# Use and Usability of Dictionaries: Common Sense and Context Sensibility?

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## Abstract

This article discusses the potential and usability of future dictionaries from two specific angles: from the point of view of language professionals and from the perspective of dictionaries as tools in an integrated network. The discussion is based on ideas first expressed by Sue Atkins in 1996. It is argued that in the future it should be possible to customize dictionaries according to user profiles and that dictionaries should not be regarded as stand-alone products. In fact, the potential of user-controlled search chains could be a major innovation in an integrated electronic dictionary. It is also claimed that the label "learner's dictionary" is misleading, because many users are not learners in the prototypical sense of the word, but rather non-native speakers using a monolingual dictionary for reasons which differ considerably from those of young language learners. Finally, a suggestion is made how frame semantics could be applied in building bridges between general and specialist language use and in helping users to find the information they need.

## 1. Introduction

Dictionaries provoke a continuum of reactions in their users, and for this reason, they are rarely treated as neutral sources of reference. On the contrary, an emotional love-hate relationship would often be a more appropriate description of the professional user's attitude towards his or her favourite dictionaries.

What, then, makes a dictionary user-friendly? There may be no simple answer to this question, as reasons seem to be manifold. Before even attempting to formulate an answer, we have to decide on the type of dictionary and the type of user we have mind. In addition, we have to determine whether we are only discussing the way in which dictionaries are used, or are we also attempting to discover how the user benefits from the information available in the dictionary. Dictionary users can roughly be divided into language learners, non-professional users and professional users (cf. Varantola 1997). Dictionaries can thus be used in various ways in language teaching and language learning but also consulted as tools in "non-

learning" activities, for example in reading comprehension, text production and in professional translation.

Below, I will discuss the potential of future dictionaries in the light of ideas first expressed by Sue Atkins in her plenary paper *Bilingual dictionaries: Past, Present and Future* (Atkins 1996). I will elaborate on some of the themes of the paper from two specific angles: first from the point of view of language professionals as dictionary users and then from the perspective of dictionaries as tools in an integrated network of different types of reference sources.

In her paper, Sue Atkins anticipates that, in the dictionary of the future, the function of customizing the dictionary will 'come into its own' (1996: 531). Future dictionary users would then be able to tailor the dictionary according to their individual user profiles. This prediction is also one of the leading themes in this article and the user I have in mind is a skilled user who needs dictionaries in his or her professional activities. A prototypical incarnation of this type of user would be a translator or a technical communicator.

Atkins also advocates the principles that the user's needs are paramount in dictionary-making and that the 'the ideal dictionary should offer the skilled user the chance to make his or her own judgment' (p. 523). It is easy to agree with this idea and I will apply it as a guiding principle when discussing professional dictionary use. (Cf. also Varantola 1994).

In our survey of dictionary use (Atkins & Varantola 1997:1), we claim that: 'There are two direct routes to more effective dictionary use: the first is to radically improve the dictionary: the second is to radically improve the users'. Later on, I have been inclined to side with the user and place more responsibility on the dictionary makers who, as professionals, should have a holistic view of what their dictionary offers to its users (Kalliokuusi & Varantola 1998).

I will deliberately continue in this vein – assessing dictionaries from the consumer perspective - also in this context. In other words, I will be shamelessly selfish and ask for the impossible. I will advocate for a dictionary that will always adapt to my needs and always be ready to provide me with exactly the answer that I need and will also agree with. I also expect the dictionary to be able to give satisfactory answers to those questions that I forget to ask. So I will require that the dictionary anticipate my needs and remind me of alternative routes that I can take in my search to find an appropriate way to express what I wish to express.

## 2. The professional dictionary user

My purpose is to discuss aspects of dictionary use and usability from the point of view of the professional users who need dictionaries in their work, and use them primarily as reference tools in what we could describe as "lexical knowledge management". My users do not, then, use dictionaries to learn a language, nor to perform a dictionary-use task designed by their teacher or a researcher to assess their competence as dictionary users and to see if they can benefit from the dictionary information in a context predetermined by somebody else.

