

# Spell-checking on the fly?

## On the use of a Swedish dictionary app

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### Abstract

Mobile application software – the app format – offers new ways of using dictionaries. However, so far, only very few user studies of dictionary apps have been conducted. In this article, we present and discuss the results of a web survey on the use of the app version of the monolingual *Svenska Akademiens ordlista* (the Swedish Academy Glossary, 13<sup>th</sup> edition, 2006), henceforth the SAOL.

The results show that the SAOL app is used mostly for checking spelling. A more surprising result, since the SAOL is not a definition dictionary, is that it is also frequently used for checking the meaning of words. For forthcoming versions of the glossary, the users request more definitions. Regarding the app, users wish for improved search functions, such as wildcard (truncated) search and cross references. The current app (of the 13<sup>th</sup> edition) is free. A majority of the users state that they are willing to pay a small sum for an app version of the 14<sup>th</sup> edition of the SAOL.

**Keywords:** dictionary apps; user study; web survey; app usage; SAOL

## 1. Introduction

The number of dictionary user studies has rapidly increased since the 1990s. This increase can be ascribed to a keener interest among lexicographers in dictionary users and their opinions, suggestions and needs (cf. Lew, 2011). User response has accordingly become an important factor to consider in the process of dictionary making.

Although dictionaries in the format of applications intended to run on mobile devices have become increasingly common (Gao, 2013), studies of the use of such apps are still scarce. Investigating the use of dictionary apps is important since it is reasonable to expect that this use differs from general dictionary use, in much the same way as mobile apps have changed media consumption in general. Unquestionably, the app format presents both new possibilities and new challenges compared to print and web dictionaries.

In this paper, we present the design and results of a web survey regarding the use of the app version of the *Svenska Akademiens ordlista* (Swedish Academy Glossary), henceforth referred to as the SAOL. The glossary covers general, contemporary Swedish. It includes about 123,000 headwords and provides the (unofficial) norm for spelling and inflection of Swedish words. The mobile app reflects the content of the 13<sup>th</sup> print edition of the glossary, published in 2006. This off-line app has been developed for several operating systems and can be used on smart phones and tablets. It is free to download and has been downloaded more than half a million times to date (May, 2015), which is a considerable number against the backdrop of Sweden's 9.6 million inhabitants.

The results of the survey are relevant to dictionary app developers and researchers focusing on app user studies. The results are also highly useful to the editorial staff of the glossary (which includes the authors of this paper) for three reasons. Firstly, no user study has previously been performed on *any* version of the glossary (print, CD, online or app), which is remarkable considering the glossary's relatively high status and high sales figures in Sweden. Secondly, a new, fully-revised and updated printed edition of the glossary, number 14, was published in April 2015. The Swedish Academy has announced the release of an app version of the new edition. Bearing this in mind, the editorial staff need to form a picture of the use of the *current* app as well as its strengths and weaknesses. Finally, a related app based on the contemporary dictionary of the Swedish Academy (*Svensk ordbok utgiven av Svenska Akademien*) from 2009, is under development by the same team of lexicographers and developers (see Holmer, von Martens & Sköldberg, 2015), and the outcome of the present survey will clearly be of great value in the design of this particular app.

In the next section, we discuss dictionary apps in general and app user studies. In section 3, we introduce the print and app versions of the SAOL. The results of our web survey are presented in section 4. Finally, in section 5, we conclude with a summary and a brief discussion.

## 2. Dictionary apps

As previously mentioned, monolingual and bilingual dictionaries are increasingly available via mobile phones and tablets. According to Gao (2013) and Rundell (2013), dictionary apps, as well as online dictionaries, offer major advantages over their traditional, analogue predecessors. For instance, they allow for multimedia presentations of micro-structural information (such as audio pronunciation and animations), cross-references and links to external websites. Apps can also be easily updated, which is beneficial for both producers and users. These features may account for the popularity that many dictionary apps are currently enjoying, in addition to the high accessibility of the dictionary content.

In the app development process, the lexicographic team must confront several

fundamental lexicographic issues. As Simonsen (2014b) points out, dictionary app development should always be based on the following six factors: user, situation, access, task, data and need. But as Holmer & Sköldbberg (2014) argue, there is a need for a more comprehensive discussion of the considerations that go into producing dictionary apps. The authors discuss apps as independent lexicographic resources compared to the printed and/or online dictionaries they are supposed to reflect. Furthermore, they raise the issue of whether the app format is suitable for all kinds of dictionaries.

