

Stakeholder Validation of a Sepedi Core Vocabulary List as a Resource for Augmentative and Alternative Communication

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Abstract

Purpose: The development of culturally and linguistically appropriate resources to support communication interventions for underserved communities is an urgent necessity. The purpose of the study was to obtain stakeholder feedback on vocabulary items from a Sepedi core vocabulary list developed as a resource for vocabulary selection for augmentative and alternative communication (AAC) systems, and to expand the list based on stakeholders' vocabulary recommendations.

Method: A questionnaire was used to obtain the ratings of 57 stakeholders regarding the importance of including 155 Sepedi words from the Sepedi core vocabulary list on an AAC system for a child with receptive language skills at the level of a 4-year-old or higher. Stakeholders also suggested additional words to include on the system.

Results: All words were rated as important or very important. However, there was a statistically significant inverse relationship between the average frequency of occurrence of words belonging to a specific category and the average importance rating that stakeholders assigned to words in that category. A total of 48 words were additionally suggested by three or more stakeholders.

Conclusion: Stakeholder ratings validated the list as relevant to consult in vocabulary selection for Sepedi AAC systems for children. Stakeholder-suggested words may be a useful supplement to this list.

Keywords: Augmentative and alternative communication, children, core vocabulary, Sepedi, stakeholder validation, vocabulary selection.

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The development of equitable and appropriate communication interventions that serve marginalised and underserved communities is a persistent concern in the field of communication disorders (Kathard & Pillay, 2013; Penn et al., 2017). In many countries across the world, colonial histories have contributed to unequal health service provision and health disparities, as well as a disregard of cultural and linguistic identities in the design and implementation of health interventions (Griffiths et al., 2016). This is also the case in South Africa, where linguistically and culturally appropriate communication interventions including augmentative and alternative communication (AAC) interventions are not available for the majority of the African population (Dada et al., 2017; Kathard et al., 2011; Pascoe & Norman, 2011; Pillay et al., 2020). Addressing such inequalities requires not only the extension of access to services and the design of linguistically and culturally appropriate resources, but also a redefinition of the role of the service provider from expert to co-learner and co-labourer alongside the individuals, families and communities whom they support (Kathard & Pillay, 2013).

Vocabulary selection has been described as one of the most challenging aspects of providing augmentative and alternative communication (AAC) interventions (Bean et al., 2019; Beukelman & Light, 2020). Children without disabilities acquire vocabulary within the first few years of life without much special instruction other than being exposed to proficient speakers of their home language (Tomasello, 2003). In contrast, children in need of AAC are dependent on others to make a symbolic form of expression available to them, for example, by providing them with graphic symbols representing words and messages on a

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communication board or speech generating device (SGD) (von Tetzchner, 2015). This vocabulary should be appropriate, relevant, and motivating; allow the child to meet immediate communication needs and also allow for expressive language growth (Bean et al., 2019; Beukelman & Light, 2020). It should also allow partners to model the use of this vocabulary in the chosen modality (e.g., graphic symbols) (Biggs et al., 2018; Senner et al., 2019) at the same time, the number of vocabulary items made available on a graphic symbol-based AAC system should not exceed the memory and navigation capabilities of the child. The demands of memorising and navigating to the locations of a large number of vocabulary items should likewise not exceed the gain of producing a specific utterance (von Tetzchner et al., 1996). It is clear that a manageable pool of well-chosen words is needed.

Contextual, linguistic and cultural factors need to be meticulously considered in the selection of vocabulary for AAC systems (Collin Stone, 2019; Mngomezulu et al., 2019; Soto & Cooper, 2021; Soto & Yu, 2014). Although the notion of universal semantic primes proposes that all languages encode at minimum a basic set of common meanings (Wierzbicka, 1998), the limited overlap in direct translation pairs across languages (Kilgarriff, 1997) suggests that semantic surface structures differ significantly between languages, and word-for-word translations between languages are rarely possible or meaningful. For AAC systems, therefore, a language-appropriate vocabulary is needed rather than a translation of vocabulary from systems devised for other languages. The development of core vocabulary lists in various non-English languages (including historically under-resourced languages of indigenous people) has been one attempt to develop linguistically appropriate vocabulary resources for non-English AAC systems (Mngomezulu et al., 2019;

