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# Online dictionaries: expectations and demands

**Abstract:** This chapter presents empirical findings on the question which criteria are making a good online dictionary using data on expectations and demands collected in the first study (N=684), completed with additional results from the second study (N=390) which examined more closely whether the respondents had differentiated views on individual aspects of the criteria rated in the first study. Our results show that the classical criteria of reference books (e.g. reliability, clarity) were rated highest by our participants, whereas the unique characteristics of online dictionaries (e.g. multimedia, adaptability) were rated and ranked as (partly) unimportant. To verify whether or not the poor rating of these innovative features was a result of the fact that the subjects are not used to online dictionaries incorporating those features, we integrated an experiment into the second study. Our results revealed a learning effect: Participants in the learning-effect condition, i. e. respondents who were first presented with examples of possible innovative features of online dictionaries, judged adaptability and multimedia to be more useful than participants who did not have this information. Thus, our data point to the conclusion that developing innovative features is worthwhile but that it is necessary to be aware of the fact that users can only be convinced of its benefits gradually.

**Keywords:** user demands, reliability of content, up to date content, accessibility, clarity, innovative features, adaptability, multimedia

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# 1 Introduction

Compared to their printed counterparts, online dictionaries offer the possibility of presenting lexicographical data more flexibly. This is due to the fact that printed dictionaries are – of course – static, meaning that the lexicographical data and its typographical presentation are inseparable, whereas the digital medium overcomes this technical limitation: given the appropriate data modelling and data structure, the same lexicographical information can be presented in different ways, which makes it possible a) to generate customized versions of a dictionary entry depending

on the user and the information s/he needs in a particular usage situation, and b) to provide additional resources and cross-references (cf. De Schryver, 2003, pp. 182–185; Müller-Spitzer, 2008; Storrer, 2001).

Quite early on, lexicographers recognized the potential benefits of the new medium and expressed their expectations of a dramatic change in the way dictionaries are being both used and produced:

> "If new methods of access (breaking the iron grip of the alphabet) and a hypertext approach to the data stored in the dictionary do not result in a product light years away from the printed dictionary, then we are evading the responsibilities of our profession." (Atkins, 1992, p. 521; cf. also De Schryver & Joffe, 2004; De Schryver, 2003, p. 157; Dziemanko, 2012; Granger, 2012; Rundell, 2012, p. 29)

However, if digital dictionaries are to develop in a way which is quite different from printed dictionaries, established patterns must be questioned and key priorities have to be put into proper perspective. Put differently, to develop a good product or to offer a good service, it is first of all necessary to find out what the important characteristics of a successful product or service are in terms of customer satisfaction or usability. Given limited resources, it is only by answering this question that it is possible to decide where efforts should be focused. At the outset, these characteristics can be formulated in quite an abstract way, e.g. *form follows function*. This principle does not tell the producer which functions to include, but indicates that the design of the product is not as important as its intended purpose.

Finding answers to this rather general question was one of the aims of the first study in which we asked our participants to rate and rank different items relating to the use of an online dictionary. In our second study, we examined more closely whether the respondents had differentiated views on individual aspects of the criteria rated in the first study (cf. Müller-Spitzer/Koplenig: First two studies, this volume).

Of course, one objection could be that dictionaries (especially printed ones) have such a long tradition that it is not necessary to evaluate basic questions of this kind empirically. But, as mentioned above, online dictionaries are different in several ways. One important example of this is the link between the dictionary entries and the corpus: generating information based on the analysis of real language data is a long-established lexicographical practice. Before the dawn of electronic corpora, lexicographers normally used data explicitly extracted for a particular dictionary. With the diffusion of the electronic medium, more and more corpora for more and more different languages became available for linguistic purposes, which also enhanced the possibilities of lexicographical work. Quite naturally, lexicographers were quick to seize upon the opportunity to compile corpus-based dictionaries .

Essentially, the entries of online dictionaries can be linked to the relevant collection of texts, offering its users direct access to the corpus (cf. e.g. Asmussen, forthcoming; Paquot, 2012). There has never – at least to our knowledge – been an

empirical investigation into whether this is a relevant function of an online dictionary, relevant in the sense that this is what users expect of a good online dictionary.

Another example is the potential integration of multimedia components into an online dictionary, e.g. audio files illustrating the pronunciation of word, a phrase or a whole sentence or collocation graphs, visualizing frequently occurring word combinations.

A last example we would like to mention here is the collaborative compilation of a dictionary. In recent years, it has become more and more common for the content on information websites to be contributed to by the internet community in a collaborative manner, Wikipedia being the prime example, of course (cf. Meyer & Gurevych, 2012). As a consequence, it is important to know whether online dictionary users still rate the accuracy and authorship of the dictionary content as a very important or the most important feature, given that collaborative dictionaries are consulted quite frequently, even though they have quite a bad reputation:

> "Furthermore, people trust dictionaries in print form, whereas data found on the Web is seen by some as slightly suspect and inherently less 'serious'. Not surprisingly, this idea is linked to the supposed unreliability of crowd sourced dictionaries and – inevitably – the Urban Dictionary is held up as an example of the dangers of going down this road." (Michael Rundell: Macmillan Dictionary Blog[1])

Other relevant questions are whether it is more important to use financial and human resources to focus on keeping the dictionary entries up to date and quick to access (e. g., there is hardly any delay when the pages are loaded) or whether it is better to make the dictionary more user-friendly by providing a fast user interface or a customizable user interface.

Taken together, we believe that answering these questions is of great importance in helping lexicographers to determine how to allocate scarce resources:

> "Given the 'flings of imagination' [...] one could be tempted to suggest that the Dictionary of the Third Millennium, while undoubtedly electronic, will simply be a jamboree of all those dreams. [...] the price tag of realising all those dreams would ensure that no one could afford to buy the product – no matter how wonderful the reference work would be. [...] When it comes to cost, it is clear that the choice for the development of this or that dream is dependent on the application and intended target user group." (De Schryver, 2003, p. 188)

> "[...] the greatest obstacle to the production of the ideal bilingual dictionary is undoubtedly cost. While we are now, I believe, in a position to produce a truly multidimensional, multilingual dictionary, the problem of financing such an enterprise is as yet unsolved." (Atkins, 2002, p. 9)

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[1] http://www.macmillandictionaryblog.com/no-more-print-dictionaries, 8.1.2013 (last accessed 13 July 2013).

It could be objected that our evaluation of the basic characteristics of dictionaries does not help the lexicographer in determining how to design a good dictionary, because the information is too general. It may not help directly but we believe that this information is of indirect value, because it can be used to decide where limited resources should be allocated. Therefore, providing reliable empirical data that can be used to answer the question of how users rate different aspects of online dictionaries is an important issue for practical lexicography.

This chapter is structured as follows: Section 2 presents our approach to answering the question "What makes a good online dictionary?" using data collected in our first study (2.1), completed with additional results from the second study, which examined more closely whether the respondents had differentiated views on individual aspects of the criteria rated in the first study (2.2). The implications of both sections are discussed in Section 2.3. Section 3 focuses on an experiment carried out in our second study to evaluate how users rate innovative features of online dictionaries. Again, the results of the parts of the study described in 3.1 and 3.2 are discussed together in Section 3.3. The chapter concludes with a discussion of the implications of our findings.

# 2 Demands on online dictionaries

## 2.1 Basic evaluation of demands on online dictionaries

To answer this research question, we assembled a list of important characteristics of good online dictionaries. This list was the result of intensive discussions within the project and with external colleagues from different lexicographical disciplines. Due to the fact that this research question was only one part of the study, we then selected ten different characteristics. Those characteristics cover both "traditional" features of dictionaries, e.g. reliability of content or long-term accessibility, and specific attributes of online dictionaries, e. g. suggestions for further browsing or links to the corpus.

The participants in our study were first asked to rate every item separately. We thought that it was likely that many respondents would rate most aspects as important, expecting a dictionary to be some sort of "jamboree of all those dreams" as De Schryver puts it in the quote above. Therefore the respondents were also asked to create a personal ranking to force them to discriminate between the different aspects.

We were also interested in potential user group differences in this context. One of our hypotheses was that, compared to non-linguists, linguists would have a

stronger preference for the entries to be linked to the relevant corpus, because this documents the empirical basis of the given information.

> "The advanced dictionary users of course are those who will benefit from selective access to corpus data." (Atkins, 2002, p. 25; cf. also Bowker, 2012, p. 391; Varantola, 1994, 2002, pp. 34–35)

This could also be the case for translators, as presumed by Bowker (Bowker, 2012, p. 387). Furthermore, we expected translators to rate, on average, a user interface that is adaptable to be more important for an online dictionary than non-translators, since professional translators rely heavily on dictionaries in their daily work. An adaptable user interface could enhance their individual productivity.

### 2.1.1 Method

| Aspect | Meaning |
|---|---|
| Adaptability | The user interface is customizable. |
| Clarity | The general structure of the website enables you to easily find the information you need. |
| Links to other dictionaries | The entries also contain links to other dictionaries. |
| Links to the corpus | The entries also contain links to the relevant collection of texts (corpus). |
| Suggestions for further browsing | The entries contain links to other entries you might find interesting. |
| Long-term accessibility | You can be certain of accessing the different entries by using the previous URL (i.e. web address) for future references. |
| Multimedia content | The online dictionary also contains multimedia files, e.g. visual and audio media. |
| Reliability of content | You can rely on the accuracy and authorship of the content. |
| Speed[2] | There is hardly any delay when the pages are loaded. |
| Suggestions for further browsing | The entries contain links to other entries you might find interesting. |
| Up-to-date content | Possible mistakes are corrected on a regular basis; new word entries and linguistic developments are regularly published online. |

**Tab. 1:** Presented aspects in the rating/ranking task.

Among other questions, respondents in the first survey were asked to rate ten aspects on 5-point Likert scales (1 = not important at all, 5 = very important) regarding the use of an online dictionary (cf. Table 1).

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**2** By "speed", we meant the actual technical speed of the online application, not the speed of the process of looking up a word (cf. Dziemanko, 2012, pp. 327–329).

After this, participants were asked to create a personal ranking according to importance. The most important criterion was placed highest, while the least important criterion was placed in last position (cf. Figure 1).[3]
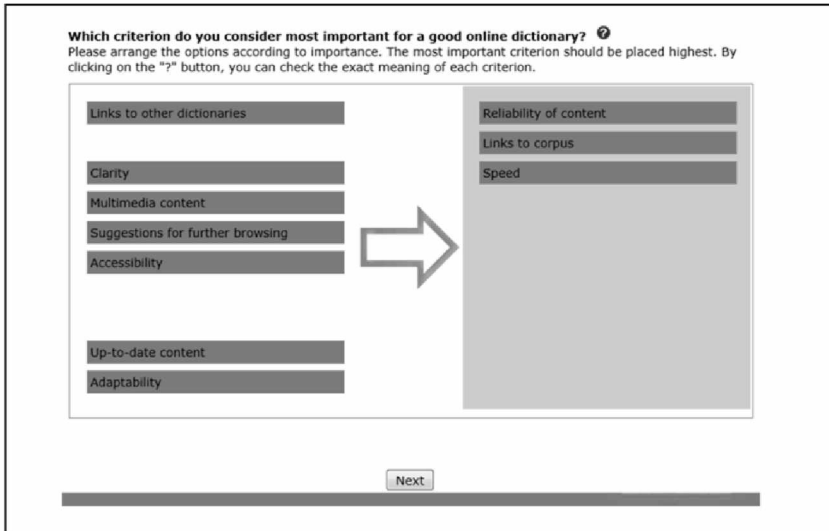
**Which criterion do you consider most important for a good online dictionary?** ❷
Please arrange the options according to importance. The most important criterion should be placed highest. By clicking on the "?" button, you can check the exact meaning of each criterion.

| Links to other dictionaries | | Reliability of content |
| | | Links to corpus |
| Clarity | | Speed |
| Multimedia content | | |
| Suggestions for further browsing | | |
| Accessibility | | |
| | | |
| Up-to-date content | | |
| Adaptability | | |

Next

**Fig 1:** The ranking task (screenshot).

### 2.1.2 Results

*Correlation analysis*
Analysis of (Spearman's rank) correlation revealed a significant association between importance and ranking. This means that both the importance measured in the Likert Scale as well as the ranking of the criteria produced a similar outcome. These results indicate that the individual ranking can be used as a reliable indicator of users' demands as intended (cf. Figure 2).

*Descriptive results*
The analysis of the ratings reveals that one aspect stands out above all others: 71.35% of the respondents chose "Reliability of content" as the most important aspect of a good online dictionary. In addition to this, other classical criteria of reference books (e.g. up-to-date content and clarity) were both ranked and rated highest, whereas the unique characteristics of online dictionaries (e.g. multimedia, adaptability) were rated and ranked as (partly) unimportant.
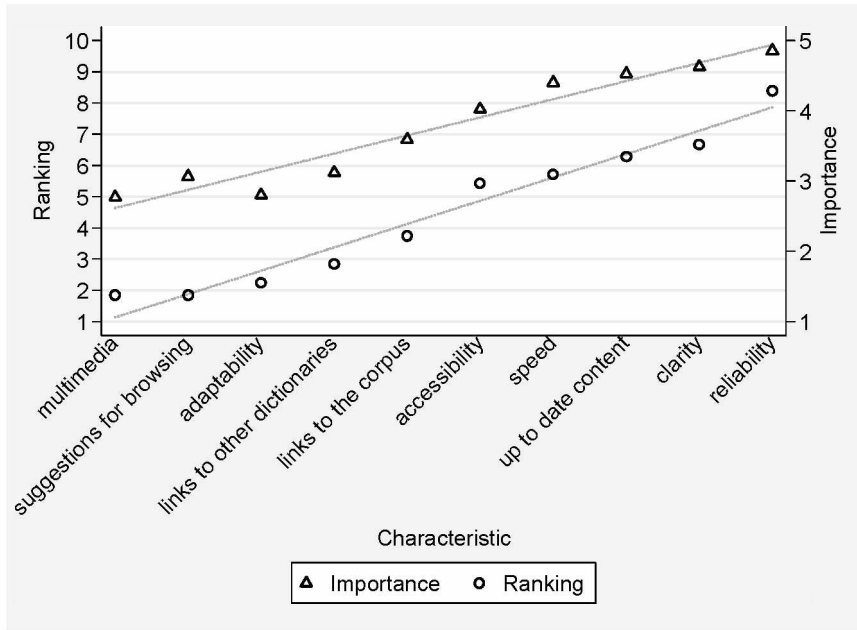
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**3** r = 0.39 [0.20; 0.56]; p < .01.