The professional users normally use a dictionary to perform a task that they get paid for. They may be translating into their native language, L1, or from it into a foreign language, their L2, or they may be producing text with no single source text as a starting point. In other words, their job may be to produce a text with or without specific background material. Often their L2 is English and their native language a less widely used language, such as Finnish. These users differ from all those academics and other professionals who nowadays write in English irrespective of their native language in that these users are also language professionals, linguists. They should therefore be able to describe their dictionary needs as linguists.

I will mainly discuss professional dictionary use in the context of L2 text production because it is in many respects far more challenging than L1 text production. In L2 production, dictionaries are explicitly used to provide the users with native speaker competence that they lack in the L2 so that they that can get the confirmation and reassurance they need for their linguistic choices. When working into the L1, this need for "a second opinion" often goes unnoticed because the user can normally make automatic adjustments to the dictionary information. For example, when we find a number of alternatives as potential translation equivalents for an L2 word, we automatically pick out the best candidate or even decide on something completely different - something not even listed in the entry - as the best equivalent for the L1 context. The choice of the best expression in an L2 context, on the other hand, is not so straightforward because the user cannot benefit from his or her native language intuition and knowledge of the potential range of the alternatives. It is also very demanding to be creative and innovative in an acceptable way in a foreign language.

Although professionals often produce texts in their L2, and are learners in that sense, very important distinctions need to be made at this stage between the concepts of a learner and a non-native speaker, although these

two words are often used synonymously and in a somewhat narrow fashion in the literature. In many contexts, it seems, that 'learner' has actually begun to mean a non-native speaker of English. This is understandable when we think of the global importance of English but unfortunate in the sense that it has led to some misleading generalizations about learners.

A learner is commonly understood to be a young person who needs a dictionary in a classroom, in a systematic language-learning situation and this attitude is also sometimes reflected in learners' dictionaries. It seems to me that, if the prototype learner in the lexicographers' mind is a young, non-native speaker of English, lexicographers might forget that this learner is also a native speaker of another language. In fact, the learner can be a mature person who is very competent and fluent in his or her own language. I take up this point here because I think that lexicographers occasionally overlook the fact that the dictionary user is a native speaker of some other language. I will get back to these matters later, but let me just say in this context, that I do not think that, at the advanced level of dictionary use, we need to make a distinction between a native speaker's or a non-native speaker's dictionary. Instead, we can think in terms of active and passive uses of monolingual dictionaries. In short, I think that we could also apply concepts that are familiar to us from bilingual dictionaries to monolingual lexicography.

It is naturally unfair to the dictionary makers to demand that a general print dictionary should cater to a wide range of potential users and, at the same time, function as a customized dictionary for a more demanding user. The dictionary maker naturally has to take into account all potential users and pay special attention to the largest groups of users and buyers. Nevertheless, I intend to go on being unfair and focus on the vision of the customized dictionary referred to above. I can therefore also demand that the future dictionary pay attention to the contexts in which the professional user needs dictionary help. In other words, I suggest that the only way to overcome the present user dilemma of general (context-free) answers to context-sensitive questions is to try to predict the reasons why the user looks up a particular headword and then try to provide a set of adequate answers. These answers can be presented in a multi-layered hypertext format that does not overwhelm the user with superfluous data and irrelevant and redundant pieces of information that the user does not want to have. (Cf. Atkins 1996:522).

## 3. Use and usability

When studying dictionary use in translation, a few regular patterns of behaviour have emerged and I have formulated these as axioms about professional dictionary use (Varantola 1998):

- Dictionary users resort to dictionaries to solve a context-dependent problem
- Users look for equivalents in the other language, but they also need reassurance and do not therefor like to find equivalents which they do not recognize
- Users also need information relating to longer stretches of text than a single lexical item
- Users try to find non-dictionary type information in dictionaries because it is not readily and systematically available in other sources.

Of these proposed axioms, context-dependency and the need for reassurance are particularly relevant for this article because they relate to the usability of the dictionary information. One basic characteristic of usability is the degree of confidence with which the user applies the information found in the dictionary. The advanced user will often find a possible solution to his or her dictionary query but nevertheless remain hesitant about the applicability of the suggested solution in the particular context the user is working with (cf. also Atkins and Varantola 1997). In such situations it can happen that the user's performance does not match his or her professional competence. The user knows that there is a better solution but has not been able to find it in the dictionary. It is a kind of tip-of-the-tongue phenomenon in dictionary use and often a major source of frustration. The user's uneasiness can be due to the fact that the print dictionary entry is too concise (because of restrictions imposed on the entry by linearity and space) to give the users enough information to base their decisions on. In ideal cases, when these restrictions no longer apply, the user finds what he or she is looking for, recognizes the best solution, decides to accept it, feels reassured and confident, and happy about the way the dictionary entry was structured.

