

THE IMPORTANCE OF USABILITY EVALUATION WHEN DEVELOPING DIGITAL TOOLS FOR A LIBRARY – A CASE STUDY

LIEZL BALL

University of Pretoria, South Africa
liezl.ball@up.ac.za

THEO BOTHMA

University of Pretoria, South Africa
theo.bothma@up.ac.za

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Abstract

Advanced information tools using modern technologies that filter information to address individual needs are not necessarily easy to develop or easy to use. This paper emphasises the importance of both usability evaluation and information literacy, by looking at a case study of an e-dictionary that was developed using modern technology to tailor information to address only specific needs. The e-dictionary is a prototype developed based on modern lexicographical theory and uses advanced search and display options. These options allow a user to receive only information that is relevant to a specific situation. A heuristic evaluation and usability tests were done on the e-dictionary. The findings showed that not all users found the advanced search and display options easy to use.

This paper briefly discusses the usability evaluation done on the e-dictionary and argues that if any e-tools are developed in a library, usability evaluation is paramount. Users and designers do not necessarily share the same opinions and usability evaluation should be used to improve a design.

In addition to usability evaluation, users should be educated on how to use advanced information tools to their full potential. Information literacy training is already used to teach users how to search in databases. However, dictionary literacy should be included and users taught how to use dictionaries effectively. Such training can benefit users significantly, especially if more advanced e-dictionaries are developed, that include tools through which users can find exactly what they are looking for.

Background

The vast amount of information available in the world is staggering. Technological developments have made it easier and faster to create, disseminate and access information. Unfortunately, however, it has been recognised that the surging amount of information can diminish a person's feeling of control and result in stress and even in an inability to complete tasks (e.g. Bergenholtz & Bothma, 2011: 55; Bergenholtz, Bothma & Gouws, 2015: 2).

Within the vast information space that exists, there is an increasing desire that a person would ideally find just the relevant information to satisfy a specific information need and not be burdened with extra irrelevant information (Bergenholtz & Bothma, 2011: 55; Bergenholtz, Bothma & Gouws, 2015: 3). Technology, the medium that made the abundance of information possible, can also be used to enable people to cope with this phenomenon more efficiently (Bothma, 2011). For example, recommender systems to recommend books a person might like based on their profile, filtering mechanisms to reduce the amount of search results according to the characteristics specified by a user, automatically adapting a site to a user's profile or advanced search options to narrow down a search to specific results.

As gateways to information, libraries already utilise many different technologies to enable users to get information to address their specific information needs. For example, subscribing to online databases and journals, managing institutional repositories, digitising material for inclusion in digital collections, making services available through mobile applications and connecting with users through social tools. As the digital world is continually changing, adapting and advancing, more tools and technologies are developed that can be included in the library landscape to empower users to find exactly what they are looking for.

However, as alluring as more technology and tools might appear, their inclusion and development should be done with careful planning and design. Users and developers of technology do not necessarily share the same points of view. This paper therefore argues that it is essential to perform usability evaluation on tools or systems that are designed to help users retrieve information, especially if these tools employ advanced technologies. This will be done by discussing the usability evaluation done on an advanced e-dictionary.

The e-dictionary Afrikaanse idiome- woordeboek

The Afrikaanse idiome-woordeboek is an e-dictionary of Afrikaans fixed expressions. There is no other existing e-dictionary of Afrikaans expressions (Bergenholtz, Bothma & Gouws, 2011: 40). It is a joint project between the universities of Aarhus, Pretoria and Stellenbosch. The dictionary is a prototype, developed with the intention to test various theories and therefore only contains a subset of Afrikaans expressions. It was also the intention to test the functionality and as such, visual design and aesthetics were not considered.

