Designing and Building a Web-based Bilingual Dictionary of South African Sign Language and Afrikaans for Foundation Phase Learners at a School for the Deaf

(Software Demonstration)

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Abstract

This software demonstration forms part of a more comprehensive theoretical framework in which a concept model for an electronic bilingual foundation phase dictionary of South African Sign Language and Afrikaans is proposed for a school for the Deaf[1] in South Africa (Fourie 2013). The purpose of the proposed dictionary is to give learners of the school electronic access to written school word-lists, with signs and examples in sign language displayed in video format – therefore in the form of an electronic dictionary. A written word-list does not meet the needs of school learners in this case and a dictionary that is designed for the Deaf target users at the school will be of far greater value in the learners' communication in both sign language and the written language. Certain components of the model can also be implemented by users other than the original target users, so that it may also be of use to the broader Deaf community, both in South Africa and internationally. The software that will be shown is a prototype used to demonstrate the practical implementation of the model mentioned above. It is the work of an honours degree student in computer science at Stellenbosch University.

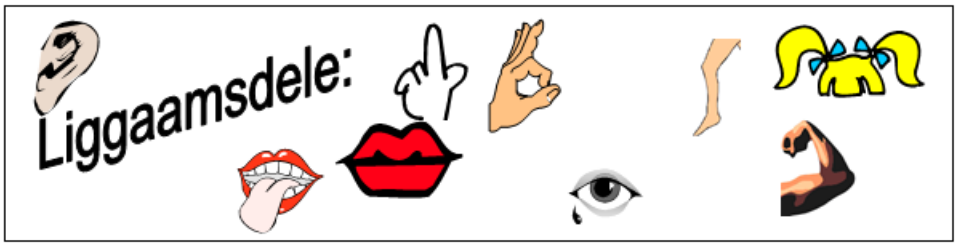
Keywords: database; sign language; American Sign Language; South African Sign Language; electronic dictionary; notation system; foundation phase learner; Australian Sign Language; sign parameter

1 Introduction and Background

The results shared here are the first of their kind in South Africa and present a model for a truly bilingual *and* bidirectional electronic dictionary of South African Sign Language (SASL) and Afrikaans (one of the 11 official spoken languages in South Africa) for foundation phase learners at a school for the Deaf in the Western Cape province of South Africa (Fourie 2013).

The idea for this dictionary was the result of a visit to the particular school, namely the De La Bat School for the Deaf in Worcester.

[1] It is common for authors to use Deaf with a capital "D" when discussing individuals who are members of the Deaf community and consider themselves to be culturally Deaf and are users of a sign language, and to use deaf with a lower case of "d" to describe audiological hearing status.



WOORDESKAT	GRAAD 1	GRAAD 2	GRAAD 3.1	GRAAD 3.2
oog				
oor				
neus				
mond				
nek				
hare				
kop				
arm				
hand				
been				
voet				

Figure 1: Extract from a written class vocabulary list about body parts at a school for the Deaf.

The aim of the dictionary is to give learners at the school electronic access to the written class word-lists (an extract from which can be seen in Figure 1) that are a summary of the target vocabulary that need to be acquired in the course of the foundation phase as set by curriculum outcomes.

As one can imagine, a written word-list does not even nearly meet the needs of school learners who are dealing with a sign language that has no written form in the first place, and the list provides only words from the core vocabulary in the written language, namely Afrikaans. It contains no illustrations or any other visual clues that may help with retention or lets one be reminded of either the signs for this core vocabulary or the denotata to which the words and signs refer.

Electronic access could easily include signs and examples in video format, and would so result in an electronic dictionary. Therefore a dictionary that is specifically designed for Deaf target users would be of much greater value in their dealings and communication in both the sign language and the written language.

The model is specifically confined to the particular school for the sake of the limits of the study, but the model can actually be used in its entirety or in parts for almost any Deaf target group.

2 Sign Language Dictionaries through the Years – a Brief Overview

Through the years a number of sign language dictionaries have been developed all over the world. Most of the early dictionaries are basically written language word-lists in which the written words are accompanied by drawings or photographs of a person articulating a particular sign. Often arrows or lines are added on the drawings or photographs to indicate the movement of a sign. The disadvantage of sign depictions is that they are holistic units that are difficult to arrange or to search in comparison with the alphabetical arrangement of the dictionaries of written/spoken languages.

In 1965 "A Dictionary of American Sign Language on linguistic principles" by William Stokoe presented a breakthrough in sign language research by indicating that all signs can be described or analysed in terms of certain parameters,[2] and that these parameters can be transcribed using an

[2] The five sign parameters are handshape, location, movement, palm orientation and non-manual features/facial expression.

annotation system. Through the following decades various notation systems based on the shapes of signs were developed. The most important ones to date are:

- the Stokoe notation system (Stokoe et al. 1976);
- HamNoSys (Prillwittz et al. 1989); and
- SignWriting, a system that is meant to function as an orthography of sign languages (SignWriting for Sign Languages 2011).