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Mothapo et al., 2021). While the concept of a core vocabulary seems to have originated in the field of language teaching (Carter, 1987), it is generally used in the field of AAC to refer to words that are frequently and commonly used by various individuals (Laubscher & Light, 2020). Although operational definitions of core words differ somewhat across studies (Laubscher & Light, 2020), most lists are based on frequency and commonality analyses of words collected through natural language samples (Soto & Cooper, 2021). Core vocabularies typically contain a relatively small pool of unique words (typically around 200-250) that are reused frequently across speakers and contexts to cover about 80% of conversations (van Tilborg & Deckers, 2016; Witkowski & Baker, 2012). Core vocabularies also typically include various structure words (also termed function words), such as prepositions, auxiliary verbs and pronouns. These words have a grammatical function – they provide the grammatical framework around the content words (words that carry semantic or lexical meaning) and they are important for sentence construction. When a core vocabulary is combined with personalized fringe vocabulary, such a core-fringe-based AAC system can give access to the construction of novel utterances (Soto & Clarke, 2017, 2018). Although questions have been raised about the suitability of core vocabulary as a resource for vocabulary selection of beginning communicators (Laubscher & Light, 2020; Soto & Cooper, 2021), reports from clinicians have indicated that core vocabulary is often incorporated when constructing more complex communication systems for children with more advanced receptive language development (Dada et al., 2017; Lund et al., 2016; Murray et al., 2019; Thistle & Wilkinson, 2015).

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A Sepedi core vocabulary list was recently established (Mothapo et al., 2021) based on a word frequency and commonality analysis of spoken language samples. Sepedi is one of the 11 official South African languages, and is currently spoken as a first language by an estimated 5.5 million South Africans (Statistics South Africa, 2012; World Population Review, 2022). According to Mothapo et al. (2021), extrapolations from South African population statistics as well as estimates from the South African Department of Education (2011), combined with estimates of incidence of severe communication disability suggest that about 20 000 children in South Africa may benefit from a Sepedi AAC system. The Sepedi core vocabulary comprises of a list of 226 orthographic words that were used with a frequency of at least 0.05% and by at least three of the six preschoolers from which the samples were collected. These core words covered 88.1% of the recorded speech. Of the 226 words, 144 were classified as content words – that is, words carrying a lexical meaning (verbs, nouns, adjectives and adverbs). The remaining 82 words were designated as structure words – words that primarily have a grammatical rather than lexical function. These included interjections, pronouns, prepositions, conjunctions, concords as well as various morphemes and particles.

While a core vocabulary list based on natural language samples can be a language-authentic resource for AAC vocabulary selection, the use of natural speakers as reference point for the design of graphic symbol-based AAC systems can be problematic (Gerber & Kraat, 1992; Laubscher & Light, 2020; Smith, 2018). Such an approach may deny the unique challenges associated with communicating using a modality that is very unlike spoken language (Smith, 2006; von Tetzchner, 2015). It may also exemplify the Western (colonial)

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medical model and an ableist approach of attempting to normalise the communication of persons in need of AAC. Stakeholder involvement in the design of AAC systems may be able to mitigate somewhat against these threats, as systems are designed with and not merely for persons who may directly and indirectly benefit from them (Amery et al., 2020; Collin Stone, 2019). Stakeholder involvement has the potential to result in socially valid AAC interventions, resources and systems that are experienced as important, meaningful, acceptable and appropriate by those who directly and indirectly benefit from them and/or are involved in these treatments (Schlosser, 2003). The involvement of stakeholders and informants such as parents, teachers and speech-language pathologists (SLPs) specifically in vocabulary selection for AAC systems has long been advocated (Beukelman et al., 1991; Morrow et al., 1993), and one previous study obtained stakeholder validation of a word list established for persons who require AAC to disclose abuse (Bornman & Bryen, 2013).

Stakeholders have also been asked to generate vocabulary. Morrow et al., (1993), for example, asked informants (i.e., teachers, speech-language pathologists and parents) to select vocabulary for school aged children with severe communication disorders using a blank page approach and a categorical inventory, and compared these approaches to their selections from a vocabulary checklist. Contributions differed amongst informant groups and also differed depending on whether informants used a checklist, a categorical inventory or a blank page approach. Informant-selected vocabulary is typically not regarded as core vocabulary, as it is often chosen for a specific individual. Also, informants tend to select many specific nouns and other content words (Balandin & Iacono, 1998; Dark & Balandin, 2007), and omit less specific words and structure words. However, in view of some of the potential shortcomings

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of core vocabulary lists based on language samples for speaking individuals and the lack of developmental data on vocabulary acquisition of children using AAC, informant contributions are still regarded as important and as a valuable addition to other sources of vocabulary (Beukelman et al., 1991; Beukelman & Light, 2020).

The aim of the current study was twofold. Firstly, the study aimed to validate ratings from stakeholders on 155 items from the Sepedi core vocabulary list established by Mothapo et al. (2021). Secondly, the study aimed to expand on the vocabulary selection resources for Sepedi children in need of AAC by asking stakeholders to suggest additional words that would be important to include on an AAC system for a child from a Sepedi language background in the foundation and intermediate phases of education (Grades R to 6), aged about 4-12 years, with receptive language skills at the level of a 4-year-old or higher. This work sought to acknowledge the need for language-authentic AAC resources that are not mere translations from English, as well as the need for stakeholder involvement in the design of AAC interventions, resources and systems as integral to ensure their social validity (Amery et al., 2020; Schlosser, 2003).