So far, very few user studies on dictionary apps have been presented. One exception is Marelló (2014), who compares high school students' use of three versions – an Android app, an online version, and a paper copy – of the same bilingual dictionary. Another exception is Simonsen (2014a,b), who focuses on the use of an app version of an extensive medical resource that is widely used in Denmark. Based on his empirical data, Simonsen (2014b: 259–260) draws a number of conclusions regarding the mobile user and the mobile user's situation, a brief summary of which follows. Firstly, the mobile user is active and accesses information while on the move. Secondly, the mobile user's situation is characterized by multi-tasking, e.g. the user is doing several things simultaneously. The mobile user typically double-checks his/her knowledge and performs simple searches. Thirdly, the mobile user navigates the physical world and the user interface of the mobile device at the same time, which calls for a very simple and easy-to-use data access method. Finally, the size of the user interface means that complex data and long text segments are suboptimal.

In order to meet the needs of different user groups, it is required to obtain a deeper understanding of dictionary app users and how, when, and where they in fact use dictionary apps. The most common approach, when it comes to studies on dictionary usage in general, consists of collecting data by using a questionnaire (Tarp, 2008: 15ff.). The strengths and weaknesses of questionnaire surveys are well-known: questionnaires can be distributed to a relatively large number of users and the answers are usually relatively simple to process. The drawback is that this approach relies solely upon how accurate and conscious users are of their own dictionary use. Another relevant aspect is the number of questions that informants can cope with. Swedish media has highlighted the fact that Swedes are increasingly reluctant to answer surveys and questionnaires, which increases the margin of error for various types of statistical surveys carried out by, for instance, Statistics Sweden, a government agency (*Dagens Nyheter* 2015-01-18). Until now, surveys in the form of brief pop-up questions – small windows that emerge relatively discreetly on the user's screen – have not been common in lexicographical user studies, but this question format is common on various commercial sites.

Other research methods include interviews, (traditional) observations and protocols. Interviews, for example, make it possible for the interviewer to explain and expand upon potentially problematic questions. However, these methods are very time-consuming, which often means that the research data will be of limited size.

Finally, the researcher can make use of log files and other forms of web-based statistical tools, which have facilitated the retrieval of data regarding which words are looked up in a dictionary and how frequently (see e.g. Hult, 2012; Lorentzen & Theilgaard, 2012). In the process of dictionary making, this kind of data has been widely welcomed as a way of discovering lemma lacunae (Bergenholtz & Johnsen, 2005). The greatest advantage of the log file method is the large amount of relatively easily processed data that can be generated. Another advantage is that user activities are observed without the presence of a researcher; i.e., the phenomenon of the “observer’s paradox” is not an issue here. On the other hand, log files give no information about users. Consequently, researchers are left in the dark about customary background information and relevant issues concerning users’ lexicographical needs and preferences.

Log files and server based statistics make it possible to gain knowledge of the use of *online* dictionaries. App developers and lexicographers seeking insight into user behavior of *off-line* dictionary apps may be supported by mobile app measurement and advertising platforms like Flurry Analytics from Yahoo! (<http://www.flurry.com/>). Today, Flurry tracks more than 540,000 apps, including Skype and Snapchat. This platform allows the lexicographic team to gain a deeper understanding of which app versions and operating systems are used, which iOS versions and device models are running, etc. as well as how often the app is used and the length of the average session. In addition, the developers get information about which headwords are frequently looked up, and about spell-check use. It should be said that the SAOL app was not equipped with such statistical software at the time of the survey.

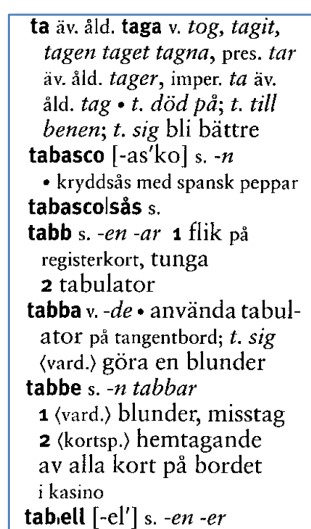
According to Tarp (2008), the best way to gain a deeper insight into user behaviour, is to combine different types of research methods. See e.g. Hult (2012) who combines a web questionnaire with log files, Lorentzen & Theilgaard (2012) who combine data from Google Analytics and log files, and Holmer & Sköldböck (in press), who make use of Google Analytics combined with a pop-up question survey, examining the use of a Swedish, commercial synonym dictionary site.