**Fig. 2:** Correlation between mean rankings and mean importance in the use of an online dictionary.

*Subgroup analyses*

As mentioned above, another objective of the study was to assess whether the size of this difference depends on further variables, especially the participants' background and the language version of the online survey chosen by the participants. Surprisingly, there are no noteworthy rating differences – on average – between different groups, as a visual representation clearly demonstrates (cf. Figure 3).[4]

Statistical analyses of variance (not reported here) reveal that some of the differences in average ratings across subgroups are significant. However, this is mainly due to the high number of participants.[5] Another way of framing these findings is to

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**4** Means of rankings as a function of language version (Fig. 7), professional background (Fig. 8), and academic background (Fig. 9). Means are on 10-point scales with higher values indicating higher levels of importance regarding the use of an online dictionary.

**5** In fact the F-Value (1, 682) ranges from 0.20 to 59.11 with 8.08 on average, yielding highly significant differences (p < .00) in only 8 out of 30 cases.

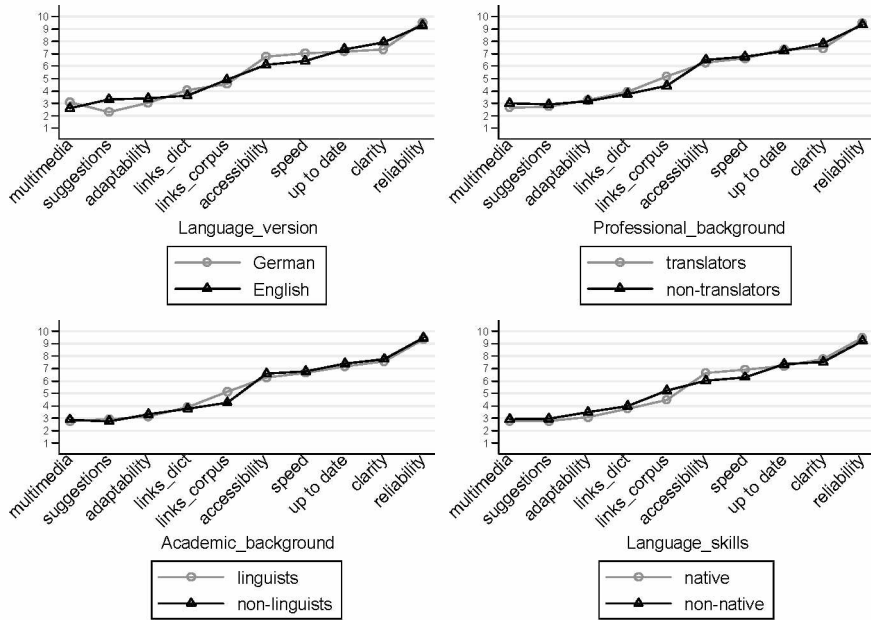state that the relative ranking orders represented by the shapes of the curves correspond in each figure.[6]



Fig. 3: Mean ranking as a function of different background variables.

*Cluster analysis*

In order to better interpret these results, we conducted a cluster analysis to see how users might group together in terms of their individual ranking. Clusters were formed on the basis of a two-step cluster analysis.[7] A two-cluster solution was identified. Means, standard deviations, and N of each cluster are presented in Table 2. Analyses of variance, with the cluster as independent variable and each criterion as a response variable, yielded highly significant differences (p < .00) for every criterion (10 out of 10 cases).[8] Most strikingly, preceded only by "Reliability of content", respondents in Cluster 1 rated the criterion "Links to the corpus" on average as the

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**6** The only exception occurs in Figure 7, where a small difference between the two criteria rated on average as least important and second least important occurs (suggestions for further browsing and multimedia content).

**7** We used the log-likelihood distance measure. The total number of clusters was not restricted, but was chosen automatically by Schwarz's Bayesian Criterion (BIC).

**8** F (1, 682) ranging from 11.22 to 520.30 (93.08 on average), ps < .00.

second most important aspect of a good online dictionary (M = 7.01, SD = 1.93), whereas this criterion only played a minor role for respondents in Cluster 2 (M = 3.77, SD = 1.60), cf. Fig. 5.[9] In the following, Cluster 1 (N = 206) is termed CORPUS CLUSTER (because "Links to the corpus" is rated significantly more important by these participants), whereas Cluster 2 (N = 478) is called STANDARD CLUSTER.

| | Cluster 1 (N = 206) | | Cluster 2 (N = 478) | |
|---|---|---|---|---|
| | M | SD | M | SD |
| **Criterion** | | | | |
| Reliability of content | 9.09 | 1.79 | 9.54 | 0.91 |
| Clarity | 6.96 | 1.98 | 7.97 | 1.35 |
| Up-to-date content | 6.89 | 2.28 | 7.45 | 1.50 |
| Speed | 5.52 | 2.56 | 7.21 | 1.47 |
| Long-term accessibility | 5.43 | 2.47 | 6.86 | 1.86 |
| Links to the corpus | 7.01 | 1.93 | 3.77 | 1.60 |
| Links to other dictionaries | 4.72 | 2.11 | 3.46 | 1.47 |
| Adaptability | 3.59 | 2.04 | 3.08 | 1.73 |
| Suggestions for further browsing | 3.35 | 2.19 | 2.64 | 1.55 |
| Multimedia content | 2.43 | 1.75 | 3.02 | 1.89 |

**Tab. 2:** Means and standard deviations of rankings as a function of the cluster analysis.

*Regression analysis*
To test our hypothesis that different users groups have different demands, we fitted a binary logistic regression model to predict the probability of belonging to one of the two clusters (as an indicator for sharing similar individual demands regarding the use of an online dictionary), using the cluster variable as the binary response and academic background, professional background, and the language version chosen by the respondents as explanatory variables. The results of the logistic regression model are presented in Table 3.

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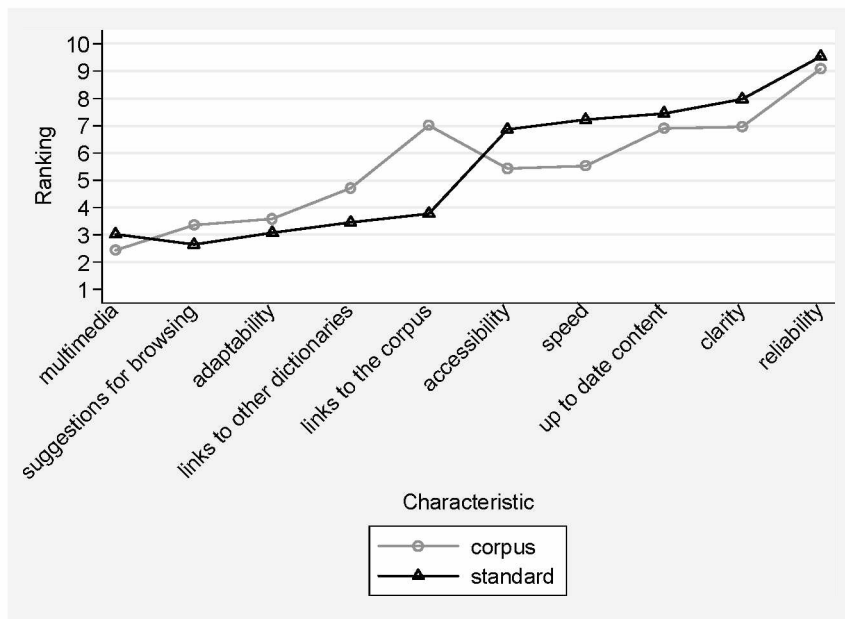**9** $F(1, 682) = 520.30$, $p < .00$.

**Fig. 4:** Mean rankings as a function of the cluster analysis.

| Variable | Coefficient | Std.Error | p-Value | Odds-Ratio |
|---|---|---|---|---|
| Language Version | 0.447 | 0.174 | 0.010 | 1.563 |
| Professional Background | 0.454 | 0.173 | 0.009 | 1.575 |
| Academic Background | 0.603 | 0.176 | 0.001 | 1.827 |
| Constant | -1.654 | 0.178 | 0.000 | |
| [a] N = 684; Nagelkerke $R^2$ = .064; $X^2(3)$ = 31.67, p < .00. All coefficients are significant at the .01 level. | | | | |

**Tab. 3:** Results of the binary logistic regression model[a].

To visualize these results, we extended our model, allowing for interaction between the explanatory variables.[10] Figure 5 shows the results of this model. For example, the model predicts (as indicated by the black circle) that the probability of belonging to the CORPUS CLUSTER for subjects in the English language version who work as translators and who have a linguistic academic background is 41.88% (95% confidence interval (as indicated by the solid line): 33.29% - 50.99%), compared to a likelihood of only 13.33% for subjects in the German language version who do not work as translators and who do not have a linguistic background (0.95% confidence interval: 8.06% - 21.26%).

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**10** N = 684; Nagelkerke $R^2$ = .07; $X^2(3)$ = 35.49, p < .00.
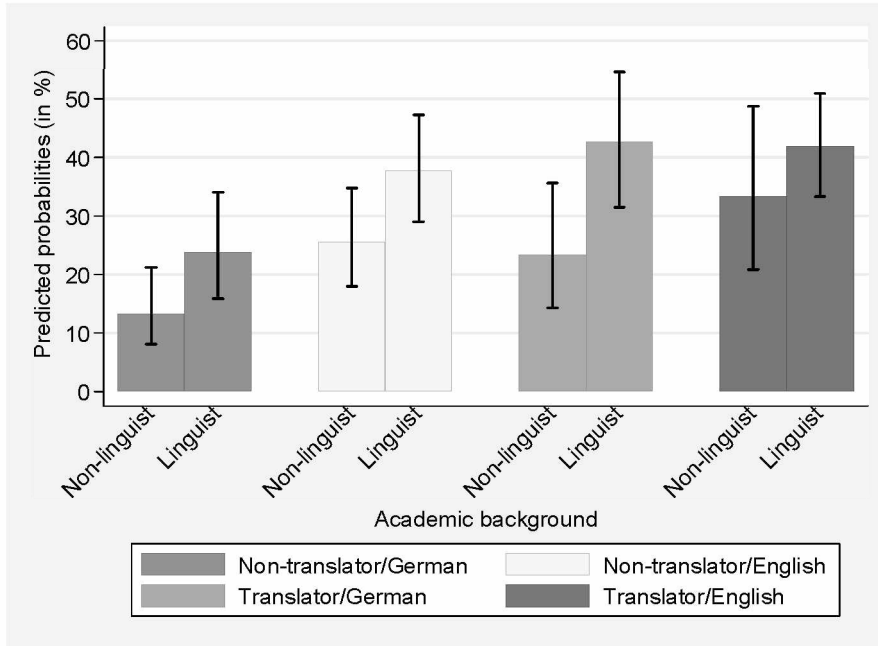
**Fig. 5:** Predicted probabilities of belonging to the 'corpus cluster' as a function of language version, professional background, and academic background.

## 2.2 Closer inspection of demands on online dictionaries

Resulting from the fact that the individual rankings in the first study were much more homogeneous than expected a priori, we decided to examine more closely in the second study whether the respondents had differentiated views on individual aspects of the criteria rated in the first study. Therefore, we asked the participants to evaluate different aspects of the criteria that had been rated as most important for a good online dictionary in the first study (reliability of content, clarity, up-to-date content, accessibility). For those criteria, we were especially interested in finding out what is understood by a broad expression such as "reliability of content", because on the one hand this characteristic is rated on average as by far the most important aspect of a good online dictionary. However, on the other hand, we know that (semi-)collaborative lexicographical projects, for example Wiktionary (Meyer & Gurevych, 2012) or LEO (http://dict.leo.org) have become very popular in the last couple of years, notwithstanding the fact that those dictionaries are deemed to be not very good when it comes to the reliability of the presented content (cf. Hanks, 2012, pp. 77–82; Müller-Spitzer, 2003, pp. 148–154).

### 2.2.1 Method

In our second study, the respondents were presented with four different aspects of each criterion.

Reliability of content. For this characteristic the following aspects were presented:
All details reflect both different types of text and usage across regions.
The online dictionary is maintained by a well-known publisher or a well-known institution.
All details have been validated by (lexicographical) experts.
All details represent actual language usage, meaning that all the details provided are validated on a corpus.

Especially in the context of (semi-)collaboratively constructed dictionaries, it is interesting to find out the importance of the second and third aspects (well-known publisher and expert validation).[11]

Keeping the dictionary up to date. For this characteristic we selected aspects that we considered to be of different degrees of importance for linguists and non-linguists:
Edited words are displayed online immediately.
Recent linguistic developments (regarding changes in spelling or new typical contexts) are quickly incorporated into the online dictionary.
New words are quickly included in the online dictionary.
Current research is incorporated into the lexicographical work.

The first aspect relates to dictionaries that publish their data bit by bit online, for example elexiko (www.elexiko.de) or the Algemeen Nederlands Woordenboek (anw.inl.n). In such cases, the question of how often the dictionary should be updated needs to be answered: on a daily basis so that edited words are published immediately or only from time to time, for example quarterly, so that new entries are published as a whole group?