The study had the following objectives: (1) to describe stakeholder ratings of 155 core vocabulary items regarding the importance of including these items on a Sepedi AAC system for children in the foundation and intermediate phases of education, including comparisons of ratings across stakeholder groups and word categories, (2) to compare stakeholder ratings to frequency counts of words and categories as established in the study by Mothapo et al., (2021) in order to determine whether there was any relationship between the measure of importance assigned to the word and the frequency with which it occurred, and (3) to identify

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and describe additional words and categories frequently suggested by stakeholders for inclusion on such an AAC system.

Method

Design

A quantitative non-experimental descriptive survey design was used in this study (McMillan & Schumacher, 2010). Stakeholders were asked to rate 155 core words (content words and interjections) on a 4-point Likert scale using a questionnaire. They were also asked to suggest additional words that would be important to include on a Sepedi AAC system for children in the foundation and intermediate phases of education, aged about 4-12 years, who had comprehension skills that were at the level or higher than those expected of a 4-year-old.

Participants

Prior to data collection, the study was approved by the ethics committee of the first author's institution. The authors aimed to recruit stakeholders who could provide input on the relevance of words to be included in a Sepedi AAC system for children aged 4-12 with receptive language skills on the level of a 4-year-old or above. For this reason, five groups of stakeholders were recruited, namely (1) SLPs, (2) teachers who taught in the foundation and intermediate phases of schools for learners with special educational needs (LSEN), (3) parents of children who required AAC who were attending schools for LSEN (foundation or intermediate phases) (4) adults who used AAC, and (5) preschool teachers who taught children aged 4-6 years and had previously included children in need of AAC in their classes. All participants had to have good spoken Sepedi competence and at least a fair ability to read Sepedi, according to a self-assessment.

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Convenience sampling was used to recruit as many stakeholders from a Sepedi language background as possible within the means of the research team and time frame of the study. Multiple recruitment strategies were used. A general recruitment strategy targeting all five groups was followed by sending out an invitation to an email list for persons interested in AAC, administered by the first and third author's institution. The email contained a detailed information letter with a link to the online consent form and questionnaire, constructed using the Qualtrics^{XM}® survey software. Two weeks after the initial email was sent, it was followed with a reminder email.

In parallel, a more targeted recruitment strategy was followed to specifically recruit additional stakeholders belonging to each of the five included groups. First, permission was obtained from the Gauteng Department of Education to recruit teachers, parents and SLPs from selected schools for LSEN in Gauteng. Schools were selected based on the likelihood of including learners from a Sepedi language background. Eight schools were contacted. Six school principals/governing boards provided permission and contact persons at the schools (teachers, SLPs or the principal) agreed to send out requests to teachers, parents, and/or SLPs. Hard copies of the questionnaire were requested by two schools, while the other schools preferred to send the invitation out electronically, via their email list or via WhatsApp. Second, WhatsApp or email messages were sent to five adults using AAC who were alumni of an empowerment programme run by the first author's institution, and who had previously indicated a knowledge of Sepedi. Third, seven independent preschools that were within traveling distance from the second authors' institutions were contacted. The heads of the preschools were asked for permission to recruit teachers from their preschool. Three heads

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consented, and two requested hard copy questionnaires to be delivered to the school. The third head passed the information on to the teachers via WhatsApp.

A total of 60 completed responses were received. The data of three respondents was eliminated as these respondents reported a low level of skill in Sepedi. The responses of 57 participants were included in the analysis. A total of 20 teachers from schools for LSEN, 13 SLPs, 12 parents, five adults using AAC, and seven preschool teachers participated. The average age of the participants was 38.6 years, with a range of 26-65 years. Of the participants, 46 spoke Sepedi as a home language, while 11 had other home languages, including Setswana ($n = 4$), Xitsonga ($n = 2$), isiNdebele ($n = 2$), isiZulu ($n = 1$), Sesotho ($n = 1$) and Tshivenda ($n = 1$). Participants were asked to rate their expressive and receptive spoken and written skills in Sepedi on a scale of 1 – 5, where 1 = excellent, while 5 = poor. On average, participants rated their skills between 1.4 and 1.8 (very good to excellent).

Materials

A questionnaire was constructed with two sections. The first section consisted of questions about demographics. The first three questions (age, home language and rating of Sepedi skills) were identical across participant groups. The remaining questions were specific to each of the groups. For example, teachers were asked about their years of teaching experience, while parents were asked about the age and diagnosis of their child in need of AAC. This information is not reported in this article.

