

visual and stylistic presentation. The results are as follows, taken in order of the article components.

6.2.1 Headword and part of speech

The headword and part of speech have been restyled so that the headword now occupies a much more prominent position on the page, also functioning as a heading (see Figure 7). This adds a contextual signpost for the user while also playing a role in navigation since the headword and part of speech will, according to the new model, always remain in view when scrolling through the rest of the article contents. An anchored heading-style headword is required here since articles may often be hundreds of words longⁱⁱⁱ and in the pilot edition the headword often disappears from view when scrolling. Research has also prompted the adoption of a mobile-friendly sans serif font (for the headword and part of speech) as it reads more easily and looks similar to fonts used across different popular websites (Beaird 2007: 113). Font choice goes beyond purely visual considerations: the working model illustrated in Figure 7 uses the Google Roboto font for the secondary reason that it can be cached locally on the user's device, thus avoiding a negative performance impact caused by font-loading — one of the ways current design work anticipates the needs of mobile device interfaces.

aardvark *noun*

Figure 7: New lemma and part of speech presentation

The part of speech has been italicised and rendered in a smaller point size than the headword (as shown in Figure 7). This is done as apart from styling, it's also a subtle navigation aid, i.e. it allows the user (once he/she has seen a few entries) to distinguish these components intuitively before even reading the words. In the print edition all parts of speech were abbreviated, except in the case of longer parts of speech. These will now be shown expanded. The heading-style foregrounding of the headword and unabbreviated parts of speech also serve the additional purpose of improving search engine optimisation.

Furthermore, lexicographic and contextual labels will be moved to the start of each sense. A final enhancement in this section relates to unassimilated lexical items, namely borrowings which were not regarded as fully integrated into South African English at the time of publication but were included in the dictionary "in order to document the *S. Afr. Eng.* vocabulary as comprehensively as possible" (Silva et al. 1996: viii). In the print and pilot editions these lemmas are preceded by tramlines (||) as a type of label. This is sometimes confusing or obtrusive, and a colour change or less confusing symbol glossed with

a mouse-over popup will be substituted to improve readability and interpretability.

6.2.2 Pronunciation

The user survey indicated that the pronunciation is a vital component of the dictionary entry and that the IPA symbols are usable to users. The pronunciation has however now been moved to below the headword. This is done to separate components, make the article structure more scannable, and create a more sleek and modern look. The pilot edition's pronunciation indicator is inadequate in that the user must refer to a long table of IPA symbols on another web page in order to make sense of the phonetic notation. In the new model the pronunciation is hyperlinked, so that when a user clicks on it a popup with translations of only the relevant IPA symbols will appear to offer context-specific help (see Figure 8).



Figure 8: Model of new pronunciation popup (prototype)

6.2.3 Variant spellings, inflections and etymology

The data categories variant spellings, inflections and etymology have, after restructuring of the XML markup, been changed from inline to block-level elements. They have also been assigned more easily-understandable labels, namely:

- variant spellings are labelled "Forms"
- inflections are labelled "Plurals"
- etymology is labelled "Origin"

These elements have also been refined so that they don't overwhelm the user with data (even lists of variant spellings are sometimes very long) but are optionally expandable (see Figure 9). 58% of respondents in the user survey indicated that expandable content would be welcomed. Under the "Forms" category, different spelling variation group sections are sometimes indicated using Greek symbols, referring to different quotation paragraphs when these are separated according to spelling patterns (e.g. *aardvaark* has spellings starting with either *a* or *e*, and these are distinguished by having separate spelling variant subsections and quotation paragraphs). These variant subsections will also be restructured into a block presentation with each section being hyperlinked to the relevant quotations. The first recorded use of the headword has also been included and hyperlinked to the first documented quotation under the "Origin" category. These changes have been proposed as a subtle way to emphasise the historical data and cognitive function of the dictionary and to aid interested users in exploring the deeper content of the article further.

FORMS: [aardvaark » more...](#)

PLURALS: [aardvarke » more...](#)

ORIGIN: [South African Dutch » more...](#)
[First recorded use 1786](#)

Figure 9: Expandable newly labelled data categories

6.2.4 Definitions

The paraphrases of meaning have been foregrounded by placing them in a text box or panel. Google Search Analytics statistics indicate that the meaning statement is of key user interest (Van Niekerk et al. 2015). Foregrounding the definitions allows those users not interested in the other historical components of the entry to access the data they need more quickly, rather than being discouraged by surrounding text which is beyond their interests (see Figure 10). A long-term goal here is also to separate the definition data-types, for example into core definitions and cross-references, as another way to facilitate improved presentation of the data.

The ant-eater *Orycteropus afer* of the Orycteropodidae, an insectivorous burrowing mammal of nocturnal habits with a long, tapering muzzle and sparsely-haired body; [ANTBEAR](#); [ANT-EATER sense 1](#); [EARTH-HOG](#); [EARTH-PIG](#). Also *attributive*.