Accessibility. Quite surprisingly, our first study revealed that only a few of the respondents indicated that they use online dictionaries on different devices (cf. Koplenig/Müller-Spitzer: General issue, this volume). This was picked up by us again as one aspect of the characteristic "accessibility". In addition to this, we selected three more technical aspects:

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**11** For example Sharifi (2012) asked users of Persian dictionaries for their reasons for buying a particular dictionary. The study reveals "the author's reputation as the most important factor when buying a dictionary" (Sharifi, 2012, p. 637).

The online dictionary works properly on different types of device (e. g. mobile/cell phone, PC).
The URL/web address is simple and easy to recall.
No server failures occur due to maintenance etc.
The URL/web address does not change.

Clarity. For this characteristic, we decided to present different aspects relating to the basic design of the functions of an online dictionary. We were especially interested in how our respondents would judge the importance of an introduction to the online dictionary, because on the one hand, this is an aspect that is identified as an important element of an online dictionary in the lexicographical literature (cf. e. g. Kemmer, 2010, pp. 6–7; Klosa, 2009, p. 49,58), while on the other hand it is a common fact that introductions and user instructions are hardly ever read:

> "The general assumption is that no-one bothers to read the front matter of dictionaries." (Kirkpatrick, 1989, p. 754) (cf. also Busane, 1990, p. 28) .

These are the four aspects:
The search window is located in a prominent position, so it is easy to spot.
There is an introduction to the online dictionary that is clearly arranged and easy to absorb.
A quick overview of the most important features and functions of the online dictionary is possible.
You can quickly obtain an overview of the keywords contained in the online dictionary.

In addition to two standardized questions, we incorporated an open-ended question for each presented criterion: "Apart from the aspects we have suggested, are there in your opinion any further aspects which are important for [characteristic] of an online dictionary? If so, please specify." We asked this question to find out if there are any other aspects that could help us gain a better understanding of individual user demands. This is in accordance with the general function of open-ended questions:

> "[Open-ended questions] can also capture diversity in responses and provide alternative explanations to those than closed-ended survey questions are able to capture." (Jackson & Trochim, 2002, p. 307)

In the next section, we will present the additional evidence we were able to collect using this kind of methodology.

## 2.2.2 Results

### 2.2.2.1 Reliability of content
*Closed-ended question*
45.4% of respondents considered the aspect 'All details represent actual language usage, meaning that all the details provided are validated on a corpus' to be most important. 34.4% of the participants chose 'All details have been validated by (lexicographical) experts' as the most important aspect. Further suggested options included: 'All details reflect both different types of text and usage across regions' (12.1%) and 'The online dictionary is maintained by a well-known publisher or a well-known institution' (8.2%, cf. Figure 6).
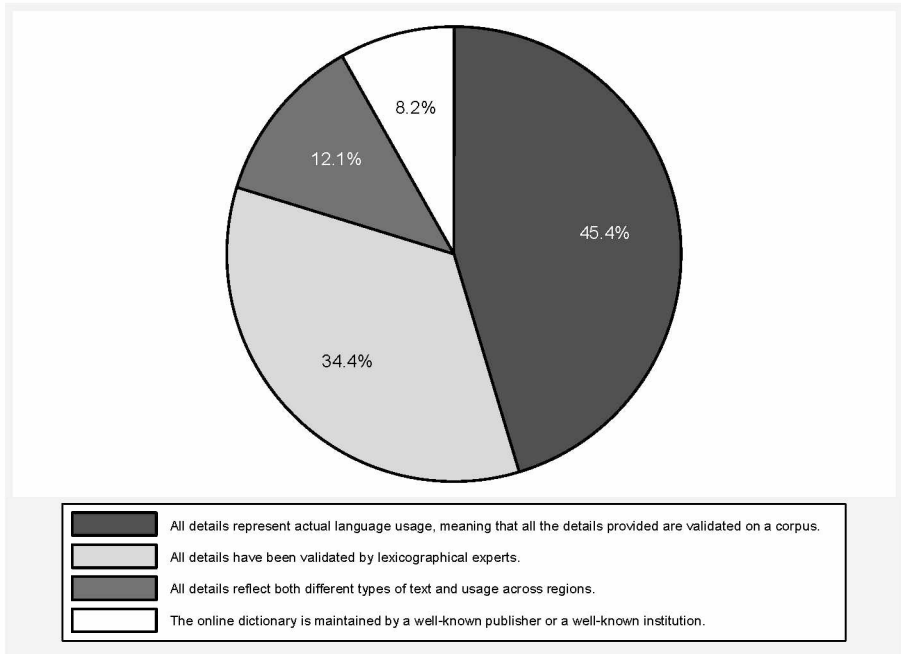


**Fig. 6:** Pie chart of the most important aspect of the reliability of an online dictionary.

*Open-ended question*
86 participants used the option of the open-ended question to mention further aspects. A qualitative analysis of the responses reveals some interesting additional aspects. Some answers relate to contact and feedback possibilities:
– The user should be able to contact makers of the dictionary.

– Editors react to discussions in forums, especially when those by (near-)native speakers.
– Möglichkeit zur Korrektur für Nutzer, gerade in der Fachsprache unerlässlich [Option for users to make corrections, essential in specialist language]
– Diskussionsforen für nicht vorhandene bzw. umstrittene Einträge, Feedback-möglichkeiten (Hat der Eintrag geholfen?, Mittleing von entdeckten Fehler usw.) [Discussion forums for unavailable or disputed entries, feedback options (Was this entry helpful? Reporting of errors discovered by users, etc.)]

At the same time, one respondent explicitly states that any (semi-)collaborative structure can reduce the reliability of the content in question:
– Eine Prüfung durch den Nutzer selbst (vgl. Wikipedia) wäre evt. wünschens-wert, zwar verringert das die Verlässlichkeit, führt jedoch schneller zu Ergeb-nissen. [Checking by users themselves (cf. Wikipedia) might be desirable. It's true that that reduces reliability, but it does lead to quicker results.]

Quite a few answers refer to the issue of authorship, for example who is quoting the dictionary or whether the publisher of the dictionary is well known. In other words, these responses pick up on the aspects presented in the closed-ended question and specify the aspects to some extent:
– I want the information to be accurate. I know that experts and institutions (say Harvard and Oxford) are much more reliable that Tom the Blogger. I do know too that facts are not always facts--even when they come from the best of places. I like notes--e.g. this information has not be validated, for example. I like infor-mation on the size of samples from which the conclusions were drawn.
– Redaktion sollte nicht "offen" sein wie die Wikipedia-Sch*****. Die Glaubwür-digkeit der Information sollte wissenschaftlich untermauert sein. Und die Auto-ren sollen von Ihre Gleichen als Experten anerkannt sein, wie die Autoren eine Enzyklopädie oder wie die Académie Française, der Littré oder der Larousse für die frz. Sprache. Das Problem vom Duden in Deutschland ist es, daß es sich hierbei um eine reine private Institution, die keinerlei übergeordnete Verpflich-tungen bzgl. Sprache hat. [Editing shouldn't be 'open' like Wikipedia-sh**. The credibility of the information should be academically supported. And the au-thors should be recognised by their equals as experts, like the authors of an en-cyclopaedia or like the Académie Française, Littré or Larousse for French. The problem with Duden in Germany is that it's a purely private institution, with no higher obligations whatsoever with regard to language.]

Other responses also highlight problems that are associated with collaborative lexi-cography:
– Make sure it's not open for editing by users, etc. like wikipedia.

Here is an answer that even offers a solution for the aforementioned problem:
– bei Community-Projekten ohne Lexikographen: Prüfung der Angaben durch mehrere (nichtlexikographische) Nutzer, wie z.B. bei dict.cc 2) Verlinkung mit anderen Wörterbüchern und Ressourcen, um Angaben zu Ausdrücken (etwa Mehrwortlexeme), die in Korpora derzeit schwer nachzuweisen sind, beim Nachschlagen unmittelbar selbst prüfen zu können [in the case of community projects without lexicographers: checking of information by several (non-lexicographer) users, as e.g. with dict.cc 2) Links with other dictionaries and re-sources so that you can immediately check information about expressions (such as multi-word lexemes) which is difficult to verify in corpora at present.]

The topic of the empirical base of the lexicographical data is also picked up in the responses to the open-ended questions. For example, some respondents stress that in addition to validating the lexicographical data in a corpus, the corpus itself should be representative:
– The corpus itself should consist of reliable documents - not how-to manuals that have been carelessly translated, for instance, as is so often the case.
– Das zweite Kriterium ist gemischt. Es ist sehr wichtig, dass das Korpus ausge-wogen ist und also sehr viel gesprochene Sprache enthält. Überregionaler Ge-brauch ist hingegen nicht zu wünschen, wiewohl Angaben zur Distribution be-stimmter Worte sehr hilfreich sind. Eine intensive qualitative Arbeit mit zahl-reichen Muttersprachlern kann zur Not ein unbalanciertes oder zu kleines Kor-pus kompensieren. [The second criterion is mixed. It is very important that the corpus is balanced and therefore contains a lot of spoken language. However, usage across regions is not desirable, although information about the distribu-tion of particular words is very helpful. Intensive qualitative work with numer-ous native speakers can just about compensate for an unbalanced or too small corpus.]

One respondent states that the corpus itself should be published as a part of the online dictionary:
– Angaben sollten nicht nur an einem Korpus überprüft sein, dieser sollte auch gleicht mit veröffentlicht werden (z.B. linguee.de), so kann ich mich vergewis-sern, dass das Wort zum jeweiligen Kontext passt [Information shouldn't just be checked against a corpus; the corpus should also be published with it (e.g. linguee.de), so I can make sure that the word fits the relevant context.]

Some respondents think that the existence of many illustrative examples enhances the reliability of the content:
– Evidence that it's updated regularly, and includes many usage examples.
– providing the reader with natural examples will increase the reliability of con-tent.

– Verschiedene Sorten sollen genauso wie Fachsprache berücksichtigen (z.B. Link auf Englisch kann auch GElenk bedeuten). Am besten ist, wenn neben einer Übersetzung auch ein Beispielsatz angezeigt wäre. [Different types should be taken into account just like specialist language (e.g. Link in English can also mean GElenk). It's best when next to a translation, there's also an example sentence.]

To summarize, the qualitative analysis of the responses shows that the open-ended question is mainly used to further specify the aspects presented in the closed-ended question.

### 2.2.2.2 Keeping the dictionary up to date

*Closed-ended question*

41.3% of the respondents selected the aspect 'Recent linguistic developments (regarding changes in spelling or new typical contexts) are quickly incorporated into the online dictionary' as being most important for keeping an online dictionary up to date. Over a third (34.4%) of respondents opted for the alternative 'New words are quickly included in the online dictionary'. Further suggested options included: 'Current research is incorporated into the lexicographical work' (14.4%) and 'Edited words are displayed online immediately' (10.0%, cf. Figure 7).

*Open-ended question*

As with the previous aspect, respondents mention the possibility of feedback as one important way of keeping a dictionary up to date:

– Potential for user feedback (e.g., submitting new words or definitions, or modifying/voting on existing ones), with some sort of moderation to ensure quality. Wiktionary and Urban Dictionary are much better at being up-to-date than traditional dictionaries.

– correcting errors that sometimes are carried on for several years before they are finally caught. Use the human resource you have available -(cf. the "human computer" projects being pursued for correction of optical character recognition errors) by offering a way for USERS to point out errors and suggest corrections
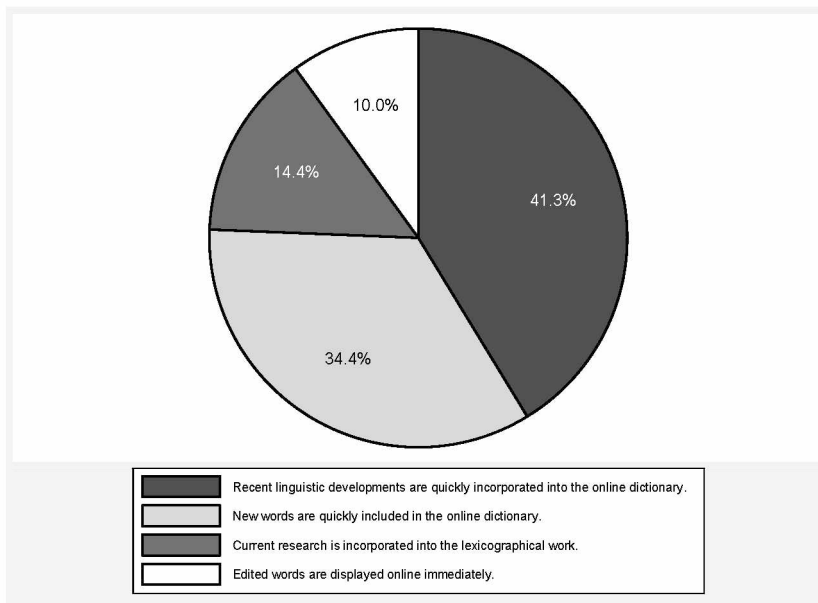
**Fig. 7:** Pie chart of the most important aspect of keeping an online dictionary up to date.

One answer even explicitly suggests the procedure of adding dictionary entries that have often been searched for without success by the dictionary users based on the (automatic) analysis of log files described as "Fuzzy Simultaneous Feedback" by De Schryver and Prinsloo (De Schryver & Prinsloo, 2001):

– allgemeine Lücken im Wörterbuchbestand zu schließen, beispielsweise anhand wiederholter (erfolgloser) Suchen durch Benutzer; bei in der Suche ortographisch falsch eingegebenen Wörtern (durch den Benutzer), automatische Weiterleitung zum richtigen Eintrag - auch hier basierend auf der Auswertung häufiger Benutzereingaben [filling in general gaps in the dictionary, e.g. based on repeated (unsuccessful) searches by users; automatic redirection to the correct entry when searching for words which have been spelt incorrectly (by the user) – again based on the evaluation of what users frequently type in]

One aspect that was not available in the closed-ended question, but that was mentioned in the open-ended one several times, was the fact that "keeping a dictionary up to date" should not only mean that new words are quickly included in the online dictionary, but also that obsolete words should be labelled accordingly.