The second section requested participants to rate 155 words from the core vocabulary established by Mothapo et al. (2021). The instructions specified that these words were to be evaluated according to the importance of including them on a communication system for a

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child age 4-12 years with receptive Sepedi language skills at the level of a 4-year-old or higher. All the content words found in the core vocabulary with exception of the proper nouns coded 'place name', 'child name' and 'teacher name' in the study by Mothapo et al. (2021) were included in the questionnaire. These were omitted as they would be specific to an individual. In addition to the remaining 141 content words, 14 interjections (classified as structure words) were also included in the questionnaire. The remaining structure words were not included as they are hard to understand outside of a sentence. These structure words are typically monosyllabic, and many heteronyms and homonyms are found among them. In addition, many are polysemous. It was therefore deemed difficult to rate these words using a questionnaire where words would be presented without a context. The 155 words were divided into 11 semantic-syntactic categories, loosely based on the categories used by Morrow et al., (1993) in their categorical inventory, as well as those of the Language Development Survey (Rescorla, 1989) and the MacArthur Bates Communicative Development Inventories (Fenson et al., 2007). The categories included *action words* (83 words), *descriptive words* (12 words), *sounds and expressions* (14 words), *people* (12 words), *body parts* (four words), *clothing* (three words), *food and drinks* (four words), *places* (three words), *questions words* (two words), *words about time, position and direction* (seven words), and *various nouns* (11 words). Each word was required to be rated on a 4-point Likert scale, with scale points defined as follows: 1 = not at all important, 2 = not so important, 3 = quite important, and 4 = very important. The reason for choosing a 4-point scale was to avoid a neutral response category – participants were forced to rate a word either as important or not important. After rating one category of words, participants were requested to add any other words belonging

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to that category that they considered important or very important to include on an AAC system for a child as described. At the end of the questionnaire, the participants were also asked to include any other words or categories of words that they felt were important or very important to include. The questionnaire was constructed in English by the first author and translated into Sepedi by the second author. Translations were checked by the third author.

The internal consistency of the vocabulary rating scale was measured by determining the Chronbach alpha coefficient for the whole scale and also for the subscales per category using the SPSS statistical software package. Because the categories *question words*, *food and drinks*, *body parts*, *clothing*, and *places* only contained a small number of words to rate (between 2 and 4), these categories were collapsed and combined with the category *various nouns*¹. This combined category then contained 27 words. The scale and all subscales for the six categories were found to be internally consistent, with an alpha coefficient of .986 for the whole scale, and levels ranging from .764 to .918 for each of the subscales.

Data Collection

Responses on the Qualtrics^{XM}® platform were received over the course of one month. Eleven hard copy questionnaires were collected from one of the schools (10 teacher questionnaires and one SLP questionnaire). Four hard copy questionnaires completed by preschool teachers were collected from two preschools.

Data Analysis

Data from the online questionnaires was downloaded in excel format. Data from the hard copy questionnaires was entered manually into excel by a research assistant. Data entries

¹ In Sepedi, question words are classified as nouns.

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were checked against the original questionnaires by the first author. Any discrepancies were noted, and reliability of the entries was calculated by dividing the number of disagreements by the sum of agreements and disagreements. Overall agreement was 98%. Any errors were corrected. Relevant excel sheets were then converted into SPSS format, and the SPSS software package was used for statistical analysis.

To meet Objective 1, descriptive statistics (means and standard deviations) were used to summarise and describe the ratings that stakeholders assigned to the core words. The assumption of normality was not met for the ratings obtained across participant groups and across word categories. For this reason, the nonparametric Kruskal Wallis test was used to test whether there were any differences between the ratings of the five stakeholder groups and between ratings assigned to the six different categories of words. The Mann-Whitney U Test was conducted to further explore differences between categories. Alpha levels were set at 0.05 for all tests.

The assumption of normality was not met for ratings and frequency counts across all words and for words within the six categories. For this reason, a nonparametric test (Kendall's Tau) was used to explore possible correlations between frequency counts and ratings of the 155 words (Objective 2).

Finally, to meet Objective 3, the words and categories suggested by stakeholders were recorded in excel files. Any words that were suggested but were already appearing in the core vocabulary were removed. Words suggested by more than one stakeholder were grouped together, as were different morphological variations of the same word (e.g., singular and plural form of the same noun). Frequencies with which each word was suggested were noted.

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Graphs of grouped frequency counts (cf. Shin & Hill, 2016) were created in excel to determine a logical cut-off point to distinguish between words to be added to the core vocabulary list. Words added were further described by part of speech and category.

Results

Stakeholder ratings

The mean rating assigned by stakeholders to each of the 155 words was found to range from 2.75 to 4.0, with an overall average rating of 3.6 ($SD = 0.71$). In other words, all words were, on average, rated as important to very important to include in the Sepedi AAC system. One word (*dijo* – ‘food’) was rated as very important by all stakeholders. The word receiving the lowest rating was *mfana* (‘young boy’), receiving an average rating of 2.75.

The mean ratings and standard deviation as well as median ratings per participant group are given in Table 1. There were no significant difference in ratings across the five groups, $\chi^2(4, n = 57) = 9.301, p = .054$. Descriptively, it can be noted from Table 1 that preschool teachers, on average, gave the highest ratings, while SLPs gave the lowest ratings.