The dictionary incorporates various technologies to allow for the retrieval of exactly the information that a user needs. The design of this dictionary is based on the function theory of lexicography (for a short summary see Bothma & Tarp, 2012). This theory suggests that a dictionary should give only the information that is relevant for a specific task and withhold information that irrelevant for a user in that specific situation (e.g. Bergenholtz, 2011; Bergenholtz & Bergenholtz, 2011; Bergenholtz, Bothma & Gouws, 2015: 3; Bergenholtz & Gouws, 2007; Bergenholtz & Tarp, 2003; Nielsen, 2011; Tarp, 2008, 2011). For example, if a user is reading a text and simply needs a definition or a meaning of a word (communicative function – text reception), extra information such as; example sentences, grammar information or background is superfluous and could hinder the user from effectively doing their task. However, if a person is editing, more examples and information regarding grammar is important (communicative function – text production). As such, it is suggested that one database is used, but that several dictionaries, each addressing a specific situation or need, can be extracted on demand, depending on the user's information need.

It has also been argued that e-dictionaries should make more use of what the technological medium brings to improve e-dictionaries (Bothma, 2011; Tarp, 2011). E-dictionaries do not have the same space limitations that traditional dictionaries have and can include more data, either by including or linking to more data, such as more example sentences (De Schryver, 2003: 157). The use of multimedia can be a differentiation factor for e-dictionaries (Lew, 2012: 344). Furthermore, e-dictionaries can offer improved access to information through advanced search options, such as wild card characters (Verlinde & Peeters, 2012: 147), Boolean operators (De Schryver, 2003: 175), the option to search for a phrase or locating multi-word expressions (De Schryver, 2003: 175), help with lemma identification (Lew, 2012: 345) or type-ahead search (Lew, 2012: 351) or other search techniques (Lew, 2013: 23). The use of other technologies to provide relevant information, such as, filtering, adapting according to a profile, annotations, decision trees can be investigated (Bothma, 2011).

The *Afrikaanse idioome-woordeboek* was specifically designed to test the use of various technologies and has five different monofunctional dictionaries created from one database, each containing information relevant to a specific function, e.g. text reception (help with understanding a text). In addition, the dictionary has advanced search and display fields, allowing a user to be very specific about what is required. A browsing option allows a different access route. Multimedia has been included to illustrate various entries and links to external sources provides additional information. A screenshot of the dictionary is shown in figure 1.

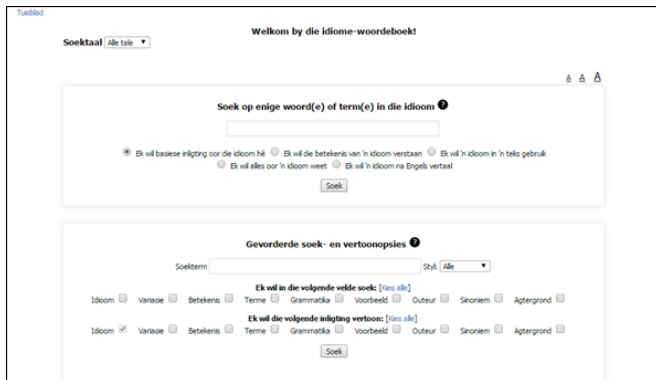


Figure 1 Home page of the *Afrikaanse idioome-woordeboek*

Underneath the main search field are 5 checkboxes, to allow the user to select the function that is relevant for his/her situation. For example, if a user needs help with writing, the function 'I want to use an expression in a text' (*Ek wil 'n idioom in 'n teks gebruik*) will have the relevant information.

Below the basic search are the advanced search and display options. The search term is entered in the field, after which a user can specify exactly what fields should be searched in. For example, a user can specify to search in the author field to find examples by a certain author. The user can then specify the layout of the article by selecting only the fields that should be displayed. For example, to display only the expression, meaning and example sentences. This means only relevant information is displayed. Figure 2 shows an example where only the meaning, example sentences and related expressions in English are shown.