– obsolete Einträge werden gekennzeichnet/herausgenommen (--> Überprüfung an Korpora) [obsolete entries to be labelled/taken out (→ checking against corpora)]

– Obsolete words should also be labeled as obsolete.

– Perhaps if a word falls out of use, keep it in the dictionary, but mark it as archaic/dated/out-of-use/uncommon.

A few answers criticized the up-to-date standard in general:
– It is vital that the previous material continue to be included. Just because something is new does not make it better. I just watched and listened to a videotaped course on linguistics in which I heard my common vocabulary, pronunciation, and sentence structure mocked as being the language of a small group of little old ladies being pretentious--I am 6 ' (I am 61) and a male--and no one omcluding my Mensa friends who make fun of everything and everyone have called me pretentious. Nothing is up-to-date if it ignores the past.
– Halte wenig von dem Aktualisierungsanspruch, der ist nicht einzulösen; online müsste man alle 24 Stunden upgraden, das ist nicht zu schaffen, also lieber stabil für 2-3 Jahre bleiben und dann lexikographisch seriöse Upgrades [Don't think much of the updating requirement – it can't be achieved; online, you would have to update every 24 hours, it can't be done, so it's better to keep it stable for 2-3 years and then have a serious lexicographical update]
– Up-to-date is such an impossible term in this world where there is so much information. None of us can keep up to date. I want help from the institution and experts--and yes, the information should be dated. However, knowledge and wisdom--well, that's different. I don't need the date the poem was written.
– Up-to-date being less important than accuracy. If it takes time to verify new words, may it be so. Nice, if fast, but not crucial for me using the dictionary.

In addition to this, a few answers suggest a "date label" for each dictionary entry, so that the users are able to understand how old an entry is.
– Date of entry (like the OED) would be useful. Also information on when a word becomes less frequent, and what it is replaced with (e.g. climate change replacing global warming.
– Fehler auf den Seiten werden regelmäßig behoben - Aktualisierungen werden für den Benutzer anhand z. B. "zuletzt geändert am DATUM" deutlich gemacht [Mistakes on the pages removed regularly – updates made clear for the user using e.g. "last amended on DATE"]
– Korrekturen werden vorgenommen. Größere Änderungen (z.B. technische Änderungen, großer Zuwachs von Artikeln) werden per Newsletter oder auf der Homepage wahrnehmbar mitgeteilt. [Corrections are carried out. Larger revisions (e.g. technical revisions, a large increase in entries) are communicated via newsletter or in a prominent position on the homepage.]

Furthermore, links to other relevant websites can help to make the content more up to date.

- Quick and visible link to one/more reliable lexicographical blogs for daily or more random updates and commentaries (e.g. Urban dictionary.com).
- Possibly a link to wepages using the word in question, showing current usages of the word (like http://www.wordnik.com)

One of the aspects presented in the closed-ended question was "edited words are displayed immediately". Quite a few answers to the open-ended question show that some respondents did not understand this:

- Was sind „redaktionell bearbeitete Wörter"? Warum sollten sie nicht online angezeigt werden? Frage nicht verstanden. [What are "edited words"? Why should they not be displayed online? Don't understand the question.]
- keine Ahnung was ‚redaktionell bearbeitete Wörter werden direkt online gezeigt' heissen soll. [No idea what 'edited words are displayed online immediately' is supposed to mean.]
- Don't understand "edited words....immediately"
- Der Nutzer kann selbst neue Wörter beitragen und ggf. zur Diskussion stellen. Übrigens: Die Option „Redaktionell bearbeitete Wörter werden direkt online gezeigt." verstehe ich nicht. Deshalb habe ich sie als weniger wichtig eingestuft. [Users themselves can contribute new words and put them up for discussion if need be. Besides, I don't understand the option "Edited words are displayed online immediately". That's why I've rated it as less important.]
- Anmerkung zu oben „Redaktionell bearbeitete Wörter werden direkt online gezeigt" -- was soll das heißen? „Direkt online" ist doch alles? Und redaktionell bearbeitet hoffentlich auch ... [Comment on the above "Edited words are displayed online immediately" – what does that mean? Isn't everything "online immediately"? And edited as well, hopefully...]

Within the project of the dictionary-portal OWID,[12] the question of how often the dictionary should be updated, on a daily basis so that edited words are published immediately or only from time to time so that new entries are published as a whole group, was a topic of much discussion. The qualitative analysis of the open-ended questions reveals that this discussion took place "inside the box", quite independently of any relevance for the dictionary users.

To summarize, the answers to the open-ended question show that – contrary to the reliability of content – our respondents mentioned quite a few aspects that were missing in the closed-ended question. In other words, we received a lot of valuable feedback that we can use in the process of designing future dictionary functions.

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### 2.2.2.3 Accessibility

*Closed-ended question*

Around one third of the participants selected the aspect 'No server failures occur due to maintenance etc.', and another third chose the option 'The URL/web address does not change' as the most important. Further suggested options included: 'The online dictionary works properly on different types of device (e.g. mobile/cell phone, PC)' (19.2%) and 'The URL/web address is simple and easy to recall' (15.9%) (cf. Figure 7).
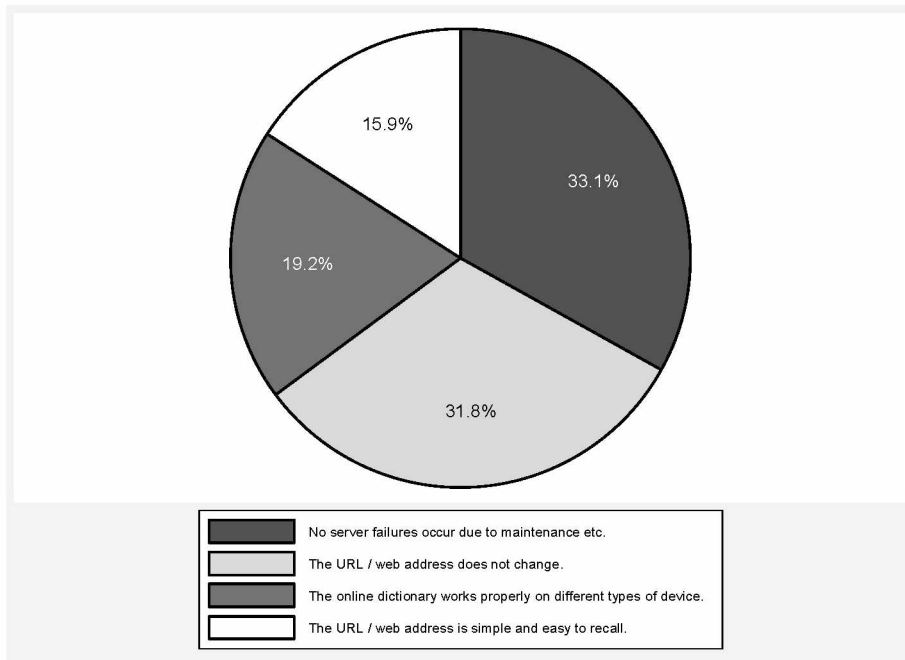


**Fig. 7:** Pie chart of the most important aspect of the accessibility of an online dictionary.

*Open-ended question*

The answers to the open-ended question regarding further aspects which are important for the accessibility of an online-dictionary contain a few aspects that were not available in the corresponding closed-ended question. For example, some respondents point out that compatibility with different browsers is important:

– Also broadly within the scope of "accessibility" is the ability to access and use the application using all reasonably common browsers and operating systems.
– Compatibility with all browers/OS

–   Ensuring browser compliance with regard to symbols and Unicode characters (some browsers do not support all Unicode characters and show "blocks") as well as W3C compliance

Other technical aspects are mentioned as well, such as the functionality of the online application with slower internet connections:

–   Site needs to comply with accessibility standards e.g. be readable by screen readers, be accessible by audio etc.
–   That it functions properly on high speed AND low speed internet connections.

Some answers emphasize the importance of a barrier-free design, another aspect missing in the closed-ended question:
Easy to use for people with disabilities.

–   The dictionary works properly on a wide variety of Web browsers, and in a range of media (e.g., in a text-to-speech browser for visually impaired users). As much content as possible remains readable when the dictionary is used in a browser with minimal multimedia capacity (e.g., Lynx).
–   Information should be available to users with disabilities, particularly visual impairments that require the use of text to voice browsers.
–   accessibility for the visually impaired different phonemic transcription standards (certainly IPA, but also systems optimized to be intuitive for people familiar with the language) audio pronunciations that do not rely on Flash (HTML 5 ftw.) UTF-8 support everywhere an inviting overall design a "Get Firefox" button that appears when the page is opened in IE

The standardized answer options offered for aspects relating to the URL of the online dictionary: 'The URL/web address is simple and easy to recall' and 'The URL/ web address does not change'. In contrast to that some answers to the open-ended question mention that it is equally or even more important that the dictionary entries appear in the top results of a search engine, that is search engines optimization:

–   Actually, I often go to my favorite online dictionary simply by typing the keyword in Google: "reverse". In other words, I pay very little attention to the actual text of the URL (and I never type it to go there). The link to dictionary.com appears in the Google search menu after typing just "dict". I would say that the search engine plays an important role taking the user to the dictionary website.
–   Suchmaschinen machen die merkbare URL unnötig, Weiterleitung die stabilitas loci [Search engines make the visible URL unnecessary, just as redirection makes the stabilitas loci unnecessary]

However, the stability of the web address is pointed out as an important aspect when it comes to quoting the dictionary entry, for example in scientific publications:

– Bei komplexeren, wisschenschaftlicheren Artikeln relevant: Der Artikel sollte zitierbar sein (eindeutige URL, Zeitstempel) Ein Artikel sollte auch nach einiger Zeit noch aufrufbar sein, bzw. Artikeländerungen sollten zumindest nachvollziehbar sein [Relevant for more complex, more academic articles; the entry should be citable (definite URL, marked with the date). It should also be possible to recall an entry after some time, or revisions to entries should at least be recognizable as such]

– URIs für alle Einträge, incl. Versionierung zur besseren Zitierbarkeit. [URLs for all entries, including an indication of different versions for better referencing.]

– Zitierfähigkeit: Auch nach längerer Zeit bzw. nach Änderungen/Aktualisierungen sollte es möglich sein, einen zu einem früheren Datum angezeigten Inhalt zu reproduzieren. [Referencing: even after a long time or after revisions/updates, it should be possible to reproduce content which was displayed at an earlier date.]

All in all, the answers to the open-ended question contain many additional cues that allow us to better understand individual user demands regarding the accessibility of an online dictionary.

### 2.2.2.4 Clarity

*Closed-ended question*

More than half of the respondents (53.8%) considered the aspect 'The search window is located in a prominent position, so it is easy to spot' to be most important for the clarity of an online dictionary. 25.9% of the participants chose 'A quick overview of the most important features and functions of the online dictionary is possible'. Further suggested options included: 'You can quickly obtain an overview of the keywords contained in the online dictionary' (16.2%) and 'There is an introduction to the online dictionary that is clearly arranged and easy to absorb'(4.4%) (cf. Figure 8).
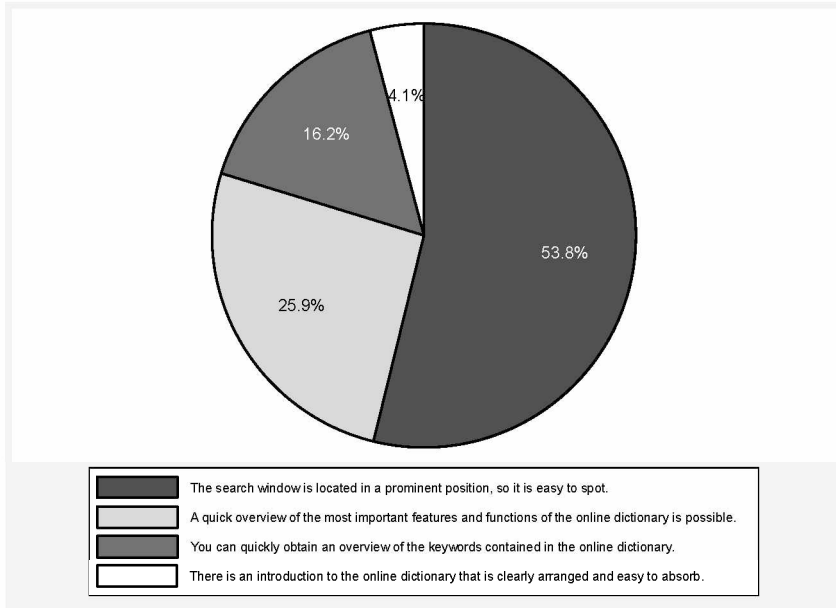
**Legend:**
- The search window is located in a prominent position, so it is easy to spot.
- A quick overview of the most important features and functions of the online dictionary is possible.
- You can quickly obtain an overview of the keywords contained in the online dictionary.
- There is an introduction to the online dictionary that is clearly arranged and easy to absorb.

**Fig. 8:** Pie chart of the most important aspect of the clarity of an online dictionary.

*Open-ended question*

Quite a few answers to the open-ended question regarding potential additional aspects of clarity as one important aspect of a good online dictionary point out that the website itself should be structured clearly and, if possible, that the lexicographical content should be separate from the advertisements:

- Neat, uncluttered page layout, including separation of advertisements from content
- Have the definition window prominent and clear of clutter. Some online dictionaries put advertisements in between definitions, which is really annoying, but could also lead to a user missing a definition because they didn't think there was more.
- General clean, uncluttered look, not having to dig around the site to find functions I want to use
- Good font and simple, uncluttered pages. Keep adverts to one side, rather than across the top.

