

# A user's guide to electronic dictionaries for language learners

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### **Abstract**

This paper describes how computer technology has affected the design and use of a range of dictionaries for language learners, from pocket bilingual dictionaries contained within a tiny electronic device, to multi-media interactive monolingual dictionaries on CD-ROM. It discusses the usefulness and success of the new search routes available to electronic dictionary users, and the educational potential of computer-based dictionaries in the language classroom.

### **I. Introduction**

In his review of the *Oxford Advanced Learner's Dictionary of Current English*, fourth edition (*OALD 4*), Bolinger praised the quality and depth of content of the dictionary but complained that it was too 'fat'. It would be difficult, he argued, for learners' dictionaries to include much more information whilst remaining portable: 'I suspect that hard-copy vademecum dictionaries of this type have about reached their capacity. Any really dramatic advance would burst the covers' (1990: 144). Yet Bolinger also identified many areas where dramatic advances would be beneficial to the user: he pointed out, for example, that *OALD 4* could usefully include more illustrations, more examples of regional usage, more idioms and collocations, and more technical terms.

Although *OALD 4* was about to burst its covers in 1989, the most recent (1995) hard-copy editions for the advanced learner market are fuller than ever, and have jettisoned little of the information content of earlier editions (cf. Bogaards 1996, Herbst 1996). Indexes and cross-reference symbols have been added to help in the navigation of multi-word searches, and coding systems have been further refined, but it is inevitable that the more information the paper-based dictionary contains, the harder (and more time-consuming) it will become for learner users to find exactly what they need to know, without first having to negotiate a quantity of information that they do not need to know, or cannot process.

Electronic dictionaries have the advantage of providing the user with almost instant access to a database much larger than a single book. Language learners may also find an electronic dictionary preferable to a printed dictionary in a variety of other respects, although the potential of the medium has yet to be fully realized and publishers still seem uncertain who is going to buy such dictionaries and what these customers' wants and needs might be. As computer technology races forward, publishers and their customers are left straggling at various stages along the way; because our skills and resources differ, the most technologically advanced dictionary is not always as convenient to use as a simpler product that does not require expensive hardware to run, and the electronic dictionaries learners buy are not always the ones teachers recommend and lexicographers admire.

Electronic dictionaries can be stored and accessed in a number of different ways. They can be built into a hand-held device, or inserted in a hand-held device via an 8cm CD-ROM or an IC (Integrated Circuit) card. Alternatively, they can be stored on a hard disk or a 12cm CD-ROM for use with a desktop computer. An electronic dictionary may be purchased and used by just one individual, but it may be possible for a dictionary on disk to be accessed from all the computers on a local area network,

while a dictionary linked to a World Wide Web site can be accessed by users all around the world.

Not all these storage and access methods are equally effective when it comes to ensuring that only purchasers use the product. A dictionary sold on floppy disk, for example, can be downloaded onto any number of different hard disks, and some CD-ROM packages function (illegally) on a multi-user network even when the licence only allows for a single user. If an electronic dictionary can be linked up to a printer it is usually possible to print out individual entries, and computer-based dictionaries will also usually permit the copying of entries to a clipboard or a separate file, from where they can be pasted into wordprocessed documents or other applications. Clearly, these are important considerations for publishers, who have to find the right balance between total protection of their products and complete accessibility and convenience for electronic dictionary users.

In this paper I will take the side of the user, and consider the benefits of various types of electronic dictionaries for learners of English who (I believe) really want their dictionaries to be cheap, complete, portable, comprehensible and easy to use.

## **2. Hand-held dictionaries**

Dictionaries that are contained within a hand-held electronic device are more portable than a dictionary-sized book and can supply many times the quantity of information, although the range of look-up routes they provide is limited in comparison with electronic dictionaries on disk. Unlike dictionaries stored in other formats, these dictionaries are often identified by the name of the electronics company which markets them, and they tend to be sold in electrical goods stores rather than in bookshops. The prevailing emphasis on technological rather than lexicographical features means that the access software is often considerably newer than the hard-copy text on which the electronic dictionary is based: the *Hand-Held Longman Dictionary of Contemporary English*, for example, which is marketed by Seiko, came out in the same year as *LDOCE3* (1995) but is based on *LDOCE 2* (1987).