The mean ratings and standard deviations as well as median ratings (calculated based on the mean of each word in the category) obtained for each of the six categories of words are given in Table 2. A Kruskal-Wallis Test revealed a significant difference in ratings across the six categories(), $\chi^2(5, n = 155) = 22.005, p = .001$. In order to further explore the nature of the differences, Mann-Whitney U Tests were conducted to compare the differences between specific groups. In order to keep the alpha level manageable, the suggestion by Pallant (2013) was followed and only strategic comparisons were made. The category *sounds and expressions* clearly received a lower average rating than the other categories, and was

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therefore compared to each of the other five categories, with a Bonferroni adjusted alpha level of 0.01 (0.05/5). The results showed that the ratings of the category *sounds and expressions* differed significantly from those obtained for the categories *action words*, $U = 220$, $z = -3.707$, $p < 0.001$, those of *descriptive words*, $U = 32.5$, $z = -2.65$, $p = 0.008$, those of *various nouns*, $U = 58.5$, $z = -3.589$, $p < 0.001$, and those of *words about time, position, and direction*, $U = 12$, $z = -2.762$, $p = 0.006$. No significant difference was found between the ratings of the category *sounds and expressions* and the rating of the category *people*, $U = 36.5$, $z = -2.444$, $p = 0.015$.

Table 1

Mean Ratings, Standard Deviations, and Median Ratings of Core Vocabulary Words by Participant Groups

Group	<i>n</i>	<i>M</i>	<i>SD</i>	<i>Md</i>
Teachers	20	3,67	0,68	3.75
Parents	12	3,72	0,63	3.74
PWAAC	5	3,55	0,66	3.58
SLPs	13	3,30	0,84	3.24
Preschool teachers	7	3,80	0,51	3.85

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Table 2

Mean Ratings, Standard Deviations, and Median Ratings of Core Vocabulary Words by Semantic-Syntactic Categories

Category	Number of			
	words	<i>M</i>	<i>SD</i>	<i>Md</i>
Action words	83	3,61	0,70	3.65
Descriptive words	12	3,69	0,69	3.74
People	12	3,60	0,73	3.64
Sounds and expressions	14	3,26	0,89	3.17
Various nouns	27	3,70	0,64	3.81
Words about time, place, and position	7	3,68	0,57	3.66

Using the data obtained by Mothapo (2019), the relationship between the frequency of occurrence of each of the 155 core words in the original composite child sample and the mean ranking assigned to each word by the stakeholders was investigated using Kendall's tau-b. The results show no relationship between the two variables, $\tau_b = 0.01$, $n = 155$, $p = .859$. The relationship between the average frequency with which the words in the six semantic-syntactic categories appeared in the child sample and the average stakeholder rating given to each word was also investigated using Kendall's tau-b. The results show a strong negative correlation between the two variables, $\tau_b = -.733$, $n = 6$, $p = .039$, with higher average frequencies of occurrence associated with lower average importance ratings per category. The average ratings per category are shown in Table 3.

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Table 3

Average Frequency of Occurrence per Mille in the Original Corpus and Average Stakeholder Rating per Category

Category	M frequency per mille	M stakeholder rating
Sounds and expressions	2.74	3.26
Action words	2.20	3.61
People	1.96	3.59
Descriptive words	1.71	3.62
Various nouns	1.49	3.70
Words about time, position, and direction	1.34	3.68

Stakeholders suggested a total of 1044 additional words for inclusion on a Sepedi AAC system. After removing words that were already contained in the original core vocabulary list and grouping together identical words as well as morphological variations of the same word (e.g., different forms of the same verb and the singular and plural form of the same noun), 428 unique words remained. The frequency with which words were suggested ranged from 27 to 1. The word *borokgo* (trousers) was suggested most frequently (27 times). In contrast, 290 words were suggested only once. Three grouped frequency bar graphs were constructed, using frequency intervals of 1, 2 and 3 respectively. When grouped in intervals of 3, a clear distinction was seen between the number of different words suggested with a frequency of 1-3 versus those suggested with a frequency of 4 or more. Based on this finding, words suggested with a frequency of 4 or more were added to the core vocabulary list. This amounted to the addition of 48 words. Of these, two were classified as verbs and the

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remaining 46 as nouns. Regarding categories, one word was classified as an action, while three were classified as descriptive words. Eight words describe people; three were classified as words about time, position and direction, and the remaining 32 words were classified as various nouns. Of these various nouns, 11 described body parts, five described clothing items, seven referred to food items, eight referred to places, and one was not further classified (*buka* – ‘book’). The Sepedi words with English translations are provided in Table A1.

While four additional word categories were suggested (*days of the week, basic colours, all visible body parts, and people’s names*), these could be described as subcategories of *words about time, position and direction, descriptive words, body parts, and people*. These were therefore not new categories.

Discussion

In accordance with the aims of the study, the ratings of the 155 core vocabulary items from the list generated by Mothapo et al. (2021) are first discussed. Thereafter the additional stakeholder-generated list of words is discussed.

