

How useful and usable are dictionaries for speakers of Australian Indigenous languages?

Miriam Corris, University of Sydney

Christopher Manning, Stanford University

Susan Poetsch, Macquarie University

Jane Simpson, University of Sydney

Abstract

This paper presents the results of our investigations of the use and usability of dictionaries of Australian Indigenous languages for speakers and language learners. We report results from task-based and qualitative observational studies with 79 people from three Indigenous language groups, and sixteen of non-Indigenous background, working with nine different dictionaries, including elementary and comprehensive dictionaries, and paper and computer dictionaries. We examine competing pressures placed on the lexicographer by demands for completeness of coverage and ease of access, by the need to accommodate low levels of literacy in English and the vernacular, the range in users' knowledge of the vernacular, and by the shortage of resources. Our conclusions echo informal remarks to this effect by other linguists working with Indigenous populations. This paper adds the results of studies, some results from comparing paper and computer dictionary usability, and practical suggestions for improving the situation.

‘The perfect dictionary is one in which you can find the thing you are looking for preferably in the very first place you look.’ (Haas 1962, p. 48)

1. Introduction¹

This paper presents investigations of dictionary use and usability by speakers, semi-speakers and learners of Australian Indigenous languages. In 1998, Manning and Simpson began a project on the possibilities for innovative computer interfaces for creating and using dictionaries of Indigenous Australian languages. A major focus was the development of ‘Kirrkirr’ (Jansz et al. 1999), an interface for browsing the contents of the Warlpiri dictionary (Laughren and Nash 1983, Laughren et al. in prep.), the biggest machine-readable dictionary of an Indigenous Australian language. Usability is one of the main aims of the interface, and the preliminary design stages were informed by predictable usability issues (based on anecdotal observations of linguists and literacy workers, discussed below). Nevertheless,

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we quickly became aware of a lack of relevant comparable work on paper dictionary usability, and so it seemed vital to gather data on both conventional and computer dictionary use: who would use paper or computer dictionaries; how they would use them; for what purpose and indeed whether they would be able to use them.

Dictionary usability has been an issue in lexicography for over forty years. Many studies have been carried out designed to find out what sorts of things people use dictionaries for (Barnhart 1962, Quirk 1973, Tomaszczyk 1979, Béjoint 1981, Delbridge 1985, Hartmann 1989, Rundell 1999, Scholfield 1999),² and whether they can use them effectively (Hatherall 1984, Bogaards 1996, Harvey & Yuill 1997, Atkins & Varantola 1997, Atkins 1998, Diab and Hamdan 1999 *inter alia*). More recently there has been a growing interest in computer dictionaries and whether they can help to overcome some of the problems people traditionally have using dictionaries (e.g., Nesi 1999, Abel and Weber 2000, Laufer 2000, Nesi 2000, Tono 2000). These studies are largely either survey based and directed at people with good reading skills (students, members of dictionary societies or teachers), or else task-based, focussed mostly on first or foreign language learners of world languages like English, French and Japanese, and again testing people from literate backgrounds.

The situation in Indigenous Australian language lexicography is different, but it shares many concerns and issues with work by linguists on Indigenous languages on other continents, and so we will frequently refer to it as the situation with Indigenous Language (IL) dictionaries. In recent decades, a steadily increasing number of IL dictionaries have been produced in Australia, as records for linguists or posterity, and/or for language maintenance purposes (Goddard and Thieberger 1997). Linguists have long

² For a comprehensive account see Béjoint (1994).

seen dictionaries as an essential contribution to work on endangered languages, and as such they have been mainly concerned with the task of preserving languages for future study or revival. In the past the main audience for dictionaries of these languages has been felt to be linguists and other people from literate traditions. To this end most of the literature on the subject deals with the problems of trying to represent the language as exhaustively as possible, and, in cases of rapidly disappearing languages, with capturing them in print as quickly as possible, or with discussing orthographical and semantic issues (O'Grady 1971, Wierzbicka 1983, Laughren and Nash 1983, Goddard and Thieberger 1997, Green and Turpin 2001).