With the exception of Sharpe (1995), who discusses possible ways of adapting existing hand-held electronic dictionaries from Japan so that they might be used by English learners of Japanese, the development and use of hand-held electronic dictionaries has been little influenced by lexicographers, academic reviewers and educationalists. In their study of the growing use of bilingual electronic dictionaries in Hong Kong, Taylor and Chan (1994) report that the English teachers they interviewed were 'rather doubtful' about their use, and all of them would have preferred their students to consult printed dictionaries. Many of the 494 student users in Taylor and Chan's study agreed that printed dictionaries were more detailed and more accurate than their own electronic ones, but they nevertheless chose the electronic format because it was so much quicker and easier to look up words.

Hand-held electronic dictionaries are particularly popular in Hong Kong, Taiwan and Japan, where the technology to create such dictionaries is readily available and many users can afford to buy a product that is considerably more expensive than a printed dictionary. (The *Hand-Held Longman Dictionary of Contemporary English* costs about £250, while the price of a bilingual handheld dictionary in Hong Kong can range from US\$100 to US\$400, according to Taylor and Chan.) Relatively little use

seems to be made of such dictionaries in Britain, either by native speakers or by non-native learners of English. A survey of the dictionary-using habits of international students entering Warwick University for the 1995-1996 academic session identified only ten students with hand-held electronic dictionaries: five from Taiwan, two from Japan, and one each from Thailand, Spain and the United States.<sup>1</sup> All ten students, however, were extremely enthusiastic about electronic dictionary use, eight claiming to consult them on a daily basis, and the other two claiming to use them 'every week'. Although all these students also owned printed dictionaries (Oxford, Longman, Cassell, Chambers, Collins and American Heritage were amongst the publishers named) only one consulted her printed dictionary more often than her electronic dictionary, and eight students claimed more frequent electronic dictionary use. Interestingly, the tenth respondent, from the United States, said that she used her electronic dictionary and her printed dictionary together.

The ten owners of hand-held electronic dictionaries thought they were superior to hard-copy dictionaries for the following reasons:

- they provided a variety of search routes  
*/ can use Chinese to look up the words in English which I don't know how to spell. When you are not sure about the spelling of words, type the sound-like spelling, and select the possible choices.*
- they could be expanded and/or linked to other applications  
*It can take a printer or [be] connected to computer. Very easy to change to another disk and there are many types of CD available. Alarm clock. TV game. Calendar. Calculator.*
- sound was available on some models  
*The pronunciation of each word. It speaks the word. Some words are very similar but by hearing the word I can tell which one is correct.*
- they were easy to carry around and use  
*Easy to consult. Convenient. I don't have to carry a heavy dictionary, and takes only time to type the words so useful in the lectures.*
- and the database contained extra information  
*Synonyms. Synonym and antonym. It also has etymology and this feature was very useful in an Old English course I did last year.*

The students were conscious that the technology was developing rapidly and that each new version of their electronic dictionaries was an improvement on the last:

*It's not a 'windows' screen, it's the old version without graphic interface. Not coloured yet but maybe in near future.*

Complaints were few, but more than half of the ten respondents felt that they needed more information than their electronic dictionaries contained:

*No English definition of the word I look up in it. Limited definition, no examples. Not every word you can find in the electronic dictionary. Sometimes I can't find the words which I want. Limited meanings.*

*No grammatical information.*

From these comments and the survey by Taylor and Chan it would appear that, despite the way that they are marketed as commodities, hand-held electronic dictionaries are regarded by their owners as serious learning tools, not just as toys or status symbols. Yet the quality of the information they contain can only be as good as that of the original dictionaries on which they are based, and thus it is inevitable that some hand-held dictionaries will suffer from defects associated with the smaller hard-copy bilingual dictionaries, such as inadequate coverage, insufficient grammatical, collocational and pragmatic information, and over-simplistic translation. On the other hand, look-up is faster than with a hard-copy dictionary, and users appreciate that it can be achieved via a greater variety of search routes, for example by selecting from a list of words phonologically similar to the look-up word, or from a list of words with similar or opposite meanings.

The popularity of these dictionaries is also due to their portability: a device as small as a pocket calculator or even a credit card can contain an IC card which holds 64 MegaBytes of memory, sufficient space for the entire contents of a 'fat' English learner's dictionary. The power of many hand-held electronic devices can also be extended, via optional IC cards or mini (8 cm) CD-ROMs.