The high ratings received by all words from the core list that were presented to stakeholders indicate that all words were perceived as important. These ratings therefore affirm the social validity of including these words on an AAC system designed for Sepedi children aged 4-12 with comprehension skills on at least a 4-year-old level. Bornman and Bryen (2013) also found that adults using AAC validated the majority (80%) of words proposed that a person using AAC may need to disclose abuse. Although the presence of a word on a list may predispose informants and stakeholder to view it as important to include

on a system and a measure of compliance may be involved (Morrow et al., 1993), a list can likewise alert them to words that may otherwise have been forgotten.

There were no statistically significant differences in the way the three stakeholder groups rated the words, although it is noteworthy that SLPs, on average, gave lower ratings of importance. It is possible that SLPs, more than other groups, are aware of the design requirements for AAC systems, as they are typically the team members primarily tasked with selecting or adapting an AAC system (Dada et al., 2017; McFadd & Wilkinson, 2010; Thistle & Wilkinson, 2015). They may therefore be aware of the need to limit the number of words made available on a system in order to delimit learning demands, and may have been more selective in assigning words a higher rating of importance. Clinically, a word list may be used as a source to select a set number of words for an AAC system, and stakeholders may be asked to in- and exclude a set number of words rather than rate their importance. Other ranking methods like Q method (Watts & Stenner, 2005) that force a specific distribution may be more useful in clinically limiting the number of very important words that should be included on an AAC system.

The average ratings obtained for each of the six semantic-syntactic categories differed significantly from each other. The finding that the category *various nouns* received the highest average rating was somewhat unsurprising considering the general concrete nature of nouns and the ease with which they evoke and are represented by a visual image. The tendency for stakeholders and informants to focus on nouns when selecting vocabulary for AAC systems has been repeatedly observed (Adamson et al., 1992; Balandin & Iacono, 1998; Bean et al., 2019; Yorkston et al., 1988). As meaning-carrying content words, nouns play an

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important role in communication (Frick Semmler et al., 2023), and as such, should be included on AAC systems. However, their preponderance on AAC systems and the omission of other parts of speech becomes problematic when children have passed the single word stage and need to start combining words into sentences (Bean et al., 2019). Although many core vocabulary lists contain nouns, such as ‘home,’ ‘friend,’ ‘water,’ ‘food’ and ‘mom’ (Beukelman et al., 1989; Boenisch & Soto, 2015; Hattingh & Tönsing, 2020; Trembath et al., 2007), nouns typically occur with a lower frequency in core vocabulary lists, possibly due to the fact that nouns are an open-ended word class with a high number of different words that tend to be context-specific. While stakeholder selections may underemphasize the importance of other parts of speech for AAC systems for children past the beginning communicator stage (Adamson et al., 1992; Dark & Balandin, 2007), reliance on core word lists alone may underemphasize the importance of including a larger number of nouns (Laubscher & Light, 2020).

Sounds and expressions were rated as less important, on average, than the other five categories. All words in this category were interjections, such as those indicating surprise, disbelief, agreement and disagreement. Various English core vocabulary lists include interjections such as ‘oh,’ ‘hey,’ ‘yeah,’ and ‘no’ (Beukelman et al., 1989; Boenisch & Soto, 2015; Trembath et al., 2007) Linguistically, interjections have been described as a neglected part of speech (Ameka, 1992). Although interjections are surmised to exist in all spoken languages, they do not perform a clear lexical or syntactical function, and many are classified as non-words that do not appear in the dictionary. Some may even be articulated using phonetic sounds that do not otherwise exist in the language (Ameka, 1992). These may be

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reasons that make them seem less important to include on AAC systems. Interjections perform important discourse functions, including cohesive functions whereby communication partners signal their attention and engagement in a conversation (e.g., by the English interjections ‘yeah’ ‘oh,’ or ‘uh-huh’) (Norrick, 2009). They can stand as utterances on their own and need not be combined with other words. Interjections have been found in the speech of young children aged 1;8 to 2;0 (Li & Fang, 2011), and many are easy to articulate as their phonetic patterns are uncomplicated. As such, the inclusion of interjections in the communication repertoire of a child in need of AAC should be carefully considered. Their simple phonetic form may make it possible for the child to approximate their pronunciation and produce them orally, or to replace them by a conventional gesture such as head nodding or shaking. Alternatively, they may be represented on an AAC system.