### **3. The 13<sup>th</sup> edition of the *Swedish Academy Glossary***

The SAOL is financed by the Swedish Academy, and the editors are employed by the Department of Swedish at the University of Gothenburg, Sweden. The very first edition was published as early as 1874. A fully revised and updated edition of the glossary has since been published about every 10<sup>th</sup> year. The 13<sup>th</sup> edition was published as a printed book in 2006. In 2007, a CD version of the same edition, *SAOL Plus*, was released. The electronic format was used to provide all semantically motivated inflected forms for every headword (cf. Berg, Holmer & Hult, 2008). The CD also featured an advanced fuzzy search and a full-text search function. The 13<sup>th</sup> edition of

the glossary was published online in 2009, but only as a facsimile.<sup>1</sup>

As previously stated, the glossary holds about 123,000 headwords and provides information on spelling, inflection and part of speech for each headword. About one fifth of the headwords are briefly defined, commented on or syntactically exemplified (Berg, Holmer & Sköldbberg, 2010). For solid compound lemmas, only the part of speech is given, usually in abbreviated form (“v.” for ‘verb’, etc.). Irregular verbs are presented with their full inflectional forms. Some of these features can be seen in Figure 1.



**ta** äv. åld. **taga** v. *tog, tagit, tagen taget tagna*, pres. *tar*  
äv. åld. *tager*, imper. *ta* äv.  
åld. *tag* • *t. död på*; *t. till benen*; *t. sig bli bättre*  
**tabasco** [-as'ko] s. -n  
• kryddsås med spansk peppar  
**tabascosås** s.  
**tabb** s. -en -ar **1** flik på registerkort, tunga  
**2** tabulator  
**tabba** v. -de • använda tabulator på tangentbord; *t. sig (vard.) göra en blunder*  
**tabbe** s. -n *tabbar*  
**1** (vard.) blunder, misstag  
**2** (kortsp.) hemtagande av alla kort på bordet i kasino  
**tabell** [-el'] s. -en -er

Figure 1: An example from the print version of the SAOL 13 including the verb *ta* (‘to take’) and the noun *tabasco* (‘tabasco’)

An app version of SAOL 13 was contracted and financed by the Swedish Academy and developed by the Swedish app development agency Isolve AB. The editors and system developers of the SAOL were mainly involved in the final test stage of the app development process. The app version of the SAOL 13 was derived from the aforementioned digital CD-version of SAOL, *SAOL Plus*, thus providing the full set of inflected forms for each headword. In comparison to the CD, all inflected forms in the app are displayed by default, which is not the case in *SAOL Plus*, where this setting is optional.

The app was released in November 2011 and was initially available only for iOS and Android phones and tablets. There was a subsequent release for Windows Phone and Nokia Symbian. The app works off-line, is free of charge and, as previously stated, has been downloaded more than half a million times (although, of course, the number of

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<sup>1</sup> Since a few years ago, the different editions of the glossary can also be accessed through an advanced search interface (SAOLhist.se), which is mainly used by scholars.

active users is lower). Some of the downloads can be ascribed to the popularity of word games such as Scrabble and WordFeud, where the SAOL lemma list and inflectional rule set are, or can be used as, standard.

The main functions of the app consist of simple word search and crossword assistance. In addition to that, users can share entries via email and messaging, and use bookmark and history functions. The app also contains miscellaneous information such as a selection of new and excluded lemmas in the SAOL 13 as compared to previous editions, and information about the Swedish Academy. The “*More*”-section contains user instructions, abbreviations used in the SAOL and an email address that allows users to contact the developers.

The SAOL app is simple in its design (for a review of the app, see Hoel, 2012). For example, there are no hyperlinks, and wildcard search or full-text search functions are not available. See Figure 2 for screenshots of the SAOL app start page and samples of entries.