In hand-held electronic dictionary design it seems to be the customer who dictates developments, and the extensions that are available are usually those that strike the customer, rather than the teacher or lexicographer, as being useful. IC card extensions containing practice exercises for public English language examinations are available in Hong Kong, and most of the devices examined by Taylor and Chan functioned as both a dictionary and a personal organizer, allowing users to input data entirely unrelated to language learning (1994: 599). On the other hand, there are no reports of extensions containing extra cultural or grammatical information, or examples of words in authentic contexts, and Sharpe complains that 'most EBDs [Electronic Bilingual Dictionaries] seem to use the content of printed dictionaries as their database without making any additions or alterations to take full advantage of the EBDs' greater capacity for holding information' (1995: 48). Although Bolinger foresaw that 'the dictionary-consulter of the future will tap out inquiries on a hand-held computer' (1990: 145), the advances in learner dictionary design that he requested, including the increased presence of illustrations, examples of regional usage, idioms and collocations, and technical terms, have yet to reach the hand-held market.

### **3. Desk-top computer-based dictionaries**

Learners' dictionaries on floppy disk or 12cm CD-ROM have attracted far more attention from lexicographers, educationalists and academic reviewers. They are strongly identified with their dictionary publishing houses and the hard-copy dictionaries from which they are derived, and claim to be at the vanguard of learner dictionary design.

The storage capacity of a CD-ROM is about 600 MegaBytes - enough to contain, for example, the 44 million-word database of the *Britannica CD*®. The twenty-volume *Oxford English Dictionary*, and the twelve-dictionary compilation of *The Sanseido Wordhunter* (Sharpe 1995: 48) are both sold on single CD-ROMs. Many monolingual

learners' dictionaries on CD-ROM, however, use only a fraction of the disk space available to them, although they combine several hard-copy volumes and a range of previously unpublished material, thus containing far more data than any published hard-copy learners' dictionary.

Some learners' dictionaries are sold on floppy disks to be downloaded onto the user's hard-drive. The *Longman Dictionary of American English for Microsoft Windows*® (reviewed in McCorduck 1995) is marketed in this format, as is the *Electronic Oxford Wordpower Dictionary* (reviewed in Nesi 1996). Both these dictionaries are relatively small, however. In theory the larger learners' dictionaries, the *Collins COBUILD on CD-ROM*, the *Longman Interactive English Dictionary (LIED)*, the *Longman Interactive American Dictionary (LIAD)*, and the *Oxford Advanced Learner's Dictionary on CD-ROM (OALD on CD-ROM)* could also be sold in floppy disk format, but the majority of users would find this inconvenient because they would take up too much hard disk space. Publishers also prefer the CD-ROM format because it prevents users from running a non-networked application simultaneously on several different machines. *COBUILD*, *LIED*, *LIAD* and *OALD on CD-ROM* will only run if the CD is kept in the disk drive, although it is important to note that all four dictionaries require quite a large amount of hard disk space as well (5 Mb for *COBUILD* and *LIED*, 8 Mb for *OALD on CD-ROM*, and at least 10 Mb for *LIAD*). Even this amount of demand for memory can be a serious limitation for users who intend to run many different applications from their hard disk.

The larger learners' dictionaries on CD-ROM contain many extra features unavailable in hard copy, such as video and audio material, corpus examples, and interactive exercises and games. Like the books in the *COBUILD* series which form its database, *Collins COBUILD on CD-ROM* contains only text, but *OALD on CD-ROM* provides a map section and a picture gallery displaying twenty-one groups of photographs and drawings with headings such as 'Actions', 'Clothing', 'Communication' and 'Professions'. The maps and pictures are the same as those that appear in the *Oxford Advanced Learner's Dictionary* (1995) (with colour added to some original line drawings), while the photographs were originally published in the *Oxford Photo Dictionary* (1991). *LIED* and *LIAD* offer video clips as well as collections of pictures, and *LIAD* also attaches animation sequences to some of the entries in its grammar section.

Visual elements in all three dictionaries can be accessed directly from their own menus, or by cross-referencing from the dictionary entry, although in practice few links are in place to lead the user from a dictionary entry to a *LIED* or *LIAD* video clip, and the video component is not really an integral feature of either package.