In a similar vein, some respondents suggest that it is important that the different parts of the dictionary entry should be easily distinguishable:

- Sections providing different functions need to be clearly delineated. e.g. you should be able to tell if you're reading a definition or etymology.

- strukturierung der lexikoneintraege. ich habe kein interesse daran, mehrere stichwoerter gleichzeitig zu sehen, aber finde einen klaren aufbau des eintrags fuer jedes wort sehr wichtig. wenn das nicht gegeben ist, verwende ich ein online-woerterbuch nie wieder. [Stucturing of the dictionary entries. I have no interest in seeing several headwords at the same time, but I think a clear structure for the entry for every word is very important. If that's not provided, I don't use that online dictionary again.]
- A quick overview of the most important features and functions of each *entry word* is possible

One respondent points out that information overload should be avoided:
- Selektivität der Anzeige: Die Benutzerführung soll dafür sorgen, dass nicht ein Wust von verschiedenartigen Informationen zu einem Lemma auf dem Bildschirm zu sehen ist, sondern zu jedem Zeitpunkt möglichst wenige, aktuell relevante Informationen. Motto: Lieber einmal mehr klicken, um gezielt zu einem weiteren Punkt eine Auskunft zu bekommen (die dann z.B. in einem Overlay-Fenster erscheint oder "ausgefahren" wird), als in einer Bleiwüste angestrengt die gewünschte Info herauszusuchen. [Selectivity of the display: the navigation for users should make sure that it's not a jumble of information about a lemma that is visible on the screen, but rather, at any given moment, the barest possible, relevant information. Motto: better to click once more in order to get targeted information on a further point (which then appears in an overlay window, for example, or is "extended"), than to have to carefully pick the desired information out of a sea of print.]

Some answers relate to the significance of an introduction to the online dictionary, which was one aspect presented in the closed-ended question. Such an introduction is seen as counterproductive, because the user interface should be intuitive and self-explanatory, or as Lemnitzer (2001) puts it, usage errors are 'not the mistake of the user but the insufficiency of the user interface'[13] (Lemnitzer, 2001, p. 248, cf. also Pulitano, 2003, p. 58)
- I should be able to figure out basically everything about using the dictionary intuitively, without reading any instructions.
- Most features should be visually obvious and not require explanation
- Wenn ich eine Einführung brauche hat das Layout versagt. [If I need an introduction, then the layout has failed.]
- wenn eine applikation richtig implementiert ist mit einer vernünftigen bedienoberfläche, erübrigt sich eine einführung – das sollte das ziel jeder entwicklung

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13 „Wir verfuhren dabei nach der Devise, daß ein ‚Fehler' in der Bedienung nicht ein Fehler des Benutzers ist, sondern eine Unzulänglichkeit der Benutzeroberfläche." (Lemnitzer, 2001, p. 248)

sein [If an application has been properly implemented, with a sensible user interface, an introduction is superfluous – that should be the aim of every development]

Regarding the clarity of an online dictionary, our analysis of the open-ended responses both reveal some specifications and refinements of the options presented in the closed question, and provide some new aspects, for example regarding the intuitiveness of the user interface.

## 2.3 Discussion

As mentioned above, we expected that many respondents would rate most of the possible aspects of a good online dictionary as important. The assumption turned out to be wrong, as the correlation between the ratings and the individual ranking revealed. This result indicates that the participants do not judge all characteristics of a good online dictionary to be of great value and only select a favourite when they are forced to discriminate between the criteria. This seems to indicate that users have a clear conception of a good online dictionary. Of course, it is not surprising that "reliability of content" is ranked highly. However, this dominance is worth mentioning. Instead of classifying it as variable, it should be considered to be a constant of a good online dictionary, since it hardly varies at all between the different respondents.

Having evaluated the more general characteristics of good online dictionaries in the first study, our aim in the second study was to examine in more detail those features that had been rated as good. In this case, the combination of closed-ended questions, in which various aspects of the general criteria were open for selection, plus one open-ended question, which gave participants the opportunity to express their views in more detail, has led to a detailed picture of what our participants understand by a good online dictionary. In terms of reliability, it was considered important that all details represent actual language use and are validated on a corpus, and that the lexicographic data have been validated by lexicographical experts; with regard to keeping the dictionary up to date, the quick incorporation of recent linguistic developments and neologisms is the most mentioned feature; in terms of accessibility, a stable Internet address and a well-maintained system with few failures are seen as important; and lastly, in the field of clarity, the most important feature is that the search window of an online dictionary is located in a prominent position.

Our study reveals a very clear preference for content-related reliability, although for example Almind believes that the speed of data retrieval from electronic dictionaries together with search precision is "the reason why even internet dictionaries with a sub-standard content are successful" (Almind, 2005, p. 39; cf. also

Dziemanko, 2012, p. 333). In a similar vein, Nesi (Nesi, 2012) shows that users of PEDs prefer using those devices even if the quality of the lexicographical data presented is not as good as in established dictionaries. Nesi argues that owners of PEDs seem to like to use dictionaries on their devices, because they appreciate many of the additional features. And this, according to Nesi, is the reason why those types of users seem to accept the low quality of the content. Based on this argument, Nesi reasons that:

> "Producers of high-quality dictionaries may still be able to maintain a competitive edge, especially if they continue to develop those peripheral e-dictionary facilities such as audio and video files, word-list creation tools, language tests, and language games, all popular with users and unique to the electronic medium." (Nesi, 2012, p. 377)

In our study, the analysis of the individual ratings and rankings shows that the classical criteria of reference books (e.g. reliability, clarity) were both ranked and rated highest, whereas the unique characteristics of online dictionaries (e.g. multimedia, adaptability) were rated and ranked as (partly) unimportant. Unlike other studies (certainly studies differing both in terms of research design and central aims), our results indicate that it is not just the additional features mentioned above, but also the "search speed and ease of use [which] rank high among the features which are most appreciated in electronic dictionaries" (Dziemanko, 2012, p. 333, and the studies quoted there). Also, our data don't show that a user-friendly dictionary must be a flexible one, as De Schryver once put it: "Going hand in hand with a user-friendly dictionary, is a flexible dictionary" (De Schryver, 2003, p. 182). Equally lacking is an empirical foundation when Bergenholtz notes: "The best dictionary is probably the one rendering a usable result in a short time" (Bergenholtz, 2011, p. 35).

Our results also conflict with ideas for the development of a user-adaptive interface and the incorporation of multimedia elements to make online dictionaries more user-friendly and innovative (De Schryver, 2003; Müller-Spitzer, 2008; Verlinde & Binon, 2010 present evidence challenging that view). This raises the question of whether the design of an adaptive interface really makes online dictionaries more user-friendly, or whether this is just a lexicographer's dream (De Schryver, 2003; Verlinde & Peeters, 2012, p. 151). Nevertheless, we believe that our results do not mean that the development of innovative features of online dictionaries is of negligible importance. As we show in Section 3 in detail, users tend to appreciate good ideas, such as a user-adaptive interface, but they are just not used to online dictionaries incorporating such features. As a result, they have no basis on which to judge the usefulness of those features.

Regarding the subgroup analyses, the findings reported here suggest that our initial hypothesis that different groups have different demands was too simple. Both a visual inspection of the data and statistical analyses of variance revealed that knowledge of the participant's background allows hardly any conclusions to be

drawn about the participant's individual ranking. By conducting a cluster analysis and by using a binary logistic regression model, we have shown that the probability of belonging to one of the two clusters (as an indicator for sharing similar individual demands regarding the use of an online dictionary) depends on academic and professional background and on the language version chosen. For example, more than 40% of respondents who work as translators and who have a linguistic academic background belong to the CORPUS CLUSTER. In this group, the link to the empirical basis of the given information is rated as very important. Respondents who do not work as translators and who do not have a linguistic background only have a probability of roughly 13% in the German-language version and roughly 25% in the English-language version of belonging to this cluster. One could speculate that there have to be other (background) variables that account for this variation. This leaves room for further studies focusing on the nature of this relationship.

In the responses to the open-ended questions in the second study, it again became very clear that those participants who wrote in some detail obviously understand a lot about dictionaries and can therefore also express their ideas quite clearly. With reference to the issues discussed in this section, this is in our opinion a great advantage, since the opinions and attitudes of this audience can really provide valuable clues as to what aspects should be focused on in the development of an online dictionary when the aim is to meet the expectations of the target group of more or less experienced dictionary users.

# 3 Evaluation of innovative features

## 3.1 Experiment on the evaluation of innovative features

It was shown in Section 2 that, compared to more conventional criteria (e.g. reliability, clarity, up-to-date content), the unique features of online dictionaries (e.g. multimedia, adaptability) were classified as of no great importance. On the one hand, this hardly comes as a surprise, given the fact that an online dictionary that is highly innovative but unreliable is not very useful, while the opposite – reliable but conventional – only slightly changes the practical value of the reference tool.

On the other hand, we assume that an additional explanation for this result is the fact that respondents are not used to online dictionaries incorporating those features, meaning that they cannot assess whether or not they need such functions.

"[...] people are not born with the skills to extract the wealth of data stored in dictionaries and other reference works efficiently and transform it into knowledge. It takes time to get accustomed to new ways of finding information, it may even require formal training." (Trap-Jensen 2010: 1142,cf. also Tarp 2011: 59, Heid/Zimmermann 2012: 669 and Verlinde 2012: 151)

Thus, respondents currently have no basis on which to judge their potential useful-ness. This line of reasoning predicts a learning effect. That is, when users are fully informed about possible multimedia and adaptable features, they will come to judge these characteristics to be more useful than users who do not have this kind of in-formation. To test this assumption, we incorporated an experimental element into our second survey.

### 3.1.1 Method

The participants in our survey were presented, both visually and linguistically, with several possible multimedia applications and various features of an adaptable online dictionary in a set of statements (S1). Each feature was explained in detail and/or supplemented by a picture illustrating its potential function (see Figures in Section 3.2.1). The participants were then asked to rate each feature with respect to three different characteristics regarding the use of an online dictionary (impor-tance/benefit/helpfulness).

In a second set (S2), participants were asked to indicate how much they agreed with the following two statements:

The application of multimedia and adaptable features ...
– (A) ... makes working with an online dictionary much easier.
– (B) ... in online dictionaries is just a gadget.

To induce a learning effect, we randomized the order of the two sets: participants in the learning-effect condition (L) were first presented with the examples in S1. After that, they were asked to indicate their opinion in S2. Participants in the non-lear-ning-effect condition (N) had to answer S2 followed by S1. Thus, to judge the poten-tial usefulness of adaptability and multimedia, the participants in the learning-effect condition could use the information presented in S1, whereas the participants in the non-learning-effect condition could not rely on this kind of information. If our assumption is correct, participants in the learning-effect condition L will judge adaptability and multimedia to be more useful compared with participants in the non-learning-effect condition N.

### 3.1.2 Results

The dependent variables were measured as described above (S2). Both ratings were made on 7-point Likert scales (1 = strongly disagree, 7 = strongly agree). The an-swers to these two items were averaged and oriented in the same direction to form a

reliable scale of adaptability and multimedia benefit judgments ($\alpha = .75$), with higher values indicating more benefit.

*Analysis of variance*

An ANOVA yielded a significant effect of the learning condition.[14] As hypothesized, the results showed that participants in *L* judged adaptability and multimedia to be more useful (M = 5.02, SD = 1.30, N = 175) than participants in *N* (M = 4.50, SD = 1.54, N = 206; cf. Fig. 12).
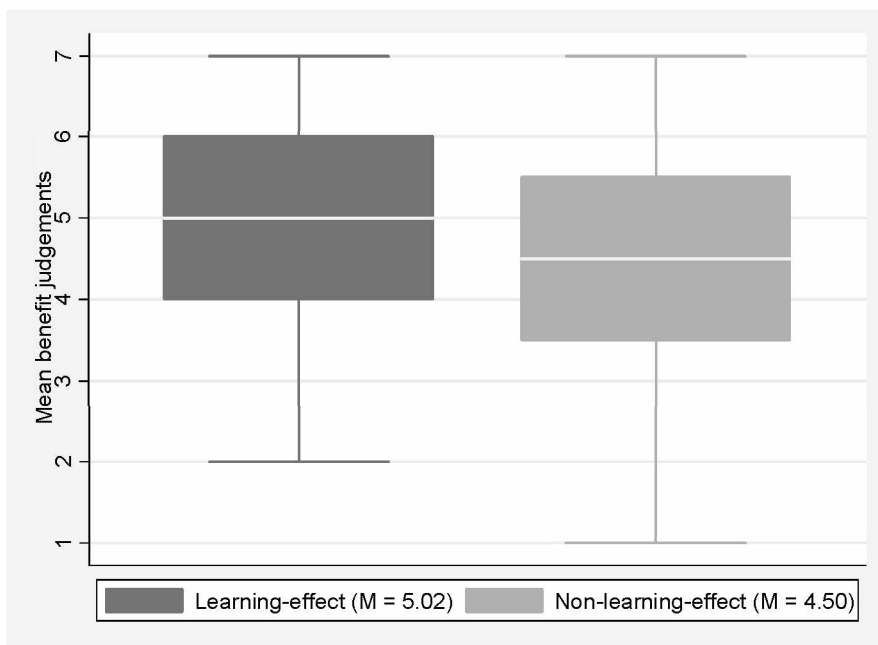


**Fig. 9:** Groupwise boxplots, showing the median adaptability and multimedia benefit judgements as a function of the learning-effect condition.