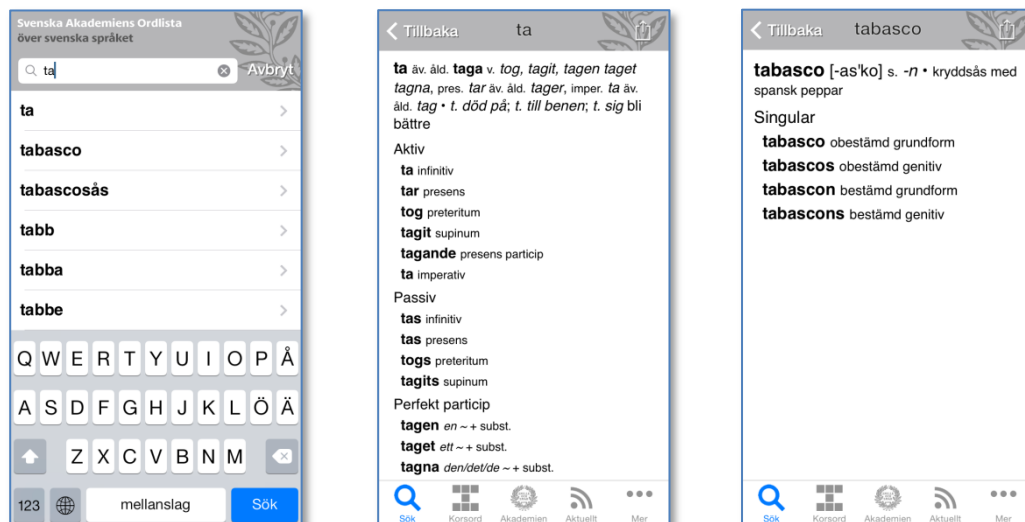


Figure 2: Left: screenshot of the lemma list of the SAOL app on an iPhone. Middle: the entry *ta* (‘to take’) with inflected forms. Right: the entry *tabasco* (‘tabasco’) with inflected forms

Lew (in press), makes an important distinction between *storage space* and *presentation space*, which is highly relevant in the app context. When it comes to the SAOL, a majority of the entries are rather short (see the entry *tabasco* in Figure 2). In that respect, the glossary is well suited for the app format.

#### 4. The SAOL app web survey: method description and results

A web survey was considered the best option for our purposes. First, a pilot study was performed to test the questions and multiple choice answers. The pilot study consisted of 20 questions and was performed in December 2014. We received 44 responses, mainly from our colleagues and students at the Department of Swedish at the University of Gothenburg. Based on the results and the comments from pilot

respondents, the questionnaire was modified and some additional questions were included.

The final questionnaire consisted of 24 questions in Swedish intended to cover four main areas:

- User behaviour – frequency of use, typical function, typical use of app features, etc.
- Design and layout of the app
- Future development – suggestions and preferences for forthcoming versions
- Background information about the respondents

We considered it highly important to keep our questions brief and concise as well as to keep the number of questions to a minimum. Our aim was to limit participation in the study to five minutes (cf. Müller-Spitzer, Koplenig & Töpel, 2012: 429). There were many possibilities for users to add comments and no question was mandatory. A respondent could therefore skip a question (the downside being that there was no reminder function if the respondent had forgotten to reply to a question). The survey was distributed with the aim of reaching the target user group: people who actually use the app version of the SAOL. The web survey link was spread mainly via social media, such as Twitter and Facebook, and was published on some University web pages and in a well-known online Swedish language magazine (*Språktidningen*). The link to the questionnaire was open for about a month. Full anonymity was guaranteed (no IP-logging or other logging of browsers, devices, etc.). The web survey was powered by Webropol.

Altogether 264 questionnaires were submitted. The internal dropout rate was very low, that is, almost everyone answered all 24 questions. Moreover, many respondents took advantage of the several opportunities to add comments, which resulted in a great deal of very useful feedback about the SAOL in general and on specific app issues.

The following sections present the results of the respondents' background information, usage of the app, lookups, suggestions for a future version of the app and pricing. Finally, some examples of useful comments from the submitted questionnaires are highlighted.

#### **4.1 Respondents: background information**

The respondents were asked background questions about year of birth, gender, native language, level of education and principal occupation. Their answers show that they were between 20 and 89 years old. The mean age was 43 and the median age was 41 years old. Gender distribution was about 60% women and 36% men; the remaining

percentage answered “other”. More than 90% of the respondents were native speakers of Swedish. The other languages mentioned more than once were Finnish, Polish and German. The respondents were highly educated: more than 80% held a university degree, of which about 10% reached postgraduate level. Nearly 70% of the respondents were employed, about 17% were students and 10% retired. To summarise, the typical respondent involved in the study is a highly-educated professional woman in her early 40s whose native language is Swedish. However, based on this information alone, we are hesitant to draw definitive conclusions concerning the *typical* user of the SAOL app, as we assume that certain users are more likely than others to respond to surveys.

#### 4.2 App usage: frequency and sought information

As mentioned in section 4, the target user group consisted of persons who actually use the SAOL app. The results show that more than 50% of respondents use the app on a weekly basis and an additional 28% use it every month. We also learned that the majority of the respondents have not read the SAOL app user instructions, which is not very surprising. Svensén (2009: 459) states that “it is a truth universally acknowledged in lexicographic circles that user’s guides are very seldom consulted”. However, although a majority of the respondents had not read the instructions, 23% had done so. Considering this fact, there are good reasons to include both user instructions and information about the dictionary itself in the app.

