vocalisation, gestures, the PECS, and the use of symbols, pictures and speech-generating devices (Gopalan & Piking, 2016; Kidder & McDonnell, 2017). The findings indicate that pictures are key in the use of SGD, a high-tech aided AAC mode of communication, to prompt learners with CCN to press the message location for the voice output of their desired needs. The message locations could have pictures of the bathroom, food, a glass of water, fruit, or any picture based on the high frequency activities the learners are exposed to. Without pictures in the SGD locations, the teachers and learners with CCN may not recognise where a particular message has been recorded. The picture stimuli enable learners with CCN to know what has been recorded in the message locations.

To enable learners with CCN to use the SGD, training of the teachers is critical, preceded by voice recordings made by peers of the same gender. The findings of the study reveal that through training, learners were able to express themselves using different AAC modes mediated by their teachers. This is consistent with previous work showing AAC affording learners the ability to use different modes of communication, which included speech, gestures, sign language and PECS (Aldabas, 2017; McDonald, Battaglia & Keane, 2015).

The findings of this study reveal that drilling of learners with CCN in the use of SGD, that is choosing the desired picture, pressing the device's message location, the teacher responding to the voice output message and rewarding or complying to the request made. This study also reveals that learners with CCN could be taken in groups sharing the use of SGD for 3 minutes each and then passing it to another learner. This revealed less time to practice using the SGD. Ideally, each learner should have a device assigned to him or her in order to customise the use of that device.

A further finding of this study was that gestures ("not sign language as a whole") and objects were used to enhance communication. One of the participants indicated bringing real objects, for

example, fruit such as an apple, to class for learners to understand.

The findings of this study also reveal challenges experienced by teachers and learners. Some of the participants indicated their dissatisfaction with the devices, especially GoTalk plus, indicating that it was not user-friendly for learners with CCN. Furthermore, the results indicate information sharing instead of in-depth training on the use of different devices such as the GoTalk series. The training from the service providers could not bear much fruit in that there was no follow-up support from districts and circuit offices.

Operating the assistive devices was also a serious challenge. The results show reluctance to use the devices, and when devices were used, they were not constantly used by teachers and learners. Low and middle-income countries have shown limited use of AAC due to limited healthcare services and education, and technology resources not prioritised by the government (Muttiah, McNaughton & Drager, 2016). Trained teachers had difficulty cascading the information to their peers as they were not fully conversant with what to transfer to colleagues. This could be the result of inadequate training of teachers or a lack of accountability sessions in the school. Most participants understood how to use the SGDs but could not put that into practice during classroom instructional activities. A lack of skills and inadequate training of teachers on the use of SGDs also led to the abandonment of the devices.

One participant thought that the SGD was similar to a braille device. It was clear that the teacher did not know the device and how to operate it. Another challenge was that devices were less often used due to a long process in procuring batteries to operate the SGDs. This also reveals how ineffective management could lead to the non-use of the devices supplied to special schools. The findings of the study highlight the negative impact created by the shortage of assistive devices. The participants indicated that not enough devices were supplied for use by learners with CCN, while those that were supplied included GoTalk 64, of which the difficulty of use exceeded the learners' understanding and abilities.

The ages of the participants could be a contributory factor in the failure of using the devices often. We assume that it could be strenuous for elderly participants to play around different operations of the SGD. For instance, putting in and replacing batteries, switching the device on and off as well as recording and deleting messages from different message locations and levels.

Their professional qualifications (cf. Table 1) contributed to the participants' understanding of the use of the SGD although they could not use the devices regularly during classroom instructional practice. In addition, the study also indicates the

need for parents of learners with CCN to be trained on how to use the devices to enhance their use while the learners are at home. However, it is worth noting that learners were not allowed to take the devices home, which meant that learners with CCN could not use the device for communication at home. A need also existed to separate learners according to disabilities in order to enhance lesson facilitation by different teachers.

Limitations of the Study

The results of the study are based on a small number of participants who described their perspectives on the use of AAC devices for learners with CCN in special schools in rural areas. This was a small study which does not allow generalisation. The study was dominated by a single ethnic group in terms of participants (that is, eight Sepedi-speaking participants and one Xitsonga-speaking participant), only four special schools and the limited locations of the schools (villages dominated by the use of Sepedi). Another limitation of the study was that the observations were only conducted for 30 minutes in each of the eight participants' classrooms.

Conclusion

Participants responded to the research question, "What are teacher perspectives of the AAC devices that they use in their classrooms?", which culminated in the research findings. Participants indicated having used diverse AAC modes for learners with CCN, which included natural sign language, vocalisation, gestures, objects, speech-generating devices and picture systems. They highlighted the need for intensive continuous professional development in the use of speech-generating devices during classroom instructional practices. Failure to continuously use the devices also emerged, strengthening the need for further training of special school teachers in rural areas. In their responses, participants highlighted the need for the supply of age-appropriate speech-generating devices.

The following recommendations are made:

- a) Special-school teachers should be trained for their role in enhancing communication of learners with CCN.
- b) They should be appropriately and effectively trained on the selection and use of the AAC devices.
- c) Age-appropriate devices should be supplied to special schools with learners with CCN.
- d) Learners with CCN should be trained in the use of SGDs.
- e) District officials should support and monitor the use of SGDs for needy learners to ensure that learners use the SGDs to enhance their communication.
- f) Learners with CCN should each receive his/her own device to allow communication away from school.

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Authors' Contributions

SPM conducted the participants' interviews, wrote the manuscript and provided data for Table 1, Figures 1 and 2; DRN provided support and guidance. Both authors reviewed the final manuscript.

Notes

- i. Published under a Creative Commons Attribution Licence.
- ii. DATES: Received: 1 March 2021; Revised: 31 May 2023; Accepted: 16 July 2023; Published: 30 November 2023.

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