## 4. Dictionaries in the professional's toolbox

Dictionaries need not be regarded as stand-alone lexical tools that should provide all the answers that the users need about language in use. In my

vision, the future dictionary is rather an integrated tool or a number of tools in a professional user's toolbox where it coexists with other language technology products such as encyclopedic sources of reference, different types of corpora, corpus analysis tools, such as WordSmith tools or Word Sketches type software, as well as corpus compilation software, translation memory systems, etc. (Cf. the respective Web pages) An integrated dictionary would be compatible with other similar tools. It should thus be easy to move from one tool to another and also to customize the dictionary to match the user profile and individual preferences. The users would then be able to synthesize the information they obtain from the different sources and use the synthesized information as the basis for their own context-dependent decision-making.

How then could the usability of dictionary information be improved? Many good ideas have already been put into practice, but the print format has prevented the lexicographers from fully exploiting the potential of these innovations. Yet, completely new ideas also need to be tested. I agree with Sue Atkins when she says that 'the future must be print dictionaries and truly electronic dictionaries, compiled afresh for the new medium, enriched with new types of information the better to meet the needs of the multifarious users' (1996:515). She also points out that the real challenge is not 'how the computer can help us to produce old-style dictionaries better, but how it can help us to create something new' (p. 516). Below, I will make a few suggestions which could improve the usability of dictionary information.

## 5. Starting from bilingual dictionaries

Bilingual dictionaries are often considered to be inferior to monolingual dictionaries and language students are sometimes strongly advised against using them, at least as the only source. Yet, dictionary use surveys have shown that bilingual dictionaries are the users' favourites. They are also typically the primary dictionaries consulted and monolingual dictionaries are used only after a bilingual dictionary has failed to give a definitive answer. A bilingual dictionary is also often the only dictionary owned by non-professional users. On the other hand, there are a number of bad and inadequate bilingual dictionaries on the market which are simply misleading and good for very restricted purposes only, which is obviously one reason for their inferior reputation. Another reason is that bilingual dictionaries are often grossly abused by inexperienced users. A typical dictionary user does not expect to need any instructions in the use of the dictionary as long as he

or she knows the alphabet. Upon reflection, this used to be the case with wrist watches and telephones as well. In reality, dictionaries can be loaded weapons in the hands of users who think that languages are codes and bilingual dictionaries conversion tables in which the right-hand side is a mirror image of the left-hand side, only in another language and that the two sides can be turned around without problems. Dictionary-based mistranslations are also a common source for hilarious bilingual jokes, but is it the fault of the dictionary?

Yet, a bilingual dictionary is a contradiction in terms. No such equivalence exists between two languages that would mandate a bilingual word list. However, as we know that there are a number of excellent bilingual dictionaries on the market, I will have to reconsider my statement. Equivalence is a very controversial concept in translation studies and it is controversial also in lexicography, unless we decide to ignore the implication of sameness and bilingual synonyms. There are few, if any, total synonyms within one language, how could there then be total synonyms across languages? In other words, I think that we should rid ourselves of the rigid implications that the notion of a translation equivalent carries and regard the gloss or glosses on the right hand side as approximations or keys to the meaning of the entry word.

Professional users naturally know about the true nature of "equivalence" and they do not automatically expect the translation equivalent to be suitable for the target language context, but when they are working into their L2, automatic meaning adjustment is no longer straightforward and much more contextual information is needed. This has been realized in bilingual lexicography, where the distinction between passive and active dictionaries is well-established but not so well-practised. There are, however, good bilingual dictionaries on the market that have kept in mind users' different needs and different linguistic backgrounds. In particular, this seems to be the case with modern, cooperatively produced bilingual dictionaries between major languages, such as English and French.