It was interesting to observe that there was a statistically significant inverse relationship between the average frequency of occurrence of words belonging to a specific category and the average rating that stakeholders assigned to words in that category. This means that, in general, stakeholders felt that categories of words with a lower frequency of occurrence were more important. For example, although the words in the category *sounds and expressions* occurred, on average, most frequently of all six categories, these words received, on average, the lowest ratings of importance of all word categories. Similarly, the category *various nouns* received the highest average rating of importance, although these words occurred with the second-lowest average frequency. While these findings should not be over-interpreted because stakeholder rated all words as important, it does highlight that different words may be prioritised when different vocabulary sources are used. Research

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suggests that it is difficult for stakeholders to accurately predict the words that will be needed in a specific communication situation (Dark & Balandin, 2007). Stakeholders tend to focus on fringe vocabulary and on nouns (Bean et al., 2019; Dark & Balandin, 2007), whereas core words (and, in particular, structure words) are often omitted. Core words lists, on the other hand, tend to be based on the words frequently used by a small pool of children without disabilities who are speaking in full sentences (Laubscher & Light, 2020). As a result, many of the words included may be relevant for building sentences, but will be less relevant to beginning communicators who are learning to produce single word utterances. The appropriateness of core vocabulary lists as a vocabulary source for specifically beginning communicators who use AAC has therefore been questioned (Laubscher & Light, 2020). It has also been suggested that systems like key word signing and graphic symbol-based AAC systems do not have the same properties as spoken language (Gerber & Kraat, 1992; Smith, 2006; von Tetzchner, 2015). The slow rate at which AAC utterances are typically produced, for example, may predispose towards a more telegraphic style rather than towards the production of syntactically correct sentences. Such a telegraphic style may require a preponderance of content words like nouns. In absence of developmental data to chart the progression of expressive language development using AAC, service providers should consider multiple sources in the selection vocabulary, as illustrated by the inverse relationship between importance and frequency found in this study.

This notion is further emphasised by the finding that a further 428 unique words were suggested by stakeholders as important to add to a Sepedi AAC system. Of these, 48 words were suggested by at least four stakeholders, while 290 were suggested by only one

stakeholder. The limited commonality with which words were suggested among stakeholders may be ascribed to the fact that each participant brought their own perspective and frame of reference to the task. Parents, for example, may have had their own child in mind when suggesting words, while teachers may have thought of the school context. Morrow et al. (1993) also found that teachers, parents, and SLPs suggested a number of unique words, and that all three informant groups were needed to arrive at a comprehensive vocabulary for an AAC system.

Limitations

The findings of the study need to be interpreted in light of several limitations. While an overall number of 57 stakeholders represents a reasonable sample size, the subgroups within the sample were relatively small. For example, only five adults who use AAC were included in the study. Because AAC intervention is not consistently provided to children and adults in South Africa, there are few literate adults using AAC from a Sepedi language background. This made recruitment of a bigger sample difficult. Furthermore, the lack of involvement of children themselves is a significant limitation. Although it is hard to involve preliterate children in a survey, creative techniques using visual rating scales may have been considered to elicit their opinions regarding the inclusion of these words on an AAC system.

No detailed information on the particular regional dialect of Sepedi spoken by each participant was collected. Doing so may have helped to interpret results in a more nuanced manner.

The fact that only 155 (predominantly content) words were rated represents a limitation. Although this decision was made to firstly limit the length of the questionnaire and

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secondly avoid the complications of rating many homo- and heteronyms that would have needed substantial explanation and context to understand their meaning, it may have been better to limit the number of words to be rated by frequency (e.g., rating the most frequent 100 or 150 words) rather than eliminating most structure words. The opinions of stakeholders about most of the structure words in the vocabulary remains unknown.

Also, participants were not given detailed training on the concept of core vocabulary, and its application to the field of AAC. While they were alerted to the need to limit the words on the system and the need to carefully consider which words may be important to include (frequently usable across contexts and persons), more in-depth training may have helped them to better understand the purpose and benefits of including core vocabulary on a system, and may have influenced their ratings.

The influence of compliance in rating the words as important cannot be ruled out, and participants may have felt compelled to rate a word as important merely because it appeared on the list. The use of foils (words that are infrequently used and likely to be judged as unimportant) could have been used to detect response bias. Methods like Q methodology (Watts & Stenner, 2005) or best-worst scaling (Ali & Ronaldson, 2012; Mühlbacher et al., 2016) that force a more nuanced evaluation of items were considered. However, these methods were not practical in view of the large number of items on the word list that needed to be rated. Asking participants to generate a word list themselves and then comparing this to the core vocabulary list may have been another option to obtain their views, although a ‘blank page’ approach to generating vocabulary has been reported to be difficult (Morrow et al., 1993).

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The generation of additional words based on semantic-syntactic categories may have limited the types of words that stakeholders suggested as additions to the existing core vocabulary. Although the questionnaire ended with a request to suggest any additional words without limitations of a specific category, respondents may have needed some guidance as to possible categories, possibly based on those found in previous word lists. However, this may also have then promoted compliance type responses.

The questionnaire asked participants to rate the importance of words in a general way, without reference to a particular child in need of AAC. Whether a particular word is indeed important to include on the system for a specific child will always remain an individual choice that has to be made in collaboration with the team and, where possible, the child themselves.