It is likely that people from traditionally oral societies will have problems using dictionaries, which are essentially artefacts of literate societies. How useful a dictionary will be to an IL speaker depends in part on whether the speaker believes they can learn about words and their uses in isolation from the speech context, and on whether they believe that what is written is likely to be true (Kulick and Stroud 1993). Concerns have been raised about the actual use and usability of IL dictionaries (especially by members of the Summer Institute of Linguistics), in Australia (Kilham 1971, McKay 1983, McConvell et al. 1983, Carroll 1999), and elsewhere, e.g., Mexico: (Bartholemew and Schoenhals 1983), Ghana: (Hansford 1991), Oceania: (Lindstrom 1985, Crowley 1999) and British Columbia: (Stebbins 1999, 2000). These discussions are in some cases the result of many years of observation and experience. The papers present issues with regard to two different kinds of user:

1. users with emerging literacy and little familiarity with dictionaries: most argue in favour of taking into account the sorts of problems people will have with various dictionary conventions such as alphabetical ordering and abbreviations.

2. users with standard literacy and familiarity with dictionaries: the focus here is on a) cultural differences in terms of dictionary content, i.e., appropriateness of entries, or b) macro-structure issues arising from the state of the language in the community, i.e., are speakers looking for bilingual learners' dictionaries, encyclopaedic dictionaries which document a dying language and culture, or monolingual dictionaries reflecting a thriving language?

While not discounting the validity of the issues these discussions raise, the papers generally predict problems based on who they take to be the audience and what they assume the dictionaries will be used for.

This paper represents, to our knowledge, one of the few attempts at examining actual dictionary use by IL speakers and semi-speakers using observation, ethnographic diagnostic testing and traditional dictionary testing. While many of our findings are anecdotal, (because of difficulties in carrying out quantitative testing, discussed later, but which are not uncommon in small IL societies), we believe that presenting them is worthwhile, because there is a shortage of time, money and lexicographic labour for producing IL dictionaries, and hence it is important to avoid time-consuming and costly mistakes in content, design and display of IL dictionaries.

Our main questions were:

1. What uses are dictionaries of Australian languages actually put to, and by who?
2. Are the available dictionaries of these languages suitable for the tasks they are already put to?
3. Can users use these dictionaries effectively?
4. What are the prospects for computer dictionaries in solving usability problems?

Our investigations involved three different language groups in Australia, 95 participants and nine dictionaries, and was carried out in three stages, initial work by Corris and Poetsch in early 1999, follow-up work by Simpson in mid-1999, and further follow-up work by Simpson in mid-2000. We summarised some findings from the first two stages of this work (and some related studies on Papuan languages), in Corris et al. (2000) and Corris et al. (2001). Here we present a full report on this investigation, with details of the procedures used, and results from a bigger sample of languages and dictionaries.

2. The Languages

We worked with people from three language groups in the Northern Territory of Australia – Warlpiri (including from Wakirti Warlpiri, an eastern Warlpiri dialect), Warumungu and Alawa - in four different communities, Lajamanu, Yuendumu, Willowra and Minyerri, as well as in the towns of Tennant Creek, Alice Springs and Katherine (see Map 1 below).

Warlpiri is the first language of the community in Lajamanu, Willowra and Yuendumu. People of all ages speak Warlpiri, although at Lajamanu children and young adults speak Kriol (an English-based creole) and English, and language shift appears to be in progress. At Willowra and Yuendumu the English spoken is closer to standard English. As a result of bilingual education programmes in all three communities many people write Warlpiri as well as English,³ but inevitably literacy skills differ according to age - most old

³ Yuendumu has had the longest and most successful bilingual education programme of the Warlpiri primary schools, in operation since the early seventies. Willowra has also had a primary school bilingual education programme for many years. At Lajamanu, a bilingual education programme was started partly as a result of community pressure for bilingual education as a means to halt the shift from Warlpiri. The future of all three programmes is

people are illiterate. Young to middle age adults who are literate in Warlpiri are likely to be literate in English as well. There is Warlpiri literacy reinforcement through the presence of the school, newsletters, and some public notices.