In addition, however, there are many, relatively new bilingual dictionaries on the market which pay very little attention to the passive/active distinction and try to steer an unsystematic middle course, both in terms of information categories and their content. Print dictionaries can blame the dearth of information on space restrictions but lack of space is no excuse for lack of systematic approach. Electronic dictionaries have even fewer excuses left. Here space is not a concern, but the danger of an

information overload certainly is and has always been even for print dictionaries. Many studies have dealt with the problems of finding the relevant information in a long dictionary entry. This has resulted in a number of visual innovations in printing and has made it easier for the user to spot the subdivisions and information categories more efficiently. Furthermore, electronic dictionaries can benefit from a layered hypertext design.

A passive dictionary could also be "activated" by giving the user the possibility to access relevant corpus data – e.g. concordance lines from target-language corpora for the potential translation equivalents given in the entry. Another welcome facility would be a link to a thesaurus from the translation equivalents. It should also be possible to access new corpus lines from the thesaurus information. The key word here is "possible" and it would be up to the user to decide whether he or she wants the additional information.

In fact, it may not be the static nature of a print or an off-line dictionary, nor the lack of neologisms in them that is as frustrating to the professional as is their inability to provide systematic access to more specific information for users who are capable of deciding when they have seen enough. I would even go so far as to claim that the professional user needs fewer explanations but better access to well-selected raw data (e.g. access to a representative range of "real examples") for deductive decision-making. I think that the potential of user-controlled search chains could be one of the major innovations in "the truly electronic dictionary" of the future. The applicable results of these search chains can be individual lexical items, collocations, shorter or longer concordance lines from different corpus collections, etc. What is essential, however, is to remember that the idea of these search chains is to give the users a key to the solution, but the dictionary need not attempt to solve the problem for them.

The electronic search process would thus simulate the "manual" search systems practised today. When working on a text, today's professional users typically have a number of various types of dictionaries, both bilingual and monolingual, within their reach. In addition, they may have access to a few resident electronic dictionaries and encyclopedias, even a concordancer, smallish corpus collections, such as MicroConcord, and naturally an Internet connection. In a sense, these users are already working with a network of reference sources to get the results they want. The problem is that this is only virtually a network. The tools can hardly be said to be compatible, as there are few links between them and every time the users moves from one tool to another they need to start from scratch again.

An obvious question to ask here is, where lexicography ends and other language technology begins. I think that we can look at this issue pragmatically and see the different products as parts of a modular network with seamless connections between the modules. For example, it will probably make more sense to keep the corpus information and the software related to it separate from the traditional dictionary. The users, however, do not necessarily need to know where the information they are looking up is located, as long as it is directly accessible from the information that gives the inspiration to the next step in the search chain.

The alphabetic order is an essential condition for a print dictionary. Even if the compilation is based on a different principle, on concept systems, for example, an alphabetic index is the key to finding the headword. In electronic dictionaries, we can still benefit from the alphabetic order, e.g., in the display windows, but we need not be straightjacketed by it. The free text search facility can lead us to all occurrences of the search chain in the electronic dictionary. This facility is particularly useful when we are not quite sure what we want to look up, when we are attempting to do a fuzzy search for something that we cannot verbalize or do not know even exists, but are nevertheless very happy to find. These fuzzy searches have proved very helpful with corpus searches (see e.g. Varantola, in print), but they can also be used with dictionary searches. In a sense, these fuzzy searches may give users - those users who have become stuck - a chance to jump to a new search strategy and new search chains. A fuzzy search approaches the matter indirectly and interactively with the users. The users apply their background knowledge and intuition about language, e.g., knowledge about collocational probabilities and restrictions, or their world knowledge of how things are connected and expressed in the outside world (See also Nesi 2000:139-143).

## 6. Starting from monolingual dictionaries

There is actually not so much difference between bilingual and monolingual dictionaries. Monolingual dictionaries need more space to define what the headword means but can benefit from the fact that they can use the same language in the definitions. Bilingual dictionaries can express the meaning more succinctly but have to give it in another language which has different conceptual divisions and associations from the left-hand side language. It would thus seem logical to claim that it must be easier to describe word meaning more accurately in monolingual dictionaries. On second thoughts, however, that claim is probably an oversimplificaton. The traditional

definition criteria of classification, substitutability and the use of synonyms do not necessarily produce user-friendly definitions; paraphrases are often only approximations and a controlled definition language forces the lexicographers to use fuzzy, even unnatural ways of explaining, a kind of lexicographical beat-about-the-bush techniques. Users have all sorts of needs, from solving a normative dispute about the correct meaning, to doing crossword puzzles and applying the dictionary information to contexts the dictionary has no clue of. Is it thus impossible for the future monolingual dictionary to be customized to anticipate user needs or to let the user select the search path he or she wants to pursue?