In addition to visual components, *LIED*, *LIAD* and *OALD on CD-ROM* also contain audio libraries which provide the user with the option to hear the spoken form of any headword in the dictionary. The audio component in *LIAD* includes a record and playback feature so that learners can compare their own pronunciation with the recommended model. The inclusion of audio and video in the Longman electronic dictionaries entitle them to be termed 'multimedia' applications, and reviewers have commented on the attractiveness of these features to learners (Eastment 1996; McCorduck 1996).

Most learners' dictionaries on CD-ROM also provide more grammar and usage information than hard-copy or hand-held electronic products, because there is space to include grammar and usage volumes in the database. *Collins COBUILD on CD-ROM* contains *Collins COBUILD English Usage* and the *Collins COBUILD English Grammar* as well as the *Collins COBUILD English Language Dictionary*, first edition (1987). It also includes a previously unpublished five million word database of authentic text, the Word Bank. The Longman dictionaries on CD-ROM are both based on dictionaries of language and culture (the *Longman Dictionary of Language and Culture* for *LI ED* and the *Longman Dictionary of American Language and Culture* for *LI AD*), but also include a collection of language notes dealing with errors that English language learners frequently make (the *Longman Dictionary of Common Errors*), together with a pedagogical grammar (the *Longman English Grammar* for *LI ED* and the *Essential American English Grammar* for *LI AD*), and, in the case of *LI ED*, a pronunciation dictionary. In contrast the Oxford electronic dictionaries rely on only one or two sources: the *Electronic Oxford Wordpower Dictionary (OWPD)* on floppy disk contains very little material outside the hard-copy *Oxford Wordpower Dictionary* on which it is based, and *OALD on CD-ROM* is simply a reconfiguration of the *Oxford Advanced Learner's Dictionary*, fifth edition (*OALD 5*), with the addition of audio and visual material and four interactive vocabulary games.

Access to and between sources on CD-ROM is quickly made by a variety of routes. Dictionary, grammar and usage information in *COBUILD*, *LI ED* and *LI AD* may be accessed directly, by clicking on a section menu. *OALD on CD-ROM* likewise provides a choice of five menus, for the A-Z dictionary, pictures, maps, appendices and games. In *LI ED* and *LI AD* the user searching one section of the database will also be alerted if extra information about a search word is contained elsewhere, while in *COBUILD* all sections of the database are accessed during an initial word search; the number of 'hits' in each area are then displayed on the screen and the user can choose whether to access the Dictionary, Usage, Grammar or Word Bank. All the dictionaries also allow searches by 'chaining' or 'hyperlinking', a search mechanism by which a double click on a word on screen will call up a dictionary entry for that word. (The Longman dictionaries will permit a long chain of such searches to build up, but *COBUILD* limits the maximum number of open windows to five, and *OALD on CD-ROM* closes each open window when a new one is selected.)

Akin to hyperlinking is 'interfacing' - the facility to call up a dictionary entry when working on another application. *OWPD*, *LI ED*, *LI AD* and *OALD on CD-ROM* can all be accessed directly from Windows-based word processing programs, and *LI AD* provides the same access from texts on the Internet. In one of the few studies of the way students use computer-based dictionaries, Guillot and Kenning (1994) found interfacing to be a very positive feature of the *Robert Electronique*, and one that was 'much appreciated by our students'. It must be borne in mind, however, that many educational institutions at present only possess a limited number of computers with a CD-ROM drive, and therefore prevent or discourage learners from using these more expensive computers for relatively low-tech applications such as wordprocessing.

Dictionaries on disk allow a certain amount of 'fuzzy' searching; wildcards can be used with most packages to search for words whose forms are not fully known, and *COBUILD*, *LI ED* and *LI AD* also flag some (but not all) homophones, providing a 'sounds like ...' search facility. 'Full text' searches can also be made in *OWPD*,

*COBUILD*, *LIED*, *LIAD* and *OALD on CD-ROM* with the aid of Boolean operators. This type of search allows the user to locate every occurrence of a word or combination of words within the dictionary, thus retrieving multi-word units, collocations, and groups of similarly-worded definitions. In practice, Boolean searches of the A-Z dictionary often extract entries that are not linked by meaning; the same words are repeated many times within the full text, and a combination of search terms will often co-occur within the same entry, not in collocation, but in totally unconnected example sentences. Some dictionaries allow a modification of the Boolean search to limit the maximum number of characters between search terms, nevertheless only sophisticated users who can master the search system and distinguish between significant and random retrievals are likely to find the Boolean facility useful for examining collocations, idioms and lexical phrases. Boolean searches of a corpus such as the *COBUILD* Word Bank, on the other hand, will throw up many instances of collocations and multi-word units, because the text to be searched contains stretches of continuous discourse rather than lists of unconnected sentences.