Wakirti Warlpiri and Warumungu (in the Tennant Creek area) and Alawa (at Minyerri) are in similar positions in so far as all three are languages which some speakers and descendants of speakers are trying to revitalise. Only middle-aged and elderly people are competent speakers. Children and young adults do not speak these languages as their first language (with a handful of exceptions), and only a few can write it, as a result of occasional classes.⁴ There is little or no other Indigenous language literacy reinforcement, except for those few people who work in regional Indigenous Australian language centres.

Warumungu and Alawa are located in the Kriol-speaking region of Northern Australia. With respect to speaking skills, people aged six to thirty are likely to be most proficient in Kriol, less proficient in English and least proficient in their traditional language. In terms of literacy, they are more likely to be literate in English and less likely to be literate in their traditional language. There has been no attempt to provide Kriol literacy in the Tennant Creek area. However, at Minyerri, due to bible translation work and some literacy reinforcement in the community (signs and notices) some people have some Kriol literacy skills.

uncertain because the government agency responsible for funding the programmes, the Northern Territory Education Department, announced in 1999 that it would start to phase out bilingual education (Hoogenraad 2001).

⁴ Lessons in vernacular language and literacy have been held sporadically in some primary schools. Adults have sometimes been able to take literacy, language and linguistics courses through Batchelor College, a tertiary education college which caters for the indigenous population of the Northern Territory.



Map 1: Locations (underlined) in the Northern Territory where dictionary use was observed and tested.

3. The Participants

Potential users of dictionaries of Australian ILs include people of IL and non-IL background: teachers, teacher assistants, literacy workers,

translators; native speakers, adults interested in learning their traditional languages, and children. All in all, we worked with 79 people of IL background, most of them women, and 16 people with a non-Indigenous background. The people we worked with fall into different categories of users with different needs. We summarise below in Table 1 the major classes of user.

LANGUAGE OF AFFILIATION	SPOKEN KNOWLEDGE OF IL	LITERACY IN IL	LITERACY IN ENGLISH	AGE	OCCUPATION
Warlpiri	fluent	medium	low-medium	adult	11 literacy workers and tertiary students
Warlpiri	fluent	low-medium	low	adult	2 literacy workers
Warlpiri	fluent	low	low	child	50 students ages 6-16
Warlpiri/ Warumungu	semi-speaker	nil-low	medium	adult	3 tertiary students
Warumungu	fluent	medium	low-medium	adult	2 tertiary students
Warumungu	learner/fluent	low	low	adult	2 tertiary students
Alawa	learners nil-low	low	low	adult	3 tertiary students
Alawa	learner	low	medium	adult	2 workers non-literacy
Alawa	learner (semi spkr)	nil-low	low	adult	2 teaching assistants
Alawa	beginner learners	nil	medium	adult	2 teaching assistants
English	learners	medium-high	high	adult	7 adult
English	beginner learners	low-medium	high	adult	9 adult
Total					95

Table 1: Different types of users

The important properties distinguishing these users and the uses they made of dictionaries were the varying levels of knowledge of the IL (spoken and written) in the community. Other relevant factors were the level of attainment of English literacy, familiarity with dictionaries, and whether users had work- or study-related uses of literacy in the IL.

4. The Dictionaries

We worked with seven printed dictionaries of the three languages, a computer dictionary interface for Warlpiri, and electronic databases for Warlpiri and Warumungu:

a) *WD: The Warlpiri dictionary* (Laughren et al. in prep) data files comprise about 10,000 headwords, including sub entries, organised as Warlpiri-English, with fine sense distinctions and lengthy definitions in English and often in Warlpiri, and extensive exemplification. Printed on A4 pages in full in a 10 point font, it would comprise over 2,000 pages. A 204pp printout of shortened versions of the entries is in circulation in the Warlpiri schools (*Warlpiri Word list: Warlpiri - English DRAFT 1996*, created by Robert Hoogenraad). It does not have an English finder list, but does have 3 pages of front matter.