*Subgroup analyses*

In order to better interpret these results, we conducted a three-way ANOVA with learning condition, background and language version as independent factors. The statistical analysis revealed significant main effects for condition, for background, and for language version. In addition, a significant three-way interaction between experimental condition, background, and language version was found. Post hoc comparisons using the Tukey HSD test indicated that the mean difference in the

**14** $F(1, 379) = 12.27$, p < .00.

German-language version between the conditions was significant for the non-linguists and insignificant for the linguists, whereas the difference between the two conditions was highly significant for the linguists and insignificant for the non-linguists in the English-language version (cf. Table 4).

| German-Language Version | | |
| --- | --- | --- |
| | Background | |
| | Linguistic | Non-Linguistic |
| Condition | | |
| Non-learning-effect | 5.02 (1.47) | 4.45 (1.66) |
| Learning-effect | 5.02 (1.18) | 5.09 (1.35) |
| English-Language Version | | |

| | Background | |
| --- | --- | --- |
| | Linguistic | Non-Linguistic |
| Condition | | |
| Non-learning-effect | 4.23 (1.47) | 4.12 (1.63) |
| Learning-effect | 5.15 (1.26) | 4.45 (1.50) |

[a] Significant differences in bold. Standard deviations in parentheses.

**Tab. 4:** Means of adaptability and multimedia benefit judgements as a function of condition, background and language version[a].

## 3.2 Closer inspection of innovative features

In addition to the experimental test of the learning effect presented in the last section, one part of our examination of innovative aspects of online dictionaries was the evaluation of several possible features of online dictionaries in the subsequent two sets of questions focusing on 1) the use of multimedia and 2) user adaptability (two features that were rated, on average, as partly unimportant or unimportant for a good online dictionary in our first survey). The empirical results of these questions are presented in this section.

### 3.2.1 Method

Regarding the incorporation of multimedia elements into the online dictionary, we picked out three different elements that are used (or could be used potentially, in our opinion) in several different dictionaries (De Schryver, 2003, pp. 165–167; Faber, Araúz, Velasco, & Reimerink, 2007):

Audio pronunciations: audio files illustrating the pronunciation of a word, a phrase or a whole sentence.

Illustrations (cf. Figure 10).

Collocation graphs representing collocations, i.e. frequently occurring word combinations, in a visual form (cf. Figure 11).
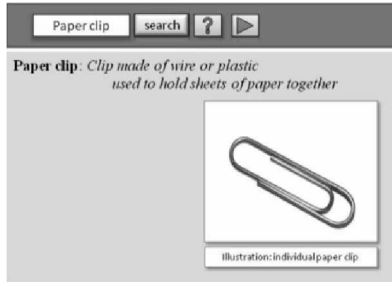


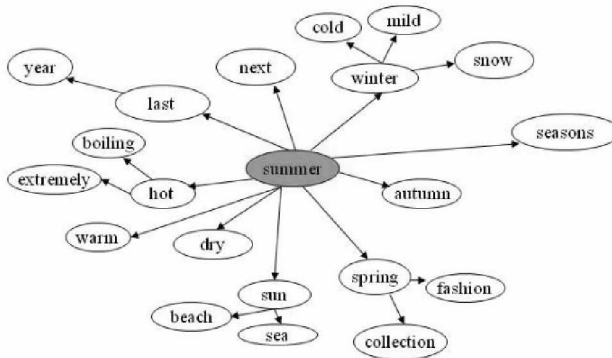**Fig. 10:** Screenshot of a possible illustration presented in the survey.



**Fig. 11:** Screenshot of a possible collocation graph presented in the survey.

Regarding the adaptability of an online dictionary, i.e. the potential adjustment to the demands of a particular activity and the user's needs by using different elements, we selected three different features of an adaptable online dictionary that are already incorporated into online dictionaries or discussed in the academic community:

1.  Customized user interface: to facilitate access to relevant personal information, the user interface of the online dictionary automatically adapts to the user's

preferences depending on the item classes used in previous search requests (De Schryver, 2003, p. 185).[15]

2.  Dynamic visual representations: this refers to the possibility of creating a personalized user view of the online dictionary. This can be done by choosing between different item classes, e. g. definition, sense relations, information on grammar or citations (Trap-Jensen, 2010, pp. 1134–1136, and the examples presented there, Figure 12).

3.  Alternative profiles: this means that the user of the online dictionary can choose between different profiles that optimally adjust the content according to the user's needs. For this purpose, the user first chooses between different user types and/or different usage situations. Certain defaults are then used to structure the mode of content presentation (Kwary, 2010; Trap-Jensen, 2010, pp. 1134–1138; Verlinde, Leroyer, & Binon, 2010) (Figure 13).
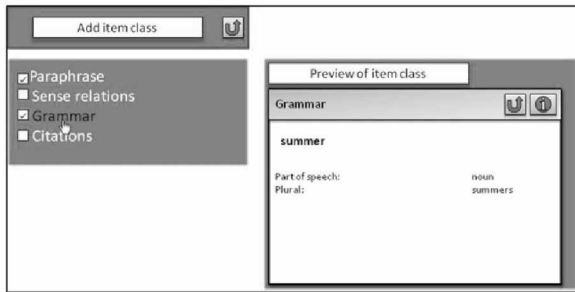


**Fig. 12:** Screenshot illustrating dynamic visual representations presented in the survey.
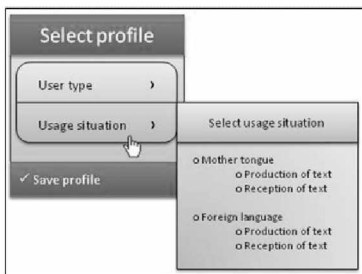


**Fig. 13:** Screenshot illustrating alternative profiles presented in the survey.

In both sections, the respondents had to rate the presented features with respect to their importance and usefulness when using an online dictionary.

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15  A widely known commercial example is the homepage of the mail-order company Amazon, which changes according to the user and his/her previous shopping preferences.

We added an open-ended question ("Do you have any other ideas about how to design an adaptable online dictionary?") at the end of the set of questions on adaptable features of online dictionaries to find out whether the respondents to our survey had any ideas regarding other potential adaptable features that we had not thought of, or to give us feedback on the general benefit of this type of characteristic.

### 3.2.2 Results

*Closed-ended questions*
To measure the importance of the feature in question, the participants were asked to use a Likert scale from 1 to 7, where 1 represents 'Not important/beneficial/helpful at all' and 7 represents 'Very important/beneficial/helpful'. The answers to these items were averaged to form a reliable scale (all $\alpha s > .93$), with higher values indicating more usefulness.

Figure 14 presents the results for the multimedia features. Of the three presented features, "audio pronunciations" is the most useful (M = 5.73, SD = 1.3), while "illustrations" is the second most useful (M = 5.09, SD = 1.50) and "collocations" is categorized as the least important when using an online dictionary (M = 4.20, SD = 1.77).

Figure 15 shows the results for the adaptable features. The possibility of creating a personalized user view of the online dictionary ("dynamic visual representations") is on average the most useful (M = 5.00, SD = 1.42). The other two adaptable features – "alternative profiles" (M = 4.46, SD = 1.68) and "customized user interface" (M = 4.15, SD = 1.58) - receive similar ratings.

*Open-ended question*
The possibility given by a customized user interface of saving previous search requests is highlighted as being particularly useful by several respondents:
– Keep a list of the user's previous searches on the dictionary's main page, so that if they user wants to consult that definition again, they can easily do so.
– Keep my search preferences in a profile (stored on the server or as a cookie in my machine) and next time I visit the site, adapt dynamically my profile
– A "Show history" feature might be useful for users who want to return to words that they looked up previously. An example of this feature can be seen at http://www.ordbogen.com/ They simply display a list of "words you have looked up" on the same page (i.e., not in the menu system or as a pop-up). Each word is linked to its respective URL, so the user can click on it word to look it up again. The history can also be used in pedagogical applications, such as a daily quiz: "can you remember the meaning(s) of the words you looked up last week? click here to take the quiz..."
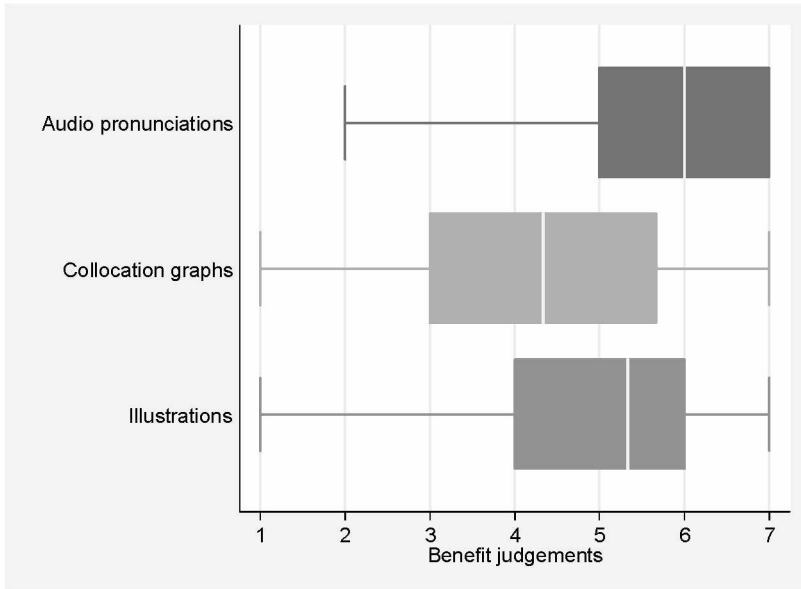
**Fig. 14:** Groupwise boxplots, showing the benefit judgements for the different multimedia elements presented.
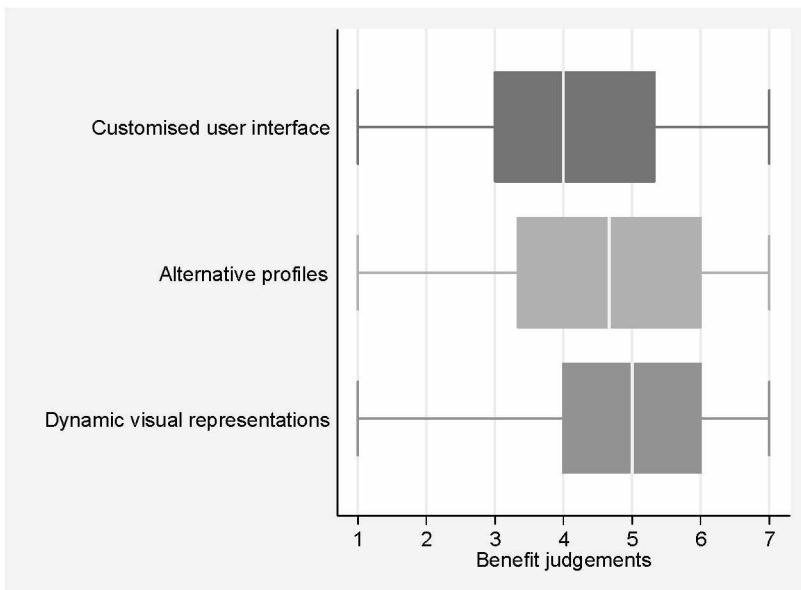


**Fig. 15:** Groupwise boxplots, showing the benefit judgements for the different adaptable elements presented.

One participant even renders this idea more precisely by suggesting an adaptation to specific domains:

–   If a user frequently looks up the same words, or synonyms, then perhaps a "recently used" list or suggestion mechanism may be beneficial. Also, this presents an opportunity to integrate with a flashcard or learning system, because the dictionary knows what words the user is struggling to remember. Further, and this may be a little tricky, but if the user is looking up words in a specific domain (say, for example, foreign computer terms or financial terms) then the dictionary may feature those words more prominetely than other words.

Another participant outlines a different kind of adaptability with respect to the encoding of characters:

–   I think it would be helpful if the encoding of characters could correspond with the user's preferences. For example, there are two ways of representing the Arabic letter kaf: ك and ڪ. I sometimes cannot anticipate which is the appropriate one, and must search sometimes twice or more to get the spelling right. Suggestions for spellings in real-time would be a useful feature.

One respondent suggests the use of multilingual instructions and layout:

–   If dictionary instructions, layout, etc. are offered in different languages, remembering the user's choice of access language.

When it comes to the general benefit of an adaptable online dictionary, a few respondents take into consideration that those features should not be some kind of 'usage obstacle', but should be as simple and intuitive as possible:

–   The problem with adaptable interfaces is that you have to learn to use them, but you only do it once so they have to be VERY intuitive. I certainly don't mind finding the information I want through links. Now if you had a system that could learn and offer me a personalized interface based on the links I followed most frequently, then you'd have something.

–   Je weniger Bedienelemente eine Oberfläche hat, desto eher werden sie benutzt. Wenn also wie bei Amazon OHNE weitere Bedienelemente ein Mehrwert geschaffen werden kann, ist das sinnvoll. Aufwendige Konfigurationsoberflächen sind eher kontraproduktiv. [The fewer user elements an interface has, the more likely it is that they will be used. So if, as on Amazon, an added value can be created WITHOUT further user elements, then that's useful. Elaborate interfaces are rather counterproductive.]

In particular, there is a lot of criticism of the "alternative profiles" option:

–   I do like the idea of a "data-driven", or user-centered dictionary. That is, centering the dictionary around what the user actually uses it for, and building upon information after each time the dictionary is used. But I didn't like the idea too

much of choosing specific categories at the beginning (like "mother tongue", etc.), because I would be afraid that then there might be too many constraints on what the user has access to--they might not be able to control what the dictionary has "decided" the user needs to see, based on an arbitrary category they chose. Perhaps instead a combination of Amazon-style usage tracking, along with a set of categories the user could switch on and off as needed. (For example, today I want to see full grammatical entries or pronunciations, but tomorrow I may just want to see usage/citations, something like that).