### *Learners' dictionaries versus native speakers' dictionaries*

Again, the prototypical user of a learner's dictionary is envisaged to be a young learner who is prompted to use the dictionary in a language learning context (See e.g. Nesi 2000:141 but as implied earlier in this article, a categorical classification of dictionaries into learners' and native speakers' dictionaries may be misleading. Perhaps a learner's dictionary is not such a fortunate label after all. I have argued that many users are not learners in the prototypical classroom sense of the word, but rather non-native speakers using a monolingual dictionary.Yet, in the majority of dictionary-use tests, in which the best-known English learners' dictionaries (COBUILD, LDOCE, OALD and sometimes also CIDE) have been compared and evaluated, the philosophy behind the tests has been to see how well language learners perform teacher- or researcher-driven tasks imposed on the users.

In other words, user-driven tasks, in which the users would have taken the initiative to use the dictionary, have been rare and few evaluations have been based on such observations (Cf. Nesi 2000). This is understandable, as such tests are very difficult to carry out in a controlled fashion because of the high number of intervening individual factors and even uncontrollable variables.Yet it would be very helpful to gain even a little information of the types of non-native speaker's dictionaries which are best suited for any particular user group. Now most of the available evidence is based on comments arising from individual experiences and preferences.

What would happen if we gave up the dichotomy learner vs. native speaker and concentrated on the user's needs instead. Would that free us to think in novel ways about the future dictionaries which could fill their slot or form a node in the network of integrated tools? Again, the user I have in

mind is the professional user who needs the monolingual dictionary for L2 text production. We can study the various types of monolingual dictionaries as a continuum of dictionaries for different user groups and different user needs. At one end, we have the dictionaries or dictionary information intended for language learning, at the other end, dictionaries that would be classified as native speaker dictionaries. However, a distinction could also be made between active and passive user needs. As suggested above, I do think that this distinction is also useful in monolingual lexicography, and it would increase the usability of the dictionaries, if the lexicographers paid attention to differences between information types intended for active and passive use.

Until recently, large monolingual dictionaries normally focused on the passive needs of the native speaker and used orthodox, "system-internal" definition styles but times are changing. In my opinion, the New Oxford Dictionary of English (NODE 1998) is a case in point. The dictionary provides corpus-based usage examples and has modified the definition style to better suit the average user. The corpus examples add an information category needed by non-native speakers who want to use the dictionary in an active fashion. The dictionary is not a "learner's dictionary", it is large, has a wide range of vocabulary and uses normal language in the definitions, but it is certainly a professional user's dictionary, also for a non-native English speaker, maybe it is a kind of "fusion" dictionary then.

By the way, on the notion of definitions, Hilary Nesi points out in her recent study on EFL dictionaries (Nesi 2000:92) that there do not seem to be major differences in intelligibility between the three major EFL dictionaries COBUILD, OALD and LDOCE (1987-89 editions). 'Apparently neither the restricted LDOCE defining vocabulary nor COBUILD folk definitions make dictionary reading quicker or more successful.'

In his article on *Contributions of Lexicography and Corpus Linguistics to a Theory of Language Performance*, Patrick Hanks (who at the time of the publication of NODE was the Chief Editor of Current Dictionaries at the OUP) comments on how rapidly the conventions of meaning and use can change (Hanks 2000). He also notes how unreliable a native speaker's intuition is about how language and words are really used. Hanks calls for a theory of language performance 'that is statistical and probabilistic rather than certain and cut-and-dried'. Corpus evidence shows clearly that language is an instrument of human sociability and should be treated as such. We should therefore treat meanings as events and not as objects. We should think

of the meaning of a word as a meaning potential and replace traditional notions of meaning by concepts inherited from prototype theory. I hope that Hanks' comments will succeed in blurring further the traditional distinction between non-native and native speaker dictionaries and place additional emphasis on a process where distinctions between monolingual dictionaries are based on differences in user needs and competences and not on their linguistic backgrounds.