(b) *K*: The *Kirrkirr* computer interface to the Warlpiri dictionary is illustrated in Figure 1 below. The version we tested in 1999 provided users with three kinds of information on the screen at once: an alphabetically-ordered word list, a colour-coded semantic network and the definition of one headword from the semantic network. The user could click on a headword (here *watu*), type in a headword search, click to get the English translation, and see words that are semantically related to the word looked up (eg *jaja*).⁵ The version we tested in 2000 also had some additional features.

⁵ See Jansz et al. (1999) and Manning et al. (2001) for a full description of the rationale behind and capabilities of *Kirrkirr*.

(c) *EWD: The Elementary Warlpiri Dictionary* (Hale 1995). This is a short, beginner's Warlpiri dictionary, with 4 pages of front matter, 39 A4 pages of vocabulary, with an English-Warlpiri finderlist, and a short sketch grammar.

(d) *SD: Warlpiri yimi kujakarlipa wangkami* (Swartz 1997) is a 229 A4 page dictionary of a dialect of Warlpiri spoken at Lajamanu (no front matter on using the dictionary, no English finderlist). It has vernacular definitions (unglossed), simple English glosses, example sentences (sometimes unglossed), synonyms.

(e) *FD*: A printed version of the data on flora from the Warlpiri electronic data files of the big Warlpiri dictionary (Warlpiri Lexicography Group 1986) (4 pages of front matter, 95 A4 pages of vocabulary, no English finderlist).

(f) *WWD*: The short (60 page) Wakirti Warlpiri dictionary (Simpson and Nash 1990) is a dictionary of a dialect of Warlpiri spoken in the Tennant Creek region (14 pages of grammatical information, no front matter on using the dictionary, no English finderlist).

(g) *WrD*: The draft (81 page) *Warumungu-English dictionary* (Belfrage and Simpson 1995), (3 A4 pages of front matter, 81 pages of vocabulary, no English-Warumungu finderlist).

(h) *WrED*: The Warumungu electronic dictionary database (Simpson in prep.). This consists of 1500 headwords, some with subentries, organised Warumungu to English.

(i) *AD*: The printed draft of the *Alawa-Kriol-English dictionary* (Sharpe 1999) is 250 A4 pages long. It has front matter, including some cultural and

grammatical information. The vocabulary is organised as Alawa-Kriol-English and by semantic domains. The dictionary also has Kriol-Alawa-English and English-Alawa-Kriol finderlists. There is no electronic version of the Alawa dictionary.