– please do not make the user have to select a whole bunch of things before getting to the dictionary entry. This would be a fatal choice and make the dictionary annoying and difficult to use. People would choose to use a dictionary, which is qualitative worse but easier to use over the one where you have to fill in a whole bunch of baloney before you use it! People want answers fast! And then they want to play around with them. We are not all scientists who search for information systematically. No - A better idea would be to have an interface which gives you results based on the standard and most used type of search right away. Lets say, native speaker. Then have a button and let the user be able to change the results - what would the dictionary say if I were not a native speaker, what do the corpora say. Such an interface is fun to use. But please, please don't make us have to make a thousand decisions before getting to the entry! Then, if we want to change it, we have to go back. And I don't want the dictionary remembering anything about me! We need less of that on the internet.

Therefore, the answers include some further aspects and ideas for possible adaptable features of online dictionaries. Furthermore, the answers show how familiar some users are with the topic.

## 3.3 Discussion

For the evaluation of innovative features, it was shown that unique and innovative features of online dictionaries, such as the integration of multimedia or possibilities of customization, were classified as of no great importance. This may be disappointing for lexicographers, because they see a high potential for possible improvements in these features, but it corresponds to the latest findings of other researchers such as Trap-Jensen:

> "Whether they adhere to one school of thought or another, most lexicographers welcome the possibility of showing exactly the relevant information categories in a particular lookup situation, no less and no more, tailored to the specific needs and skills of the user. For the lexicographer, this is a strong argument in favour of the e-dictionary over the printed dictionary: the electronic medium has solved some of the problems related to traditional dictionaries. For the

same lexicographers, it may be disappointing that the users do not seem to take advantage of all these wonderful possibilities." (Trap-Jensen, 2010, p. 1142)

This leads Verlinde/Peeters to the conclusion that ideas for user-adaptive customization is more aligned to the needs or ideas of lexicographers than to the actual needs of dictionary users:

> "The various proposals for dictionary customization [...] clearly show that lexicographers are willing to take users' needs into account when designing new electronic dictionaries. However, it may be argued that the elements of customization implemented in electronic dictionaries so far result more from the lexicographers' ideas about how users should use e-dictionaries (to the point that it might be called a 'lexicographer-oriented' lexicography) rather than from insights into the way dictionaries are actually used." (Verlinde & Peeters, 2012, p. 151)

But to verify whether or not the poor rating of these innovative features was a result of the fact that the subjects are not used to online dictionaries incorporating those features and therefore cannot assess whether or not they need them, we integrated an experiment into the second study. As predicted, the results revealed a learning effect. Participants in the learning-effect condition, i.e. respondents who were first presented with examples of possible innovative features of online dictionaries, judged adaptability and multimedia to be more useful than participants who did not have this information.

However, a closer inspection showed that this difference is mediated by linguistic background and language version: while there is a significant learning effect in the German version but only for non-linguists, there is a highly significant learning effect in the English version but only for linguists. The overall effect turned out to be modest in size, but highly significant. Also, it should be noted here that we implemented only a weak manipulation of the learning effect. Due to the nature of our survey design, we simply presented several features of multimedia and adaptability. It could be argued that if the participants had had the opportunity to actually use the presented features, the observed learning effect would have been even more pronounced.

Furthermore, in this section, we presented the evaluation of several multimedia or adaptive features in an online dictionary. It was shown that the integration of audio files was considered to be particularly useful, as well as the option of creating a personalized view when the possibility of an adaptive interface is given. The integration of audio files in particular is confirmed in other studies, e.g. Lew (Lew, 2012, pp. 359–360) summarizes different empirical studies in this area and comes to the following conclusion:

> "What we can say at present is that available evidence invites optimism with respect to static pictures and audio recordings, but looks less optimistic when it comes to video and animation enhancements. Here, the difficulty of matching the playback speed of the material with indi-

vidual users' cognitive pace might be a large part of the problem." (cf. also Lew & Doroszewska, 2009)

Illustrations should be particularly important for language learners to supplement the definition, according to other studies (Kemmer, forthcoming, p. 11 and other literature cited there). Lew and Doroszewka also come to the conclusion that animated graphics cannot positively impact vocabulary retention (Lew & Doroszewska, 2009, p. 254). Our results can neither support these studies nor provide new or complementary results because our queries were not differentiated by usage situations or user groups.

The responses to the open-ended question again show how carefully some participants reflect on the advantages and disadvantages of adaptive features and that they are fully aware that new functionality should not create a barrier. However, a few answers also demonstrate that the question on a potential "adaptable online dictionary" were not understood as intended by us, but as a question concerning the general topic of a good presentation or meaningful information. This in turn confirms the revelation that without actual examples, the usefulness of an adaptable online dictionary cannot be judged properly.

Thus, our data point to the conclusion that developing innovative features is worthwhile but that it is necessary to be aware of the fact that users can only be convinced of its benefits gradually; or, as Trap-Jensen points out, we have to make an effort!

> "The lesson to learn is probably that both lexicographers and dictionary users must make an effort. Dictionary-makers cannot use the introduction of user profiles as a pretext for leaning back and do nothing but should be concerned with finding ways to improve presentation." (Trap-Jensen, 2010, p. 1142)

The question is, however, how to do this, since lexicographers do not usually have direct contact with users. One possibility could be to make greater use of educational institutions, especially for academic dictionaries, i. e. to use those contexts in particular in which it is possible to have contact with users in a closed setting, and there is therefore also the opportunity of training them for specific applications. This will not convince those users who just want to quickly check the spelling of a word, but it could perhaps persuade those who are interested in further questions about language, and are therefore willing to overcome any initial barriers.

With all innovative features, it is necessary to take the learning curve into account, as explicated by Lew. He assumes that all complex learning processes start with a slow beginning, followed by a steep acceleration and finally a plateau, i.e. modelled in the form of an s-curve. Lew relates this learning curve in particular to how innovative features can be explored in user studies, but it can also generally be transferred to the learning of innovative features.

"As users work with a dictionary over time, they learn some of the structure, conventions; they learn how to cut corners. Humans exhibit a natural and generally healthy cognitive tendency to economize on the amount of attention assigned to the task at hand. So in the course of inter-action with dictionaries, users' habits adjust, and their reference skills evolve. The process is driven through users getting accustomed to the particular features of the dictionary. [...] But if a solution is unknown to the users, as is necessarily the case with any experimental feature we would like to test, their performance is likely to be negatively affected by the novelty of the fea-ture. Depending on how steep a learning curve the new feature has, it may take more or less time and practice before users get more familiar with the innovation tested, and before the benefits, if any, get a chance to come to the surface." (Lew, 2011, pp. 10–11)

If users are used to working with dictionaries, and are then faced with new features, they are first taken away from this plateau, i.e. initially new features impede dic-tionary use. Overcoming this barrier represents the greatest challenge if the aim is to provide users with new types of functions. The empirical data obtained by us under-line the fact that this is a route worth taking.

# 4 Conclusion

Electronic dictionaries can – as shown in the introduction using a few examples – be clearly differentiated from printed ones and indeed already are. Not only have lexicographical resources been created collaboratively, but the linking of lexico-graphic data and underlying corpora as well as new types of design have also al-ready been put into practice.

At the same time, there is talk of an existential crisis in lexicography (cf. Engelberg, forthcoming). It can be assumed that today more language-related con-sultation processes take place since language resources are much more freely avail-able than, for example, 20 years ago, and therefore people who would hardly ever have used dictionaries are 'googling' language issues. At the same time, these con-sultation acts do not primarily lead to the use of lexicographic resources, at least not in the sense of use that is paid for. Many online dictionaries are very frequently used and register high numbers of consultations,[16] but this sales model is not economi-cally viable. For example, Rundell writes with regard to learners' dictionaries, that these have an uncertain future:

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16 Cf. for example the press report on Duden online: http://www.duden.de/presse/duden-auch-im-netz-die-instanz-fuer-deutsche-sprache: the difficult economic situation was emphasized in two lectures on Duden online, both on the GAL-meeting in Erlangen (19.9.2012: Karin Rautmann: Duden „online" und seine Nutzer) as well as on the 5th meeting of the academic network „Internet-lexikografie" in Leiden (25.3.2013 Karin Rautmann/Anja Konopka/Melina Alexa: Duden online: Die Nutzer im Fokus); see http://multimedia.ids-mannheim.de/mediawiki/web/index.php /Hauptseite (last accessed 13 July 2013).

"Its main user group is in the 17-24 range, and most of this cohort are now ‚digital natives': people who routinely go to the Web for information of any kind, and generally expect to get it for nothing. If the fate of printed encyclopedias is any guide, the transformation, once started, will be rapid." (Rundell, 2012, p. 15).

It is therefore questionable whether fewer dictionaries are actually used today simply because there are fewer dictionaries being purchased. It used to be the case that pupils, students and language learners were often obliged to buy dictionaries as learning material, because there was no alternative. How often and intensely they were actually used is disputable. It is clear, however, that lexicography is in an existential crisis, because it is increasingly difficult to make (enough) money from lexicographical content. This raises the question of whether lexicography can preserve an important position in the future when its development is 'light-years' further ahead (Atkins, 1992, p. 521), i.e. when in the future online dictionaries differ much more clearly from printed dictionaries than they do today, something other researchers are calling for (cf. Bergenholtz & Bergenholtz, 2011; Bothma, Faaß, Heid, & Prinsloo, 2011; Tarp, 2011).

On the other hand, dictionary projects that offer innovative features - for example, a search "from meaning to word" in the Algemeen Nederlands Woordenboek - report that these options are hardly ever used.[17] Similarly, Trap-Jensen reports for ordnet.dk that "less than one percent (0.86% to be exact)" (Trap-Jensen, 2010, p. 1140) choose the non-default mode, i.e. make use of the opportunity to adaptively adjust the online representation. This raises the question of whether designing lexicographical resources as innovatively as possible is really the best route to take.

What can our data contribute to this question? In our studies, it has been shown that the classic characteristics of dictionaries were rated very highly, especially content-related reliability; and not just in competition with other features, but in general. This means our participants expect an online dictionary first of all to be a reliable reference work, and that medium-specific enrichment with innovative features is clearly subordinated. Neither age nor professional background nor language version reveal significant group differences with regards to this. This again yields parallels with other results, such as that no group differences have been shown in the use of different devices, although one would think that the so-called digital natives would behave differently, i.e. that they would use dictionaries on small screens such as smartphones (cf. Koplenig/Müller-Spitzer: General issues, this volume).

In addition to this, the thesis that linguists tend to make evaluations which are different from those of non-linguists has not been shown to be true. The cluster analysis (Section 2.1.2) has shown that differences in the data can be revealed in

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17 Carole Tiberius, lecture on the on the 5th meeting of the academic network „Internetlexikografie" in Leiden (25.3.2013 Carole Tiberius/Jan Niestadt: Using the ANW).

terms of linking corpora and lexicographical resources, but only if demographic data are taken into account in the analysis, i.e. the differences are not clear-cut.

How is this to be interpreted? A possible interpretation is that our participants were too homogeneous. However, this can be refuted: the number of participants in every group was high enough in both studies that, if there had been any differences, e.g. between participants with and without linguistic background, this would also have been shown, particularly because we also gained non-specialist students via the 'Forschung erleben' platform (cf. Müller-Spitzer/Koplenig: First two studies, this volume). It is just the same in matters of age: the groups were big enough that any differences between age groups would have surfaced. Therefore, a much more plausible interpretation is that, surprisingly, our participants – no matter what professional background they have, whether they are located the in German- or English-speaking world, whether they are young or old – agree on what makes a good online dictionary. And these are the characteristics that have been making good reference works for centuries: being a reliable resource, and a clearly presented and understandable tool, which is kept as up to date as possible. So it is not necessarily the case that a user-friendly dictionary must be a flexible (De Schryver, 2003, p. 182) or a fast one (Almind, 2005, p. 39; Bergenholtz, 2011). Our empirical data show a different focus.

Does this mean that these classic features are only important for digital dictionaries, and that innovative features, even though they just use the possibilities of the new medium and have a high appeal, are unimportant? This conclusion we would draw only partially: while innovative features were rated as unimportant in our first study, we were able to show in an experiment in our second study that one reason for this assessment is that participants are not yet familiar with enough examples to appreciate such features. Also, the fact that these features are still hardly ever used should not prevent lexicographers from developing further innovative elements, but they should try to gradually convince users of the quality and usability of these features.