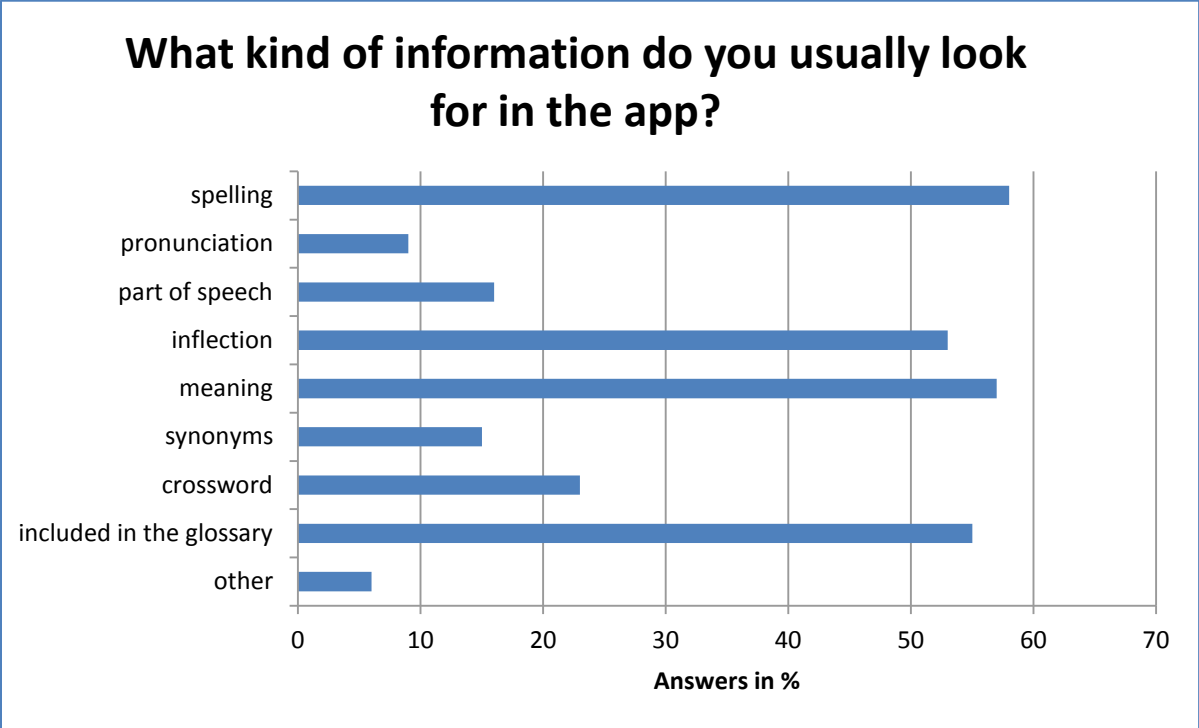


Figure 3: Answers to the question “What kind of information do you usually look for in the app?” (our translation). (Respondents could select more than one option)



One of the most important questions for the editorial staff concerned what kind of information the respondents most commonly search for. As Figure 3 shows, about 57% of respondents mostly use the app to check spelling or meaning. About 54% use it to check “if the word is included in the glossary”, which may be related to the important role of the glossary as a key for word games like Scrabble. In the fourth major category, 53% look for “inflection”. This supports the editorial decision to emphasize the full set of inflected forms by default in the app, compared to the limited information given in the print version.

Another question was: “How often do you find the information you are looking for in the app?”. About 28% answered “always”, roughly 70% answered “often”, and about 2% stated “sometimes”. No respondent answered “seldom” or “never”. To sum up, a vast majority of the respondents always or often find the information they are looking for in the app.

The responses to the two questions above may be inter-related. A cross-tabulation between the two questions shows that a majority of the respondents using the app for spelling, “often” or “always” find the information they are looking for. The same applies to respondents looking for information on inflection, as well as, surprisingly, those who are looking for meaning. This was a rather unexpected result since meaning is not one of the main information categories, although about a fifth of the lemmas have some kind of, usually very brief, explanation. The fact that so many users search for information on meaning in the glossary is not unexpected *per se*. A majority of the users are in all likelihood unaware of the difference between a glossary and a dictionary containing more extensive definitions. It is, however, striking that such a large number of respondents are satisfied with the information concerning meaning with which they are provided. This can possibly be related to the specific group of respondents in the study and the words they look up (see section 4.4 below).

### 4.3 App usage: when and where?

As referred to in section 2, Simonsen (2014b) states that the mobile user typically performs simple searches. According to his findings, dictionary app users are frequently on the move while using the device. Based on our data, we are hesitant to draw major conclusions concerning the typical mobile user situation. The glossary includes a large number of headwords but the information provided for each word is strictly limited and does not constitute a challenge to the user from a cognitive perspective. A clear majority (about 75%) of the respondents stated that they use the app when they are writing a text, i.e. in productive situations. This result was expected *a priori*, given the information that the glossary offers regarding spelling and inflection. However, as many as 35% of respondents claimed to consult the app while they are reading; i.e. in receptive situations. Finally, about 45% of respondents mentioned that they also look words up during conversations. We find it likely that

they consult the glossary with the intention of checking if a specific word or inflected form is “accepted” by the Swedish Academy. To summarise, the responses concerning typical user situations are consistent with the answers concerning what kind of information is typically sought when using the dictionary app.