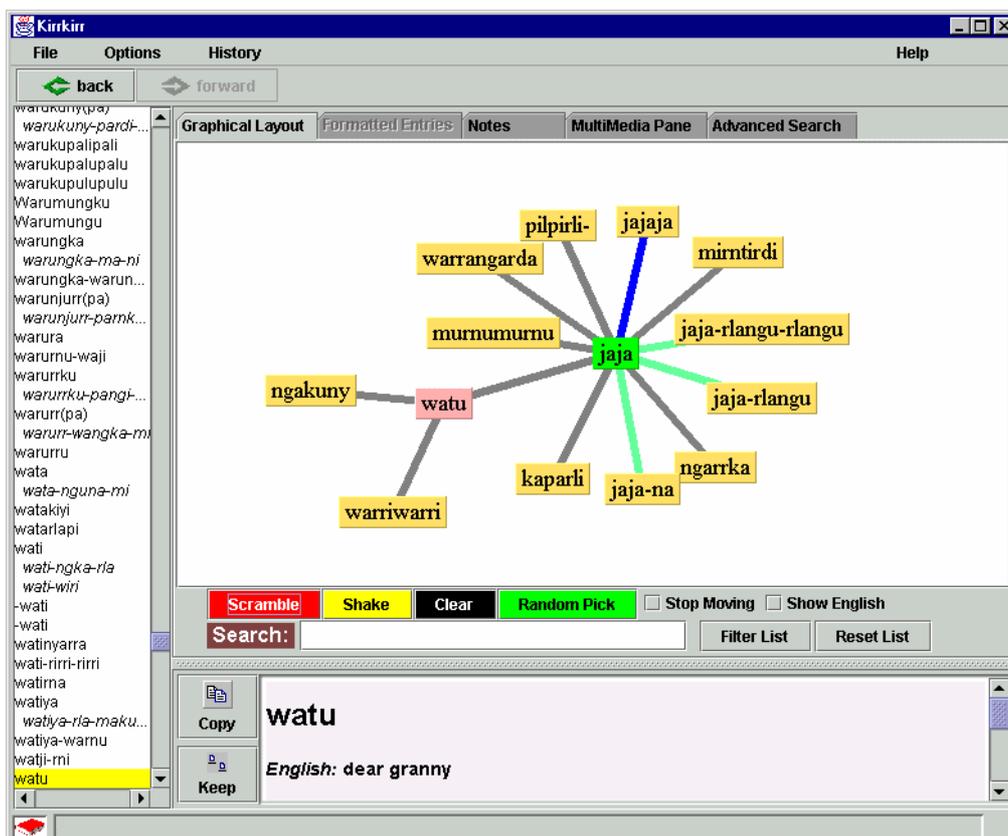


Figure 1. One view of the Kirrkirr user interface.

All these dictionaries are bilingual or trilingual, with English, the language of wider communication, as one of the languages and IL and/or the lingua franca of the area as the other(s). IL dictionaries in Australia are almost always bilingual, with the direction IL-English.⁶ Some have English

⁶ This arrangement is typically most useful for speakers of English (which includes in almost all cases the lexicographer) who are trying to learn, understand or explicate the IL, in other words for decoding. It also fits with the desire of many lexicographers to produce documentation dictionaries,

finderlists, sometimes separated into semantic domains (Goddard and Thieberger 1997). The IL dictionaries that we used had little front matter; where they did, it was in English only.

The microstructures of the dictionaries differed according to how big the dictionaries were. Most contained some example sentences. A few (*WD*, *SD*) had IL definitions as well. IL definitions and example sentences are useful because they can contain cultural and grammatical information, helpful for further study and documentation as well as for speakers maintaining the language. Actual definitional practice varied from one or two English glosses, to structured entries. Part of speech information was usually included, and sometimes sense relations.

5. Methods and Procedure

Our studies involved ethnographic diagnostic observation and discussion, and, where possible, task completion. The methodological approaches we took were determined by a number of considerations. Our ability to set dictionary-use tasks was hampered by the great range in age, educational experience, knowledge of the IL, and English literacy of the speakers, as well as the fact that they live in a number of small communities. It became clear that there was no group of ‘typical users’ of dictionaries of Indigenous languages, to whom a single standardised test of dictionary use would apply. In most cases, these many confounding factors would dominate in any attempted measurements of task performance, and undermine statistical analysis of numerical performance data.

which record every word they can. Secondly, it has a symbolic value: putting the IL first is a claim that the IL is important. Speakers sometimes feel that it is the only direction that could truly be described as a dictionary of their language (Corris et al. 2001).

While almost all of the IL speakers and descendants we worked with had some familiarity with dictionaries through English schooling⁷, many of them did not have all the skills necessary to find words in a comprehensive dictionary, read an entry, and understand all of the information it contained. Consequently many participants required time and help from us to complete reading and writing tasks, and many of the participants felt more comfortable and confident completing tasks together in pairs or small groups rather than as isolated subjects in an experiment. These factors increased the need to provide qualitative results, rather than relying mainly on quantitative measures of task performance.

5.1 Ethnographic diagnostic observation and discussion

Over the period of two years, our visits to the various communities provided us with opportunities to observe and discuss attitudes to dictionary content and use with Indigenous people and other people working with them, including language informants, language learners of various ages and attainment levels, linguists and lexicographers, teachers and teacher linguists. The situations ranged from those which were set up specifically to examine dictionary use to those in which dictionary use was part of some other task (for example, adult literacy classes). We used ethnographic diagnostic testing methods that have been used elsewhere for testing usability of education material (Brady and McKenzie 2000), and which rely on informal but detailed conversations with, and observations of, a sample of individuals to determine the range of differences in the intended readership of the material.