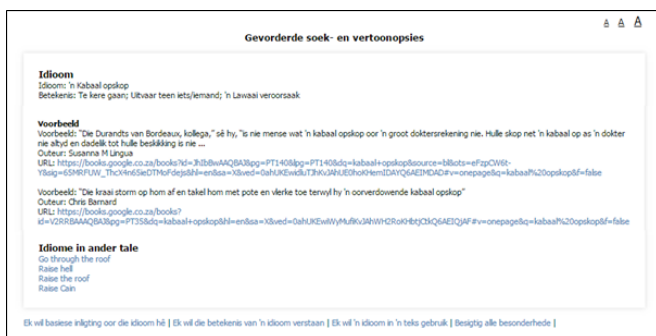


Figure 2 Only meaning, example sentences and English equivalents are shown in the article

Methodology

Usability evaluation was done determine to what extent the Afrikaanse idioome-woordeboek could provide relevant information on demand, specifically to see how users would use the technology in the e-dictionary to get to relevant information. The discount usability methods heuristic evaluation and usability testing were used. The proponents of discount usability suggest that expensive tests are not necessary, but that reliable results can be obtained by using few users (approximately five), experts and simple versions of the system (i.e. prototypes) (e.g. Nielsen, 1993: 17; Nielsen, 2009).

Heuristic evaluation is a method that does not involve any users, but relies on experts. Expert reviewers make use of principles (heuristics) to evaluate an interface systematically (Nielsen, 1995; Schneiderman & Plaisant, 2005: 142). In this study, a set of criteria for the evaluation of e-dictionaries was developed based on an extensive literature review and the heuristic evaluation was done by one expert. The heuristic evaluation is not reported on in this paper, for a detailed discussion see Ball (2016).

Usability testing is an approach where users are expected to complete a set of tasks and their actions can be recorded through a variety of data collection methods (Preece, Rogers & Sharp, 2011: 438). In this study, seven people were asked to complete 16 tasks on the Afrikaans e-dictionary of fixed expressions during which time they were observed. Each task contains a scenario which describes a real information need. After the tasks the participants were asked to complete a questionnaire.

Findings

This paper reports on the most pertinent findings of the usability tests. It is discussed according to the following headings: content, information architecture, navigation, access, help and customisation.

Content

Though the participants commented that the dictionary provided relevant information for the task at hand and did not give too much information, participants reacted differently to the amount of information given while performing the tasks. One participant specifically noted that the perfect amount of information is given. However, others stated that they would have liked or expected more information. One suggestion was that a summary should be given first, with the option of more information. It was interesting to note that participants who displayed more information in the article, sometimes found it easier to complete the tasks.

Participants were positive about the use of external sources and very positive about the use of multimedia. However, during the tests, participants were critical of

examples from external sources that were not formal (e.g. an example sentence from a song by a popular singer). Most participants were negative about the use of labels in the e-dictionary, for example that the labels were too long or used old-fashioned language. The use of uncommon abbreviations was also criticised.

Information architecture

From the questionnaire, it is not obvious whether the participants were either convincingly positive or negative about the over-all organisation of the dictionary (i.e. the functions). However, most participants agreed that it is useful to filter information on a page to show only exactly what the user wants to see. Most participants used the intended functions for the simple tasks (where the match between task and function was clear) and could complete the tasks efficiently and effectively. However, for more complex tasks the functions sometimes caused more confusion than help. Particularly, when a participant did not choose a correct function, or assumed a function would give information that it does not give, they struggled more to do the task than participants who simply chose the function with the most information.

Most participants thought that the data in the articles (page-level organisation) are clearly organised and it was observed that participants typically did not have trouble finding the data on a page to answer a question.

The display fields under the advanced search options can be used to filter data on the article pages. However, it confused most participants, and these options were often ignored; all fields were selected or the same fields for both the search and display options selected. Though most participants found the display options confusing, it does not mean that the functionality is unwanted, as is evident from an incident where one participant specifically commented that the grammar and references that are displayed each time are annoying and (s)he tried to hide these fields. One of the participants commented that a heading should be displayed even if there are no data available for a specific field on the page.