Implications for Practice and Further Research

The list of 155 core words represents a socially validated resource that practitioners can consult in the design of a Sepedi AAC system for preliterate children. The additional 48 stakeholder-suggested words may also be considered as a relevant additional source of vocabulary. The suggested semantic-syntactic categories may be useful as a way of organizing the vocabulary within and across pages or screens of a system/device. However, the addition of structure vocabulary should not be overlooked, as these words provide the grammatical framework of the language and would enable sentence building.

Further research is needed to find culturally and linguistically appropriate graphic symbols with which to represent these vocabulary items. In absence of a symbol library specifically designed with reference to the Sepedi language, possible representations may be

identified based on English translations of these words from libraries that are commercially or freely available (e.g., Picture Communication Symbols™, Widgit symbols™, or ARASAAC™ symbols). These could then be evaluated by stakeholders for cultural and linguistic appropriateness, and, where necessary, symbols may be redesigned. Additional symbols would have to be designed for words that are not translatable (e.g., copula).

Clinicians have highlighted the merit of a comprehensive AAC system giving access to a large vocabulary and relevant grammatical features (Binger et al., 2020; Tönsing et al., 2018) that can then be simplified by hiding specific features that are not yet appropriate for the child's stage of language development. In this way, the comprehensive system is available as needed, and does not need to be designed ad hoc and without plan by clinicians, as would be the case if one would start with a more limited system without a blueprint as to how to expand the system. The validated vocabulary list together with the structure words from the core vocabulary may assist in the design of such a system for children from a Sepedi language background.

Conclusion

This study represents an attempt to socially validate 155 Sepedi core words by obtaining stakeholder opinions on the importance of core words for inclusion on a Sepedi AAC system for children aged 4-12 years with receptive language skills at an age equivalent level of 4 years and above. Results suggest that these words may indeed be relevant and important to include on such a system. Stakeholder involvement in the design of AAC systems can increase the cultural and contextual relevance of the system. It has been suggested as a way of mitigating against Western-centric design that does not take the lived

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experiences of persons who use the system and their partners into account (Amery et al., 2020). The involvement of 57 stakeholders from a Sepedi language background represents a relatively large sample of participants, and some measure of generalisation may be possible as a result. The involvement of five different respondent groups furthermore adds a variety of perspectives.

The results also suggest that, when different sources of vocabulary are consulted, different words may be prioritized. Each source may have its merit and limitations, and system designers need to be aware of these. It has been reiterated that vocabulary on an AAC system should ideally be informed by a variety of sources (Bean et al., 2019; Beukelman & Light, 2020). In this regard, the addition of 48 words suggested by three or more stakeholders may be a useful supplement to the frequency-based Sepedi core list, and may enable service providers to consider words from this additional source for inclusion. While these lists may provide a useful starting point, customization of vocabulary for each individual remains a necessity and should always form part of the process when adapting an AAC system for a preliterate individual.

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We have no conflict of interest to disclose.

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Appendix

Table A1

Additional Words Suggested by Four or More Stakeholders

No of suggestions	Part of speech	Category	Word	English translation or translation equivalent
27	noun	various nouns: clothing	borokgo	trousers
20	noun	various nouns: body parts	leihlo	eye
		various nouns: clothing	roko	dress
19	noun	various nouns: body parts	tsebe	ear
16	noun	question word	neng	when
		various nouns: body parts	nko	nose
15	noun	various nouns: food	borotho	bread
14	noun	various nouns: body parts	monwana	finger
			molomo	mouth
		various nouns: place	kereke	church
		various nouns: food	nama	meat
10	noun	Words about time, position and direction	godimo	high, above, up, on top
9	noun	people	koko	granny
			papa	father
		various nouns: body parts	leino	tooth/teeth
		various nouns: clothing	sekhethe	skirt
8	noun	people	buti	brother
		Words about time, position and direction	lehono	today
7	noun	various nouns: place	lebenkele	shop
			toropo	town
		people	malome	uncle
		various nouns: food	teye	tea
		various nouns: clothing	lesokisi	sock
6	noun	various nouns: body parts	leleme	tongue
		various nouns: place	sepetele	hospital
5	noun	various nouns: food	apola	apple
			morogo	vegetable
		various nouns: body parts	legetla	shoulder
			moriri	hair

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No of suggestions	Part of speech	Category	Word	English translation or translation equivalent	
4	noun	various nouns: place	ntlo	house	
			shopo	shop	
			kamora	room	
		people	rakgolo	grandfather	
			rakgadi	father's younger sister or her husband	
			mmane	mother/maternal aunt	
		verb	descriptive	tonya	cold
		various nouns: body parts	letheka	hip	
			mala	stomach	
			various nouns: food	panana	banana
	mae			eggs	
	descriptive		bohloko	pain	
	botse		beautiful/good		
	various nouns: clothing		gempe	shirt	
	various nouns: place	ntle	outside		
	various nouns	buka	book		
		people	motswala	cousin	
Words about time, position and direction		maloba	the day before yesterday		
verb	action	kitima	run		

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