Finally, we would like to take up another thesis: Engelberg makes a distinction between language-use-oriented and language-knowledge-oriented dictionaries.[18]

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18 „Um die Konsequenzen dieser Veränderungen für die Lexikographie einschätzen zu können, ist es nützlich, zwei grundlegende Typen der Benutzung von Wörterbüchern zu unterscheiden. Zum einen sollen Wörterbücher uns helfen, bestimmte sprachliche Probleme in konkreten Kommunikationssituationen zu lösen. Sie sollen uns die Bedeutung eines fremdsprachigen Wortes erklären, einen Ausdruck bei der Textproduktion finden helfen oder die Richtigkeit einer Schreibung bestätigen. Wörterbücher dienen hier der Überwindung von Problemen bei der Sprachverwendung. Zum anderen werden Wörterbücher dazu konsultiert, unabhängig von kommunikativen Problemen Wissen über Sprache zu erlangen. Sie beantworten Fragen nach der Wortgeschichte, nach Sprachkontaktphänomenen oder nach semantischen Zusammenhängen im Wortschatz. In diesem Sinne will ich hier zwischen sprachverwendungs- und sprachwissensorientierter Lexikographie unterscheiden." (Engelberg, forthcoming)

This distinction can be compared with Tarp's distinction between communicative and cognitive usage situations (Tarp, 2008). Engelberg's thesis is that language-use-oriented lexicography is increasingly disappearing or is becoming more and more different from what we currently call dictionaries, i. e. that they are integrated into automated translation or word processing programs, etc., and are no longer seen as a separate resource.[19] Similarly, Rundell notes:

> "It is already clear that the dictionary is moving from its current incarnation as autonomous 'product' to something more like a 'service', often embedded in other resources." (Rundell, 2012, p. 29)

However, Engelberg ascribes an important role in the future to language-knowledge-oriented lexicography in its own right, one where an important impetus could come from linguistics. For the future, it would be interesting to investigate whether – if this clear distinction between dictionaries for cognitive vs. for communicative situations really develops – differences would show which characteristics are particularly important for which types of lexicographical tool. The following assumption could be made for the future: for the lexicographical resources that are integrated into other programs, be they word processing programs or similar, these characteristics are only partially valid because the lexicographic resources therein are not perceived as independent products. For these products, it is more the overall product which is assessed (i.e. the word processing or translation program as a whole) and the assessment of the underlying lexicographic data is not based so much on the tradition of how dictionaries are judged. In lexicography, which is intended for cognitive usage situations, this could look different. It became clear not only in the questions about characteristics of good online dictionaries, but also at other points in our studies that our participants appreciate the classic features of a reference work. There were participants, for example, who in answer to an open-ended question on contexts of dictionary use (cf. Müller-Spitzer: Contexts of dictionary use, this volume) said that they consult dictionaries for settling linguistic discussions; a clear language-knowledge oriented usage situation in which the dictionary was used as a reliable authority. For this cognitive-oriented lexicography, it can be assumed – or at least our data can be interpreted in this way – that these dictionaries should not be separated from the tradition that has been making good dictionaries for centuries, since the task of online dictionaries is not materially different from that of printed dictionaries. It must therefore be very clearly worked out what the core is that should be not discarded but also, by contrast, which media-

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**19** „Aber wie auch immer die Zukunft der sprachverwendungsorientierten Lexikographie aussieht, es deutet sich doch eines an: Letztlich werden wir keine Wörterbücher mehr konsultieren, sondern die Wörterbücher werden uns konsultieren und uns unauffällig und situationsgerecht ihre Dienste anbieten." (Engelberg, forthcoming)

bound traditions should be given up, because particular conventions of representation were inadequate in the first place; as Rundell points out (Rundell, 2012, p. 16):

> "The printed book has many limitations and is far from adequate as a medium for dictionaries".

To summarize, just as in any other domain, innovations in lexicography need time, both to spread and to be developed. This is supported by our data, although the outcome of this development is very open at the moment.

> "We are still in the middle of all these changes, and there is much more to do and much more to learn." (Rundell, 2012, p. 18)

# Bibliography

Almind, R. (2005). Designing Internet Dictionaries. *Hermes. Journal of Language and Communication Studies*, *34*, 37–54.

Asmussen, J. (forthcoming). Combined products: Dictionary and corpus. In R. H. Gouws, U. Heid, W. Schweickard, & H. E. Wiegand (Eds.), *Dictionaries. An international encyclopedia of lexicography. Supplementary volume: Recent Developments with Focus on Electronic and Computational Lexicography*. Berlin/New York: de Gruyter.

Atkins, B. T. S. (1992). Putting lexicography on the professional map. Training needs and qualifications of lexicographers. In M. A. Ezquerra (Ed.), *Proceedings of the Euralex '90* (pp. 519–526). Barcelona. Retrieved from http://www.euralex.org/elx_proceedings/Euralex1990/055_B.%20T.%20Sue%20Atkins%20-PuttingI%20exicography%20on%20the%20professional%20map.pdf

Atkins, B. T. S. (2002). Bilingual Dictionaries. Past, Present and Future. In M.-H. Corréard (Ed.), *Lexicography and Natural Language Processing. A Festschrift in Honour of B.T.S. Atkins* (pp. 1–29). Stuttgart: Euralex.

Bergenholtz, H. (2011). Access to and Presentation of Needs-Adapted Data in Monofunctional Internet Dictionaries. In H. Bergenholtz & Fuertes-Olivera (Eds.),  (pp. 30–53). London/New York: Continuum.

Bergenholtz, H., & Bergenholtz, I. (2011). A Dictionary Is a Tool, a Good Dictionary Is a Monofunctional Tool. In H. Bergenholtz & P. A. Fuertes-Olivera (Eds.), *e-Lexicography. The Internet, Digital Initiatives and Lexicography* (pp. 187–207). London/New York: Continuum.

Bothma, T. J. D., Faaß, G., Heid, U., & Prinsloo, D. J. (2011). Interactive, dynamic electronic dictionaries for text production. In I. Kosem & K. Kosem (Eds.), *Electronic lexicography in the 21st Century: New Applications for New Users. Proceedings of eLex2011, Bled, Slowenien, 10 – 12 November 2011* (pp. 215–220). Ljubljana: Trojina, Institute for Applied Slovene Studies. Retrieved from http://www.trojina.si/elex2011/Vsebine/proceedings/eLex2011-29.pdf

Bowker, L. (2012). Meeting the needs of translators in the age of e-lexicography: Exploring the possibilities. In S. Granger & M. Paquot (Eds.), *Electronic lexicography* (pp. 379–397). Oxford: Oxford University Press.

Busane, M. (1990). Lexicography in Central Africa: the User Perspective, with Special Reference to Zaïre. In *Lexicography in Africa. Progress Reports from the Dictionary Research centre Workshop in Exeter, 24–25 March 1989* (pp. 19–35). Exeter: University of Exeter Press.

De Schryver, G.-M. (2003). Lexicographers' Dreams in the Electronic-Dictionary Age. *International Journal of Lexicography, 16*(2), 143–199.

De Schryver, G.-M., & Joffe, D. (2004). On How Electronic Dictionaries are Really Used. In G. Williams & S. Vessier (Eds.), *Proceedings of the Eleventh EURALEX International Congress, Lorient, France, July 6th–10th* (pp. 187–196). Lorient: Université de Bretagne Sud.

De Schryver, G.-M., & Prinsloo, D. J. (2001). Fuzzy SF: Towards the ultimate customised dictionary, *11*(1), 97–111.

Dziemanko, A. (2012). On the use(fulness) of paper and electronic dictionaries. In *Electronic lexicography* (pp. 320–341). Oxford: Oxford University Press.

Engelberg, S. (forthcoming). Gegenwart und Zukunft der Abteilung Lexik am IDS: Plädoyer für eine Lexikographie der Sprachdynamik. In *50 Jahre IDS*.

Faber, P., Araúz, P. L., Velasco, J. A. P., & Reimerink, A. (2007). Linking Images and Words: the description of specialized concepts, *20*(1), 39–65.

Granger, S. (2012). Introduction: Electronic lexicography - from challenge to opportunity. In S. Granger & M. Paquot (Eds.), *Electronic lexicography* (pp. 1–11). Oxford: Oxford University Press.

Hanks, P. (2012). Corpus evidence and electronic lexicography. In S. Granger & M. Paquot (Eds.), *Electronic lexicography* (pp. 57–82). Oxford: Oxford University Press.

Jackson, K. M., & Trochim, W. M. K. (2002). Concept Mapping as an Alternative approach for the analysis of Open-Ended Survey Responses, *5*(4), 307–336.

Kemmer, K. (forthcoming). *Illustrationen im Onlinewörterbuch (Dissertation)*.

Kemmer, K. (2010). Onlinewörterbücher in der Wörterbuchkritik. Ein Evaluationsraster mit 39 Beurteilungskriterien, *2*, 1–33.

Kirkpatrick, B. (1989). User's Guides in Dictionaries. In F. J. Hausmann, O. Reichmann, H. E. Wiegand, & L. Zgusta (Eds.), *Wörterbücher – Dictionaries – Dictionnairees. Ein Internationales Handbuch zur Lexikographie* (Vol. 5.1, pp. 754–761). Berlin/New York: de Gruyter.

Klosa, A. (2009). Außentexte in elektronischen Wörterbüchern. In E. Beijk (Ed.), *Fons verborum : feestbundel voor prof. dr. A. M. F. J. (Fons) Moerdijk, aangeboden door vrienden en collegas bij zijn afscheid van het Instituut voor Nederlandse Lexikologie* (pp. 49–60). Amsterdam: Gopher BV.

Kwary, D. A. (2010). From Language-Orientes to User-Oriented Electronic Dictionaries: A Case Study of an English Dictionary of Finance for Indonesian Students. In A. Dykstra & T. Schoonheim (Eds.), *XIV EURALEX International Congress* (pp. 1112–1120). Leeuwarden/Ljouwert.

Lemnitzer, L. (2001). Das Internet als Medium für die Wörterbuchbenutzungsforschung. In I. Lemberg, B. Schröder, & A. Storrer (Eds.), *Chancen und Perspektiven computergestützer Lexikographie. Hypertext, Internet und SGML/XML für die Produktion und Publikation digitaler Wörterbücher* (pp. 247–254). Tübingen: Max Niemeyer Verlag.

Lew, R. (2011). User studies: Opportunities and limitations. In K. Akasu & U. Satoru (Eds.), *ASIALEX2011 Proceedings Lexicography: Theoretical and practical perspectives* (pp. 7–16). Kyoto: Asian Association for Lexicography.

Lew, R. (2012). How can we make electronic dictionaries more effective? In S. Granger & M. Paquot (Eds.), *Electronic lexicography* (pp. 343–361). Oxford: Oxford University Press.

Lew, R., & Doroszewska, J. (2009). Electronic dictionary entries with animated pictures: Lookup preferences and word retention. *International Journal of Lexicography, 22*(3), 239–257.

Meyer, C. M., & Gurevych, I. (2012). Wiktionary: A new rival for expert-built lexicons? Exploring the possibilities of collaborative lexicography. In S. Granger & M. Paquot (Eds.), *Electronic lexicography* (pp. 259–291). Oxford: Oxford University Press.

Müller-Spitzer, C. (2003). Ordnende Betrachtungen zu elektronischen Wörterbüchern und lexikographischen Prozessen, *19*, 140–168.

Müller-Spitzer, C. (2008). Research on Dictionary Use and the Development of User-Adapted Views. In A. Storrer, A. Geyken, A. Siebert, & K.-M. Würzner (Eds.), *Text Resources and Lexical Knowledge Selected Papers from the 9th Conference on Natural Language Processing KONVENS 2008* (pp. 223–238). Berlin: de Gruyter.

Nesi, H. (2012). Alternative e-dictionaries: Uncovering dark practices. In S. Granger & M. Paquot (Eds.), *Electronic lexicography* (pp. 363–378). Oxford: Oxford University Press.

Paquot, M. (2012). The LEAD dictionary-cum-writing aid: An integrated dictionary and corpus tool. In S. Granger & M. Paquot (Eds.), *Electronic lexicography* (pp. 163–185). Oxford: Oxford University Press.

Pulitano, D. (2003). Ein Evaluationsraster für elektronische Wörterbücher. *Lebende Sprachen*, *48*(2), 49–59.

Rundell, M. (2012). The road to automated lexicography: An editor's viewpoint. In S. Granger & M. Paquot (Eds.), *Electronic lexicography* (pp. 15–30). Oxford: Oxford University Press.

Sharifi, S. (2012). General Monolingual Persian Dictionaries and Their Users: A Case Study. In J. M. Torjusen & R. V. Fjeld (Eds.), *Proceedings of the 15th EURALEX International Congress 2012, Oslo, Norway, 7 - 11 August 2012* (pp. 626–639). Oslo: Universitetet i Oslo, Institutt for lingvistiske og nordiske studier. Retrieved from http://www.euralex.org/elx_proceedings/Euralex2012/pp626-639%20Sharifi.pdf

Storrer, A. (2001). Digitale Wörterbücher als Hypertexte: Zur Nutzung des Hypertextkonzepts in der Lexikographie. In I. Lemberg, B. Schröder, & A. Storrer (Eds.), *Chancen und Perspektiven computergestützer Lexikographie. Hypertext, Internet und SGML/XML für die Produktion und Publikation digitaler Wörterbücher* (Vol. 107, pp. 53–69). Tübingen: Niemeyer.

Tarp, S. (2008). *Lexicography in the borderland between knowledge and non-knowledge: general lexicographical theory with particular focus on learner's lexicography*. Walter de Gruyter.

Tarp, Sven. (2011). Lexicographical and Other e-Tools for Consultation Purposes: Towards the Individualization of Needs Satisfaction. In H. Bergenholtz & P. A. Fuertes-Olivera (Eds.), *e-Lexicography. The Internet, Digital Initiatives and Lexicography* (pp. 54–70). London/New York: Continuum.

Trap-Jensen, L. (2010). One, Two, Many: Customization and User Profiles in Internet Dictionaries. In A. Dykstra & T. Schoonheim (Eds.), *XIV EURALEX International Congress* (pp. 1133–1143). Leeuwarden/Ljouwert.

Varantola, K. (1994). The dictionary user as decision-maker. In W. Martin, W. Meijs, M. Moerland, ten E. Pas, van P. Sterkenburg, & P. Vossen (Eds.), *VI EURALEX International Congress* (pp. 606–611). Amsterdam.

Varantola, K. (2002). Use and Usability of Dictionaries: Common Sense and Context Sensibility? In M. H. Corréard (Ed.), *Lexicography and Natural Language Processing. A Festschrift in Honour of B. S. T. Atkins* (pp. 30–44). Stuttgart: Euralex.

Verlinde, S., & Binon, J. (2010). Monitoring Dictionary Use in the Electronic Age. In A. Dykstra & T. Schoonheim (Eds.), *XIV EURALEX International Congress* (pp. 321–326). Leeuwarden/Ljouwert.

Verlinde, S., Leroyer, P., & Binon, J. (2010). Search and you will find. From stand-alone lexicographic tools to user driven task and problem-oriented multifunctional leximats. *International Journal of Lexicography*, *23*(1), 1–17.

Verlinde, S., & Peeters, G. (2012). Data access revisited: The Interactive Language Toolbox. In S. Granger & M. Paquot (Eds.), *Electronic lexicography* (pp. 147–162). Oxford: Oxford University Press.