### *Definitions*

Hanks (2000:7) also comments on how difficult it is for the user to understand what *spider* means if it is defined as 'an arachnid... having a narrow-waisted body and eight jointed legs'. If a user does not know what a *spider* is, then it is very unlikely that he or she will know what an *arachnid* is. A similar observation was made by Kalliokuusi and Varantola about terminological definitions (Kalliokuusi and Varantola 1998). We point out that glossary users often 'complain that the definitions do not have enough contextual, real-world information'. The terminologically correct definitions are correct from the point of view of the domain-specific concept system, but useless to anyone unfamiliar with the concept system and knowledge structures of the domain. It would thus be much more user-friendly to define special field concepts in different ways for users with different knowledge backgrounds (See also Temmerman 2000 and Varantola in print). It is also interesting to notice that very similar concerns have been expressed about difficult technical writing practices (Cf. e.g. Barker 1998).

It has long been the tradition in user guides of household appliances to base the instructions on the internal principles and specifications of the system and to pay less attention to how the user is likely to approach the new appliance. One perfect example can be traced to my own washing machine instructions which give the amount of wash that the machine can do in a washing cycle in kilograms of dry wash. Yet, I know of no washing machine that comes with scales, nor have I ever met a user who weighs the dry wash before placing it in the machine. The origin of this instruction is obvious. The technical specifications and standards for a washing machine determine the capacity of the machine in terms of dry weight, but this is not what the user does. The same philosophy is prevalent also in many on-line help systems of common computer programs. The indexes of these help systems normally provide as search words the system-internal special terms and conceptualizations which are often very different from the users'

conceptualization of the different functions and facilities. In a sense, the same problem occurs in many dictionaries. The accurate but difficult definition styles of many monolingual dictionaries - following the principle that every word in the definition also occurs as a headword - produce definitions which are not necessarily what the user is looking for. The user may actually prefer to understand the definition at its first reading and to see the range of contexts in which the word has been recorded in current usage.

## 7. A future approach

A major issue in modern lexicography is how to benefit from all the corpus-based lexicographical work in different languages in order to produce various types of dictionaries between different language pairs. Atkins (1996:540-541) suggests a frame-semantic approach as a theoretical basis for user-friendly dictionaries. Dictionaries based on frame semantics would have a hypertext structure, display information 'without swamping the reader' and cater to the specific needs of users and their varying degrees of competence. In addition to being applicable in multilingual lexicography, frame semantics could also prove useful in monolingual (lexical) knowledge management by which I mean the ability to access 'the information you need to have' (cf. Carliner 1999:85).

What I am suggesting is the application of frame semantics as a solution to finding information "in the user's own terms". It was argued above that terminologists are increasingly worried about the usability of systematic and conceptually structured definitions which, from the system-internal point of view, are logical and consistent. From the user's angle, however, they can be problematic, because the definitions are context-free and also impenetrable, if the user does not possess the background knowledge of a field specialist. Corpus evidence could tell us what kind of language is used by non-specialists about special-field activities in particular special-field domains and frames. It could thus be possible to build bridges between specialist (system-internal) and general language use. These bridges could in turn be used in user interfaces as a kind of path finders to the information in conceptually structured knowledge bases (Cf. Kalliokuusi & Varantola 2000). The aim of these thesaural and context-sensitive interfaces would be the same as that of dictionaries - to help users in their lexical knowledge management by giving them access to the information they need.

## References

### *Dictionaries:*

CIDE = Cambridge International Dictionary of English. Ed. Paul Procter. Cambridge University Press 1995.

COBUILD = COBUILD English Dictionary. Ed. John Sinclair. Latest edition London: HarperCollins 1995.

LDOCE = Longman Dictionary of Contemporary English. Ed. Della Summers. Latest edition Harlow: Longman 1995.

NODE = The New Oxford Dictionary of English. Ed. by Judy Pearsall. Oxford. Oxford University Press 1998.

OALD = Oxford Advanced Learner's Dictionary. Ed. Jonathan Crowther [1948 Comp. A.S. Hornby]. Latest edition Oxford University Press, Oxford 1995.