Figure 10: Foregrounded paraphrase of meaning for aardvark

6.2.5 Quotations

Directly below and visually juxtaposed with the paraphrases of meaning are the quotations. As mentioned, the historical data are an integral part of the *DSAEHist* and the goal here is for users to access this section regularly, since they contain additional information which cannot be synthesised in definitions. However, some lemmas have an extensive list of quotations.^{iv} This poses somewhat of a quandary as the historical data needs to be highlighted, but overloading the user with data causes users to look elsewhere for the required information. Therefore to satisfy most users' needs (again linking to the respondents in the user survey's need for expandable content) a content filtering strategy which displays, by default, the first and last quotation per sense, with the option to click a button to expand to the full list, has been developed (also see Van Niekerk et al. 2016a), and the final implementation of this filtering will be refined in the DSAE-SU collaboration. Beyond this, we also propose font and background changes here as a means to i) direct the users' attention to this section, and ii) to make the category of data clear and readable (see Figure 11).

1786 G. FORSTER tr. of [A. Sparrman's Voy. to Cape of G.H.](#) l. 270 The *aard-varken*, or earth-pig, which, probably, is a species of *manis*.



1959 L.G. GREEN tr. of [These Wonders](#) l. 270 That creature of obscure origin, that champion tunneller of the veld, the erdvark or ant-eater. This pig-shaped freak is not rare, but is seldom captured.

Figure 11: Expandable quotations with a dynamic structural indicator

6.2.6 Cross-references and combinations

Related current work includes expanding cross-references between quotations (another print-edition space-saving device which is no longer necessary). For example, under the quotations for **berghaan** in the pilot edition (see Figure 12) the user is sent between these entries for different quotations (1889 and 1867). To give the user immediate access to the data the target quotation will be shown instead (see Figure 13). This change will apply to approximately 2,800

quotations and has involved a combination of semi-automatic updates and case-by-case proofreading, incidentally resulting in improved content where ambiguous or broken cross-references were identified.

berghaan /ˈberx,ɦɑːn, ˈbeːg-/ *n.* *obsolescent*.
 ORIGIN: S. Afr. Du., *berg* mountain + *haan* cock.

1. The **BLACK EAGLE**, *Aquila verreauxii*.

1844 J. BACKHOUSE *Narr. of Visit* 488 Three species of Eagle occur in South Africa..[including] *Aquila vulturina*, the Berghaan.

1867 [see **DASSIEVANGER**]

Figure 12: Cross-references between quotations in the pilot version

berghaan *noun*

– ORIGIN: South African Dutch, *berg* mountain + *haan* cock.

obsolescent

1. The **BLACK EAGLE**, *Aquila verreauxii*.

1844 J. BACKHOUSE *Narr. of Visit* 488 Three species of Eagle occur in South Africa..[including] *Aquila vulturina*, the Berghaan.

1867 E.L. LAYARD *Birds of S. Afr.* 11 *Aquila Verreauxii*...*Dassie Vanger* and *Berghaan* of Colonists...It is called '*Dassie Vanger*' (coney-eater) and '*Berghaan*' (mountain cock) by the Colonists..from feeding principally on the coney, or rock-rabbit.

Figure 13: Quotation cross-references expanded

Work on presenting combined forms and their respective quotations as separate block-level elements (rather than unbroken paragraphs as in the print edition) is also under way after having been initiated during the DSAE-HU collaboration. Again a semi-automated dataset adaptation is required. The same strategy has been applied to compounds and derivatives, all of which were formerly nested in paragraphs which did not separate these elements — again, to save space in print. For example, the combinations for **biltong** – **biltong-curtain** and **biltong farmer** (Figure 14) will be displayed in a block at the foot of the entry similar to the block for forms, plurals and origin to enhance readability (see Figure 15).

2. *comb.* **biltong curtain** [by analogy with Eng. *Iron Curtain*], a jocular name for the borders of South Africa; **biltong farmer**, **-hunter**, **-jackal**, one who hunts game in order to obtain meat for the making of biltong.

Figure 14: Combinations in pilot edition

2. combinations

biltong curtain [by analogy with English *Iron Curtain*], a jocular name for the borders of South Africa;

biltong farmer, biltong hunter, biltong jackal, one who hunts game in order to obtain meat for the making of biltong.

Figure 15: Combinations in new layout

6.2.7 Extended microstructure and access structure

As stated in Section 5.2, guiding the user to the historical data contained in the dictionary is an important part of the new working model. An interesting and innovative way to present and link dictionary data is providing users with relevant contextual or subject specific data as part of the extended microstructure. The extended microstructure also functions as an expanded access structure as users will have the option of accessing different entries or parts of the dictionary from an extra search route. Interestingly, 44% of respondents in the user survey indicated that access to related content would be important.

aardvark *noun*

[/ˈɑːdʌrk/](#)

FORMS: [aardvaark](#) [» more...](#)

PLURALS: [aardvarke](#) [» more...](#)

ORIGIN: South African Dutch [» more...](#)
[First recorded use 1786](#)

The ant-eater *Orycteropus afer* of the Orycteropodidae, an insectivorous burrowing mammal of nocturnal habits with a long, tapering muzzle and sparsely-haired body; [ANTBEAR](#); [ANT-EATER SENSE 1](#); [EARTH-HOG](#); [EARTH-PIG](#). Also *attributive*.