Each of these systems has sets of symbols for the various values of sign parameters, and these symbols are combined to represent the form of the sign. The Stokoe and HamNoSys notations are mostly linear and rather abstract, but the SignWriting version is more holistic and the signs are more easily recognizable from the notation. An example can be seen using the sign for BEAR in ASL,[3] first depicted as a line drawing in Figure 2 and then transcribed in the three main notation systems in Figure 3.

Figure 2: A drawn depiction of the sign BEAR in ASL (Valli 2005: 38).

Stokoe notation system	[ ] √C↑ √C✕
HamNoSys	
SignWriting	

Figure 3: The ASL sign for BEAR represented in three different notation systems (adapted from Zwitserlood 2010: 449).

Only a few bilingual dictionaries contain depictions of signs as well as an arrangement of signs based on sign structure, like the "Preliminary Signing Dictionary of Australian Sign Language" (Johnston 1987), which contains not only an alphabetical English-to-Auslan[4] list but also a section with Auslan-to-English in which signs are arranged according to the values of the sign parameters. The majority of printed dictionaries did not go to this trouble and they still tend to be bilingual, monodirectional and alphabetically arranged according to the words of the spoken language in written form.

[3] ASL stands for American Sign Language.
[4] Auslan stands for Australian Sign Language.

3 The New Digital Era – from Writing and Annotation to a User-friendly Electronic Database

However, thanks to the advances of technology, "writing" a sign language is not the only solution to searching and finding a sign in a dictionary anymore. The model provides three search methods: searches via picture (concept) arranged per thematic category, via a written word as well as via a sign (by selecting certain sign parameters). The picture search option means that no literacy in either language is actually required to start using the dictionary. This is an important point, because it means that the dictionary may potentially be of use and interest to a larger group of potential users from a "lost generation" of Deaf adults who, on average, attain the literacy skills of a learner in Grade 4 or 5. The picture search option also constitutes a new feature compared with other digital sign language dictionaries, which allow only word and/or sign searches.

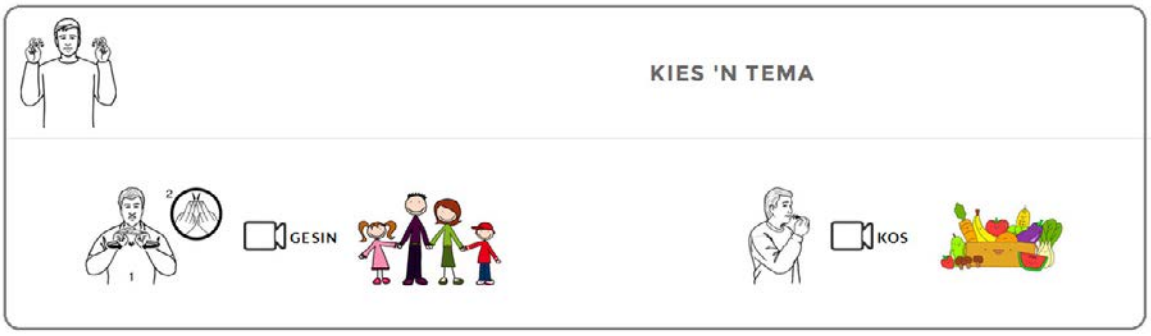


Figure 4: Screenshot from the thematic search section, "*Kies 'n tema*" ["Choose a theme"], of the electronic dictionary.

In an electronic dictionary, signs are easily accommodated as video clips, so that users can see the full articulation of a sign. Therefore the demonstrated software is an e-dictionary of SASL that incorporates the model mentioned here. It is aimed at foundation phase learners (i.e. grades 1 to 3) but can easily be expanded as learners progress and vocabulary needs increase. The dictionary implements a collaborative approach and can easily be administrated and updated by teachers, and various user levels can be created based on vocabulary targets or outcomes set by a specific teacher at a specific time, for example, or to accommodate dialectal differences within a larger group of users.

4 Basic Design of the Database

The underlying approach to the electronic dictionary is that of a database hosted in the cloud, with remote access by users through a web interface.
URL: http://www.mewoord.appspot.com/
Hardware and software requirements: Internet access and web browser (preferably Chrome or Firefox, but not Safari).
For more details about the specific design of the database, please contact one of the authors.
Please note: the electronic dictionary is still a *work in progress* and is currently used as a prototype to demonstrate the practical implementation of the model rather than a completed product.

5 Conclusion

The prototype that is discussed here demonstrates that the theoretical model can indeed be applied in practice, and that it works well. Initial testing has been positive, the overall response after the project received some attention in the press has been one of enthusiasm and excitement, and one publishing house has already expressed interest in the project as well. Discussions are still underway to determine which platform would be the most suitable to provide a good "home" for the proposed dictionary, and also to find authors of the content (i.e. definitions and example sentences in at least two languages – SASL and Afrikaans, but other spoken languages may also be chosen – as well as pictures). Both authors sincerely hope that the prototype will be successful and be of some avail to all interested parties.

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