### *Other references:*

Atkins, B.T.S. Bilingual Dictionaries. Past, Present and Future. In Gellerstam, M., J. Järborg, S-G. Malmgren, K. Norén, L. Rogström, C. Röjder Papmehl. Eds. *Euralex '96 Proceedings.* Göteborg: Göteborg University. 515-546.

Atkins, B.T.S. Ed. Using Dictionaries. Studies of Dictionary Use by Language Learners and Translators. Niemeyer.

Atkins B.T.S and K. Varantola. 1997. Monitoring Dictionary Use. *IJL 10/1(International Journal of Lexicography).* 1-45.

Barker, Thomas T. 1998. Writing Software Documentation. A Task-Oriented Approach. Boston: Allyn and Bacon.

Carliner, S. 1999. Knowledge Management, Intellectual Capital, and Technical Communication. In *Communication Jazz: Improvising The New International Communication Culture.* Proceedings 1999 IEEE International Professional Communication Conference. New Orleans, September 1999. 85-91.

Fillmore, C. J. & B.T.S. Atkins. 1992. Toward a Frame-Based lexicon: The Semantics of RISK and its Neighbors. In Frames, Fields and Contrasts. Eds. A. Lehrer & E.F. Kittay. New Jersey. Lawrence Erlbaum Associates. 75-102.

Fillmore, C. J. & B.T.S. Atkins. 1998. FrameNet and Lexicographic Relevance. *In Proceedings of the First International Conference On Language Resources and Evaluation..* Granada, Spain. 417-23.

Fillmore, Charles J. and B.T.S. Atkins (1994): Starting where the dictionaries stop: The challenge for computational lexicography. Computational Approaches to the Lexicon. In B.T.S. Atkins and A. Zampolli. Eds. *Computational Approaches to the Lexicon.* OUP. Oxford. 349-93.

Fontenelle, T. A Bilingual Lexical Database for Frame Semantics. In *IJL 4/2000(International Journal of Lexicography)*. 232-248.

Hanks, P.1994. Linguistic Norms and Pragmatic Exploitations, or why Lexicographers neeed Prototype Theory, and Vice Versa. In Kiefer et al. Eds. *Complex '94. Papers in Computational Lexicography*. Budapest. Research Institute for Linguistics, Hungarian cademy of Sciences.89-113.

Hanks, P. 2000. Contributions of Lexicography and Corpus Linguistics to a Theory of Language Performance. In Ulrich Heid, Stefan Evert, Egbert Lehmann, Christian Rohrer. Eds. *Proceedings of the Ninth Euralex International Congress, EURALEX 2000*. Stuttgart. 3-13.

Kalliokuusi, V. and K. Varantola. 1998. From general dictionaries to terminological glossaries. In Fontenelle, T., P Hiligsmann, A. Michiels, A. Moulin and S Theissen. Eds. Actes EURALEX '98 Proceedings. Liège. 601-610.

Kalliokuusi, V and K. Varantola. 2000. User-Sensitive Lexical Databases. A case of lexical knowledge management. In Eds. Ulrich Heid, Stefan Evert, Egbert Lehmann, Christian Rohrer. *Proceedings of the Ninth Euralex International Congress, EURALEX 2000*. Stuttgart. 393-401.

Temmerman, R. 2000. Training Terminographers: The Sociocognitive Approach. In Ulrich Heid, Stefan Evert, Egbert Lehmann, Christian Rohrer. Eds. *Proceedings of the Ninth Euralex International Congress, EURALEX 2000*. 453-460.

Varantola, K. 1997. On the information needs of Dictionary Users. In Karpova, O. Ed. *Aktual'nye problemy teoretiãeskoj prikladnoj leksikografii*.Ivanovo.

Varantola, K. 1998. Translators and their Use of Dictionaries. User needs and user habits. In Atkins, B.T.S. Ed. *Using Dictionaries. Studies of Dictionary Use by Language learners and Translators*. Niemeyer. Tübingen. 179-192.

Varantola. In print. Translators and disposable corpora.

Varantola. In print. Reflections on the use of corpus information

## *Electronic references*

TheFrameNet Project. What is Frame Semantics? http://www.icsi.berkeley.edu/~framenet

The Word Sketches website. Killgarriff, Adam homepage. http://www.itri.bton.ac.uk/~Adam.Kilgarriff

WordSmith Tools website. http://www.liv.ac.uk/~ms2928/index.htm