Another question asked where the dictionary app was typically used. With reference to the question posed in the title of this paper, only a few respondents (about 16%) answered that they use the app on the fly; e.g. when walking down the street. Almost the same percentage of users responded that they consult the SAOL app in cafés, restaurants, etc. However, a clear majority of lookups take place at home or at work.

A majority of the respondents, about 64%, use the app on an iPhone and about 35% use it on another phone. The option “other phone” may seem a bit vague, but our background knowledge from the app developers tells us that Android is the second most common operating system, although there are also some Nokia Symbian and Windows Phone users as well. It is much more common to run the app on phones than on tablets; only 23% use tablets. This may be a result of the general relative abundance of phones.

#### 4.4 Lookups

The editorial staff of the SAOL was naturally interested in what kind of words users want to look up when accessing the app. We therefore asked the following question in the survey: “Which word did you last look up in the app (regardless of whether or not it is included in the glossary)?” We are aware of the problems related to this question. First, this is the question with the highest dropout rate. About 200 answers were submitted; of these, about 50 respondents answered “I don’t remember”. Also, respondents may not want to share their lookups with others.

However, it is possible to draw some conclusions from the nearly 150 words (and comments) given by the respondents, especially when the motive is explicitly expressed. The lookups consist of mainly foreign, low-frequency words. A clear majority cannot be considered to belong to basic Swedish vocabulary. The majority of the words in the list are nouns. Some examples are *abderitisk* (‘abderian’), *allegat* (‘voucher’), *befryndad* (‘allied’, ‘kindred’), *chimär* (‘chimera’), *courtage* (‘brokerage’) and *draksådd* (‘a sowing of dragon’s teeth’).

In section 4.2, we discussed the reasons for consulting the app in general. But why did the respondents look up the words specified in the answers? Some respondents went into detail about this in their comments (our translation):

- (1) **cp-skada** (för att se om det skulle vara versaler eller gemener) (‘cerebral palsy injury’, to see if the abbreviation should be written with upper or lower case letters)

(2) **understrecka** (blev osäker på om det skrivs med ä eller e) ('to underscore', was not sure if it is spelled with an 'ä' or 'e')

(3) **Minns inte**, det kan ha varit *hen* (för att kolla objektsformen) (Don't remember. It might have been *hen* (to check the direct object form))

Examples (1) and (2) concern production. Example (3) is about the new gender neutral pronoun *hen* (which has even attracted international attention; see e.g. *The Guardian* 2015-03-24). The motive may have been to see which direct object form (out of two possible ones) is recommended by the Swedish Academy.

#### 4.5 Suggestions for a future version of the app

Yet another purpose of the survey was to obtain information concerning what additional functionality the respondents would like to include in future versions of the app. The diagram in Figure 4 shows the responses.