1786 G. FORSTER tr. of [A. Sparrman's Voy. to Cape of G.H.](#) I. 270 The *aard-varken*, or earth-pig, which, probably, is a species of *manis*.
[\[+\]](#)

1959 L.G. GREEN tr. of [These Wonders](#) I. 270 That creature of obscure origin, that champion tunneller of the veld, the erdvark or ant-eater. This pig-shaped freak is not rare, but is seldom captured.

Other animals:

[aardwolf](#)
[aasvoel](#)
[alikeukel](#)
[» more...](#)

Also first recorded in the 1780s:

[eland](#)
[Jan Compagnie](#)
[lock-shoe](#)
[» more...](#)

Find other entries quoting:

[G. Forster](#)
[L.G. Green](#)
[» more...](#)

[aarde-wolf](#)
[aardroos, n.](#)
[aardvark, n.](#)
[aardwolf, n.](#)
[aarlie, n.](#)
[aaskies](#)
[aasvoel, n.](#)
[AB, n.](#)
[aba-, pref.](#)
[abafana](#)
[abafazi](#)
[abafundisi](#)
[abakhaya](#)
[abakhulu](#)
[abakweta dance](#)
[abakwetha, n.](#)
[abalongo, n.](#)
[abaloongu](#)
[abalumbi, pl. n.](#)
[abalungu](#)
[abaMbo](#)
[abangoma](#)
[Abantu,](#)
[abaNtu](#)
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Figure 16: Related content shown on the right of the article

The related content found in the extended microstructure will be nested under labelled display blocks in a new sidebar adjacent to the article. These blocks will be expandable and could also be linked to the infographics previously discussed. The labels describing each related content block and the article hyperlinks listed under them (see Figure 16 for an example) can be derived

from categories such as shared origin, shared register or subject specific lexicographic labels as well as other historical and bibliographical data encoded in the dictionary database. Except for comprehensive subject-categories — which are currently being added to supplement existing subject-labels as a prerequisite for advanced search functionality — these semantic categories are already encoded in the dictionary's richly-annotated dataset, and their XML structure makes their values queryable with ease and flexibility. However the implementation of appropriate dynamically generated related content requires careful modelling and testing, and will only be undertaken on completion of current project priorities.

7. Future work

Apart from the ongoing work already mentioned in adapting the XML dataset, general layout and article structure, there are other possible long-term goals that should be pursued.

One area that requires more research is user engagement and involvement. Raising awareness about the *DSAEHist* should become a priority from a marketing perspective. The various ways of promoting the dictionary should also be investigated. One of the objectives of the current adaptation process is specifically to make the dictionary design and user interface appealing to an emerging group of 'digital natives'.

A possibility to increase user involvement in the future is to get users to actively partake in the lexicographic process. This can be done by for example letting users collect data for the dictionary, especially in terms of quotations.

Apart from this possibility, other user-friendly enhancements such as audio options alongside the newly modelled pronunciation indicator should be pursued, as well as the proposal (mentioned in Section 6.2.7) to provide access routes to related content or extra data. In due course, possibilities for offering different search routes, functional and interactive elements and user involvement via an extended microstructure or access structure should also be explored and developed.

The content and functions of outer texts or extra matter, currently occupied by content from the preface of the print version, also need further discussion. This is an area where, for example, external links and important concepts such as the history of South African English can be contained.

Other navigation features such as scroll bars and scrolling methods also need to be tested, as does the integration of other visual components and pop-ups.

Finally, as many of the current adaptations, as well as many of the future possibilities, are in accordance with many of the results of the user survey, especially in terms of adaptability, clarity and access to data, possible follow-up surveys should also be considered for the future.

The work presented here will take time to complete and publish online due to resource constraints and the scale of the undertaking of adapting a his-

torical dictionary originally designed for print to a functional digital online format. Nevertheless this paper presents current work towards bringing a valuable cultural and linguistic resource into the digital era, a process in which the DSAE is being greatly aided by the present collaboration with SU. Such collaborations between research institutions offer the opportunity of showing how guidelines from theoretical lexicography can be applied in practice, and the non-profit model of the project, which allows experimentation and innovation without risk to publishers' commercial imperatives, makes it well-suited for this form of exchange. As such, the intent of this paper is to show the evolution of the dictionary from a print to electronic product to meet evolving user needs, and we renew our invitation to the lexicographical community to provide feedback on the project's current and future development.

8. Endnotes

- i. Please note that this article and any future publications stemming from work done within the DSAE-SU collaboration may be read in conjunction with publications from the DSAE-HU collaboration. See for example Van Niekerk 2016a.
- ii. The changes to search functions are not discussed here as this forms part of the DSAE-HU collaboration (cf. Van Niekerk et al. 2016a).
- iii. Some entries are much longer, e.g. African (approximately 2,300 words) and Hottentot (approximately 6,000 words).
- iv. On average there are 10 quotations per entry but the count is much higher for many headwords, e.g. *Capenas* 230.
- v. Gary Terry is an IT and web design specialist at Rhodes University.

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