Navigation

Most participants were positive or neutral about the statement that it is easy to find information in the e-dictionary. However, most agreed that they had to scroll too much to find information and the majority indicated that they had to click through too many levels. There are two factors that contribute to the number of clicks in this dictionary, namely the fact that the user has to open the article to view it and the fact that a user then has to go back to the home page to do a new search. Some of the participants were particularly frustrated by what they felt were too many clicks before getting to an answer. One participant commented that (s)he would have liked to see a summary of the expression in the results already and that there should definitely be fewer clicks between entering the search string and getting an answer. Another

comment was that it is not obvious that one does not find the answer immediately, but has to click on a link before finding an answer.

Most participants struggled to find the search results, as they are at the bottom of the page and participants have to scroll between the results and the search field. Some participants had to redo their first search before finding the search results. There were many suggestions that the search results should be more prominent.

Most participants indicated that they did not feel lost and knew where they were in the e-dictionary. However, not all agreed that it was clear where to go next in the dictionary.

Most agreed that the links are labelled in such a way that they understood where they would lead, and most agreed or were neutral that the links did not lead them to unexpected places.

Access (search and browse)

The participants were not overwhelmingly positive that the search field is easy to find, and varied in opinion over whether it is easy to change a search and search for something new. Some suggested that the search field should be on every page, instead of having to go back to the home page.

Most participants found the advanced search confusing. The fact that there were both search and display fields seemed to confuse most and the difference between the two was not apparent and most participants also interpreted the meaning of the search fields incorrectly. A user is expected to select the field (s)he wants to search in, for example, if a user wants grammatical information about an expression, (s)he must select the 'expression' field to search in, then select to display the 'grammar' field. However, many participants selected the search field to indicate what information they wanted to find.

Most participants did not see the browsing option, but once they knew about it they found it easy to use and most agreed that they found the option to browse through the dictionary useful.

Most participants did not struggle to browse internally between expressions in the e-dictionary and it seemed that it could help users to confirm an answer to a task. Some participants found it frustrating that the search results are not saved and other found it surprising that more information was not given with the search results. One participant particularly commented that (s)he would have liked to be able to search in the results.

Help

Most participants did not find it easy to find the 'help', but agreed that the 'help' section provided sufficient help. However, it is important to note that the two participants that consulted the 'help' for something other than

that the task that tested the help function and could not find what they were looking for.

Customisation

Though the dictionary allows a user to save advanced search and display options, most users struggled to find where to store their selection and did not know exactly what was stored. For example, some thought the results were stored and they were searching in the results or others assumed that the results would be emailed to the user.

Conclusion

From this study it is evident that users and designers do not necessarily share the same point of view. Usability evaluation should be used to reveal how tools and systems are really used so that improvements to their design can be made. The designers of the Afrikaanse idiomewoordeboek did not anticipate that the use of functions would cause confusion in some instances. Nor did they expect users to have problems with the advanced search and display options. The usability testing revealed these issues of concern and allowed for various recommendations to the system.

The fact that users struggled with some options does not mean the functionality is unwanted. For example, one participant specifically tried to filter data. This means that there is a need for advanced tools that allow for complex manipulation of data. Apart from refining a design through usability evaluation, more should be done to train users to be able to use advanced information tools. This is essential in an ever expanding information landscape. Information literacy training is already used to teach users how to search in databases. However, there are other information tools that should be included as well. Dictionary literacy should be seen as a subset of information literacy, where users are taught how to use e-dictionaries effectively. Particularly if an e-dictionary makes use of advanced search features or other innovative technologies, users should be educated to be able to make use of these. Users could be taught both typical information literacy aspects, but within the context of a dictionary, for example, how to use advanced searching (Boolean operators and wildcards), linking, or how to distinguish relevant from irrelevant information. Another component could cover work that is from the field of lexicography, for example how to understand the structure of a dictionary, how to interpreting etymological, morphological and syntactic information. A comprehensive list of skills for e-dictionaries can be found in Lew (2013).

If usability is used to identify flaws in design, and users are educated in e-dictionary use, designers and developers of e-dictionaries can confidently create advanced e-dictionaries that include tools through which users can find exactly what they are looking for.

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