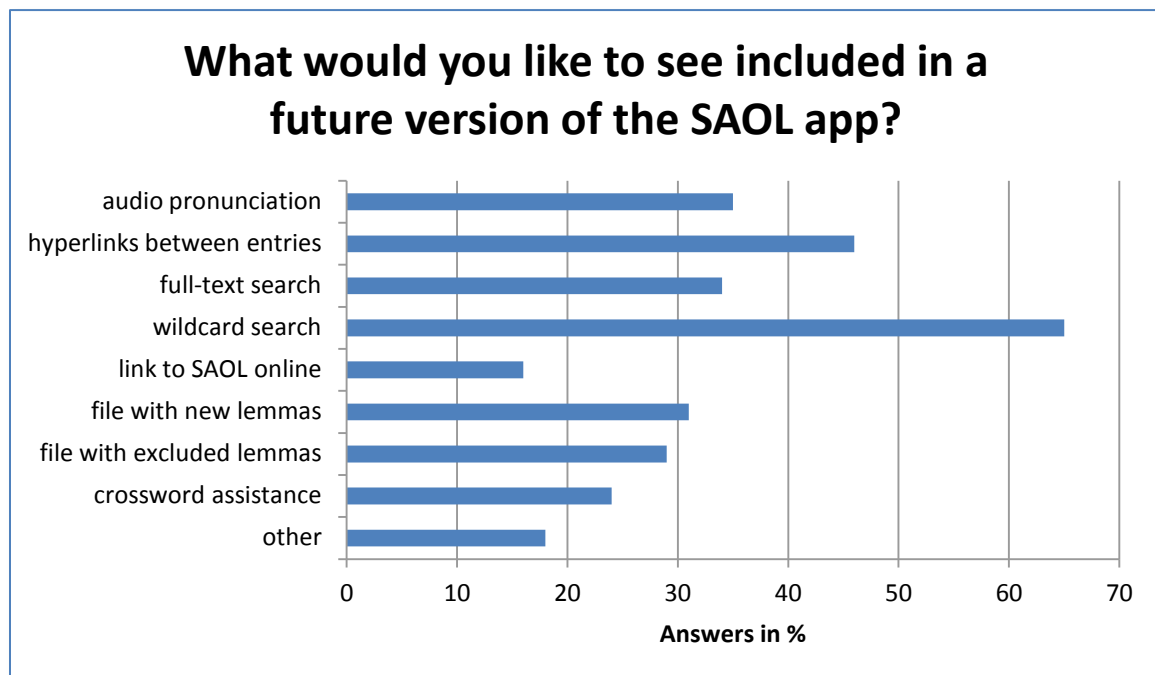


Figure 4: Answers to the question “What would you like to see included in a future version of the SAOL app?” (our translation). (Respondents could select more than one option)

Interestingly, most respondents answered “wildcard search” and “hyperlinks between entries”, with “audio pronunciation” being the third most frequent answer. Both wildcard search and hyperlinks between entries are relatively easy to include in the app considering the digital format and the underlying database structure of the glossary. We clearly should consider this possibility in our future work. Regarding audio pronunciation, at present we have to direct users to the forthcoming dictionary app for the contemporary dictionary of the Swedish Academy, which will include this function.

Those who selected “other” and left a comment suggested improvements on the glossary content rather than on the app functionality. In the app, they requested an improved history function (there is one, but it is evidently hard to find). In the glossary, they suggest definitions, synonyms, etymology and phrasal verbs, etc. According to Malmgren (2014), the 14<sup>th</sup> edition of the SAOL provides more information on meaning, both explicitly and implicitly. The glossary also includes phrasal verbs as sublemmas. In that sense, the new dictionary content is a solid basis for such improvements in a forthcoming app.

#### 4.6 Pricing

Dictionary sales in Sweden have fallen sharply since the mid-2000s and many publishers have consequently reduced the publishing rate of their dictionaries. Many users now expect linguistic information to be available free of charge (see also Marell 2014: 79). As mentioned, the present SAOL app is free to download, which has had in all probability a substantial impact on the number of downloads. In light of this, it is interesting to see how much the informants are willing to pay for a future version of the glossary app. See Figure 5.

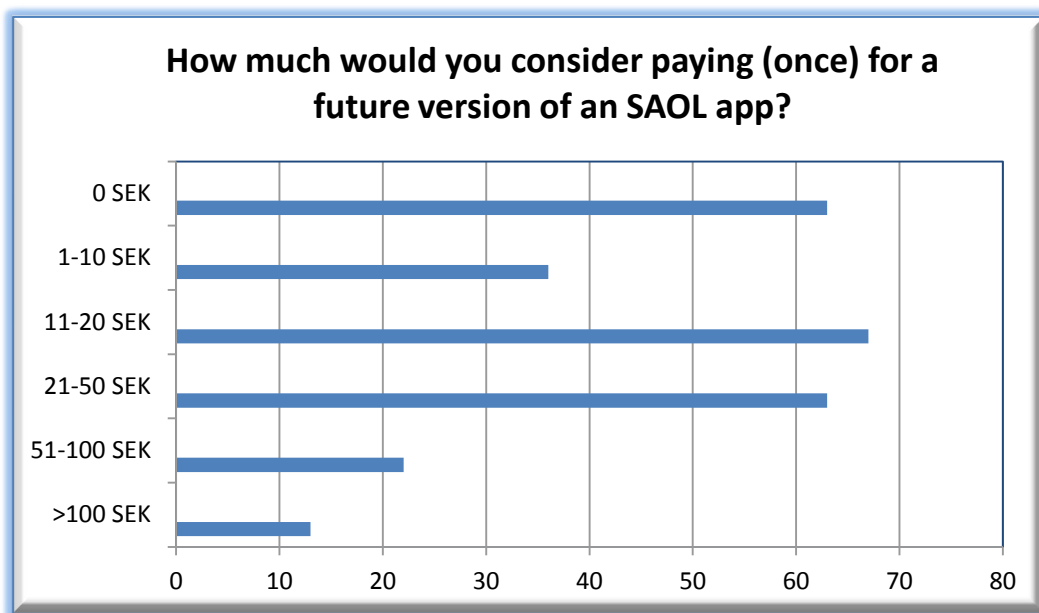


Figure 5: Answers to the question “How much would you consider paying (once) for a future version of the app?” (our translation, 1 SEK = 0.11 EUR)

About 24% say that they are not interested in paying for a new version of the app. Along with those who responded that they are willing to pay the nominal sum of a maximum of 10 Swedish kronor (1.10 Euros), this group constitutes 38% of the respondents. As shown in Figure 5, 25% are willing to pay between 11–20 Swedish kronor. Nearly 5% would be willing to pay more than 100 Swedish kronor, i.e. ca. 11 Euros, which is a hefty sum in the context of apps.