*COBUILD* have taken advantage of the additional storage space on CD-ROM to provide a reference facility radically different from any in print or hand-held electronic form. Because of the size of the Word Bank (about five million words) most word searches of single or multiple words will result in several examples to clarify their meaning and use; it is a pity that the scripts of the video sequences in *LIED* and *LIAD* are not similarly linked into the search system. It is to be hoped that future electronic learners' dictionaries will expand the sort of facility offered by *COBUILD*'s Word Bank to include, for example, authentic spoken discourse, and texts categorized according to genre, register and geographical region.

Although it is probably the most interesting development in disk-based lexicography, *COBUILD*'s Word Bank still needs further editing and refinement. There are plenty of misprints in the corpus, and search words are often (and perhaps inevitably) used in ways which are not explained in the other sections of the dictionary, thus creating difficulties for unsophisticated learners. Problems with synthesis and coherence are not, of course, unique to *COBUILD*; it is relatively easy to find places in the larger electronic learners' dictionaries where cross-referencing breaks down because systems within the hard-copy sources do not match, or because the break-up of linear text within one source has resulted in the loss of reference markers (see Nesi 1996). It is fair to assume, however, that many of these problems will be resolved in the second editions of the dictionaries; *LIAD* has, in fact, already corrected some of the defects of *LIED*, four years its senior. (The recently-published *OALD on CD-ROM* avoids many of the problems of its predecessors by relying on just one main source.)

Disk-based dictionaries are beginning to cast off the constraints of hardcopy and to move away from a linear approach based on form rather than meaning. Rogers (1996: 84) points out that electronic replications of paper-based publications are still 'word-based rather than meaning-based' even though they offer better search and retrieval facilities. She proposes a semantically organized dictionary which would take the user from the definition to the word, and which would deal with such queries as 'find me the name of the thing which is a kind of boat and which is flat-bottomed and travels on canals and rivers'. Search facilities of this kind are in fact already provided by learners' dictionaries on CD-ROM, although many users are probably unaware of

their existence. A full text search for *boat* AND *canal* in *LIED* instantly accessed eight relevant words, amongst them *barge*, *canal boat*, and *narrow boat*, all of which answer Rogers' query. The same search in *LIAD* found *barge* and *canal boat*. However, in order to achieve this degree of success with *OALD on CD-ROM* it was necessary to alter the form of the search words in unpredictable ways: *boat* AND *canal* found *canal boat*, *chug*, and *dredge* (not *barge*), *boats* AND *canals* yielded no results at all, but *boat* AND *canals* found *barge*, *canal boat* and *gondola*. *COBUILD* was even less helpful; a full text search for *boat* AND *canal* resulted in only a single hit across all four sections - a Word Bank citation for *canal boat* - while field-based searches with *boat* as a superordinate and/or synonym, *canal* as an example word and the grammatical category *noun* yielded twenty-three irrelevant entries, and no mention of *barge*. Although in theory *COBUILD* field-based searches are an excellent idea, in practice they are something of a disappointment, and are not at all easy to conduct. The next generation of electronic dictionaries may be able to develop the *COBUILD* search mode so that it becomes easier to locate words by their semantic specifications: Inui and Ishikawa (1997), for example, are proposing a method of on-line example-retrieval in which the user can search a corpus of (Japanese) examples similar to the *COBUILD* Word Bank. They explain that 'the user can input in English or Japanese any word that is semantically related to the one she is looking for. The system then searches its databases for those examples that exhibit this kind of relation'.

#### **4. The pedagogical value of electronic learners' dictionaries**

There is a good deal of enthusiasm for electronic dictionaries on the part of users, publishers and reviewers. *LIAD*, for example, is advertised as the dictionary that will 'revolutionize your language learning', and McCorduck (1996: 225) writes of *LIED* as 'a revolutionary product for learners of English'. Nevertheless there has been very little research into the effects of electronic dictionary use on language learning, and we still do not know much about how such dictionaries are used, or how they might be used. Even those who market electronic dictionaries seem to be uncertain of user requirements; an article on educational software in *The Bookseller*, for example, admits that 'there is still much debate about how many people own, use, or have access to CD-ROM machines' (3 February 1995: 43).