Combining the answers above with the age groups of respondents reveals some correlations. Older respondents appear more willing to pay than younger ones. Respondents aged 40–49 years old are the most willing to pay for an enhanced app. There are also some correlations between user satisfaction and willingness to pay. The more satisfied users are, the more willing they are to pay – but only up to a certain amount (50 Swedish kronor). However, many respondents still request that the app should be free.

#### 4.7 Highly pertinent comments

The various comments offer a wide spectrum of views upon the app from the lexicographical and technical perspectives, on the SAOL as a whole and on dictionary use in a broad sense. The opinions on the app include, for example (our translation):

- (4) “I work with language and I am willing to pay quite a lot for the app – it is amazing! But my students would turn to Google if it started to cost money.”
- (5) “[...] The ‘online version’ available today is not very good; it has to be adjusted more to the web. If the webpage or the web-based SAOL service had a responsive design, it wouldn’t matter if you used it on the computer or your smart phone.”

Considering external links, some of the respondents requested links to other dictionaries, a function that is now included in the dictionary apps published by the Society for Danish Language and Literature (cf. Holmer & Sköldbberg, 2014):

- (6) “It would be fun with a link to the entry in SAOB [The historical dictionary of the Swedish Academy, 1893–], for the words included in that dictionary.”

And, for the SAOL as a whole, we received many comments:

- (7) “I would like more definitions or synonyms for more of the entries.”
- (8) “Both the print book, the app and the web page have their pros, respectively.”
- (9) “My students use the SAOL mainly to look up inflection. They would benefit from more synonyms and hyperlinks between different parts of speech from the same field, for example *thieve* – *thief* – *theft*.”

The overall comments also reveal that there is frustration among online users since the online version is not a database but only a facsimile version of the book. Some app users, such as in example (5), would use the online version if it offered better search options (compared to the now existing facsimile). They seem to use the app as a substitute.

## 5. Concluding remarks

This article presents the design and results of a web survey regarding the use of the app version of the SAOL, the *Swedish Academy Glossary*, which provides the (unofficial) norm for spelling and inflection of contemporary Swedish words. The survey was directed at people who use the app on a regular basis and consisted of 24 questions covering app usage, design and layout, suggestions for a forthcoming version and respondents' background information. Altogether 264 questionnaires were submitted. Many respondents took advantage of the numerous opportunities to add comments, which resulted in a great deal of highly useful feedback about the SAOL in general and on specific app issues.

The study shows that a clear majority of respondents (about 75%) use the app when they write a text. But as many as about 35% of respondents consult the app also when reading. The respondents are particularly interested in three information categories: spelling, meaning and inflection. In general, their searches consist mainly of foreign, low-frequency nouns. Regarding typical locations for using the dictionary app, few respondents (about 16%) answered that they use the app while on the move. Almost the same percentage of users responded that they consult the SAOL app in cafés, restaurants, etc. The clear majority of entry lookups take place at home or at work.

The results from the survey are of great importance, for example in planning the app version of the recently published 14<sup>th</sup> edition of the SAOL. It has already been decided (by the Swedish Academy) that the statistical tool Flurry Analytics (see section 2) will be running in the new version, and the editorial staff hope to gain even deeper insights into glossary users and app performance through the use of this new tool. However, the implementation of the Flurry Analytics tool will not eliminate the need for surveys. Surveys may still provide data that are not possible to obtain via statistical tools.

Taking the future of the SAOL app into consideration – as well as that of Swedish dictionary apps in general – knowledge of user willingness to purchase future versions of the app is important. Even though the majority of respondents, in one way or another, use the app in connection with their work, relatively few are willing to pay – and those who are, do not wish to pay much. The unwillingness to pay for dictionary apps and online versions of dictionaries among (Swedish) users has had serious consequences for dictionary publishers in Sweden. This, we believe, mirrors an almost global development concerning traditional dictionaries. Dictionary projects (including app development) are costly and from our professional stance we find it reasonable for users to pay, at least a nominal sum, for these resources. However, convincing users of this is a true challenge, at least in Sweden.

## 6. References

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