We do know that hand-held electronic dictionaries are popular because of their portability, and it is obvious that users of dictionaries on CD-ROM, hard disk or a computer network are somewhat disadvantaged because of the site-dependency of these products. A dictionary that can only be accessed via a desk-top computer is not really suitable for receptive purposes such as reading print and listening to lectures, although it might be very convenient for learner writers who can look up words within the text they are word processing. Dictionaries which link to the Internet, such as *LIAD*, might also be useful for reading text on Web sites, although it is unclear whether learners will really use an application of this kind, or whether *LIAD's* 'Internet link' will largely serve as a marketing ploy.

Although the comments of hand-held dictionary owners suggest that learners appreciate the speed and ease of electronic lookup, it is not known whether fast searching is really advantageous to the learning process. According to Sharpe (1995: 50) some teachers of Japanese have expressed fears that learners will not retain the information they retrieve so quickly and so painlessly. In support of the pedagogical

value of electronic dictionary use, however, Guillot and Kenning (1994) write of their students' 'increased capacity for sustained effort' when using the *Robert Electronique*. They found that the accessibility of computer-based dictionary entries encouraged browsing, and hence vocabulary acquisition:

*students spontaneously looked up a large number of unknown or unclear words, not just in cases where the task made it necessary ... but also simply out of curiosity .... they subsequently commented on how easy and satisfying it was to do so, and added that they would never have done it to anything like the same extent with a printed dictionary, if at all.*

(Guillot and Kenning 1994: 65)

Searching a print-based dictionary is of necessity a private experience: it is difficult for learners to look up a word in pairs or groups, and still more difficult for a teacher to monitor the process. Guillot and Kenning (1994) note that a further unanticipated benefit of working with the *Robert Electronique* was that dictionary consultation became more visible and open to discussion.

An important consideration for teachers who want to use electronic dictionaries with their learners is the fact that CD-ROMs and CD-ROM drives are expensive and relatively fragile. CD-ROMs cannot be copied, and many schools and language centres will be reluctant to let learners handle original disks because of the risk of damage or theft. Some dictionaries, such as *COBUILD* and *LIED*, can be accessed by a limited number of different computers on a local area network once a site licence has been purchased, but not all packages permit this; *LIAD*, for example, is only available to individual users at the time of writing.

Most electronic dictionaries, however, have print and copy options which permit the creation of materials on paper. This means that classes with no access at all to a computer can still benefit from some electronic dictionary features such as exercises, pictures, usage information and Word Bank examples if their teachers have the use of a machine elsewhere. Some dictionaries provide support for teachers who need to work in this way; *Oxford Study Shelf* on CD-ROM, a dictionary designed for young native-speaker learners, includes an exercise book 'to enable you to save and print out exercises and games for use at home or in the classroom'. The exercises can be printed with or without answers, and advice is given on how to customize files to meet different learning needs. Similarly, *LIAD* contains a 13-page document of teaching suggestions that can be copied onto hard disk and accessed as a wordprocessing file. Although the lesson plans involve computer use, many of the suggested activities are paper-based and could be supported by printouts from *LIAD* rather than on-line searches.

The pedagogical potential of electronic dictionaries is too great to be ignored, even by institutions with few resources. A single CD-ROM on a single computer can provide a huge amount of classroom material, while the provision of dictionaries on the Internet may in time make it unnecessary to install local area networks, or trust CD-ROM disks to individual learners. A number of on-line dictionaries are already available on the World Wide Web (two Web sites are listed among the references below to electronic dictionaries), but we are still awaiting Web access to an English language learners' dictionary.

Meijs (1992: 152) foretells 'the imminent demise of the dictionary as a book. In a decade or so, on-line dictionaries on disk or CD-ROM will no doubt be the norm rather than the exception'. Many readers will doubt the veracity of this prediction, yet the present pace of technological change is bewilderingly fast, and electronic learners' dictionaries seem already to be on the way to becoming a preferred alternative to the 'fat' dictionary in print.

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