⁷ Many of the adults attending post-school classes used English monolingual dictionaries in their classes. The disappearance of ten out of sixteen English dictionaries provided in one classroom may be an indirect measure of their interest in using dictionaries to further their knowledge (Samantha Disbray p.c. Alice Springs 2001).

Corris demonstrated the *K* interface to a range of people at Yuendumu and Willowra, focussing especially on school children. She observed: how they used the interface; what they looked up; what seemed to interest them; what difficulties they had in using it. Simpson demonstrated *K* to teachers, teaching assistants and school children at Lajamanu on three visits, as well as to students from different Warlpiri communities attending language and literacy courses. Simpson and Poetsch observed use of the paper dictionaries (*SD*, *EWD*, *FD*, and *AD*), both when they were shown to users for the first time, and in language and literacy courses, where dictionaries were available for use.

5.2 Task-based activities

In 1999 Poetsch designed thirteen task-based activities,⁸ ordered in terms of difficulty, to be used in workshops with potential users for seeing how efficiently nine adult learners could find information in *AD*. In preparing these tasks, low levels of spoken and written competency in Alawa were assumed. Each task required basic searches for word translations, to be copied onto a task sheet. Searches to solve the initial tasks were deliberately designed to involve reading the shortest and least dense entries. However, in the event, only the first five of the thirteen tasks could be carried out with the users, because the time taken to complete each task was so great. For example, a crossword requiring twelve look ups took most users some 45-60 minutes.

Task 1 required the participant to order, alphabetically, a set of cards with ten to fifteen English, Kriol or Alawa words on them. Task 2 was a worksheet with three columns of words, labelled English, Kriol and Alawa. The English words were listed and the task was to look only in the English section of the dictionary and find and write the corresponding Alawa and Kriol words from the dictionary. Task 3 was a similar worksheet with three

⁸ Examples can be found in Appendix 1.

columns of words, labelled English, Kriol and Alawa. Each column had some words filled in and the task was to find the correct (i.e., English, Kriol or Alawa) section of the dictionary, look up the given word and write the translation words in the other columns. The worksheets for both tasks 2 and 3 indicated, as a clue for the user, how many letters were in the words being searched for. Task 4 ('Findaword') contained two types of clue - Kriol to Alawa, English to Alawa. Participants thus had to look up the relevant section of the dictionary to find the Alawa translation. Task 5a - 5g (crossword puzzles) each contained between twelve and eighteen clues of the form: What is a Kriol word for *nyalal*?

In 1999 Simpson tested Warumungu dictionary use in action by incorporating dictionary tasks as part of adult literacy and linguistics training courses that she was running. Task 1 involved giving Warumungu students a list of ten misspelled Warumungu words to spell correctly. Task 2, designed for an advanced/fluent Warlpiri speaker with a medium level of written language, required the speaker to look up words in the electronic dictionary from song texts that she was writing to check spelling of words as a way of proof-reading the texts. Looking up twenty-six words with discussion with the researcher took about two hours.

In 2000 Simpson tested Warlpiri speakers and non-Indigenous teachers using three paper dictionaries (*SD*, *EWD* and *FD*) and the *K* interface. She designed a worksheet (Appendix 2) which included six tasks for users to complete: task 1, look up words; task 2, follow 'same as' or 'see also' links; task 3, find alternate forms; task 4, find synonyms; task 5, find senses; task 6, find other information (cultural information). This worksheet was used with six students in a Warlpiri course, and seven Indigenous participants (four adults and three children) and nine non-Indigenous members of the teaching staff at Lajamanu community school. Some people completed the worksheet using the paper dictionaries and others used *K*.

6. Findings and Recommendations

The results of our observations, discussions and tests can be considered in terms of two aspects of dictionaries: *functionality* (How easily can users retrieve information?), and *attitudes of users and makers to dictionaries* (How do users see dictionaries; how do lexicographers see dictionaries; what are dictionaries currently used for; what words and information should be included?).

6.1 Functionality and exhaustiveness

The tension between functionality and exhaustiveness of both printed and electronic dictionaries is discussed under the two headings of macro-structure and micro-structure.

6.1.1 Macro-structure

a) order of the languages All the dictionaries were bilingual or trilingual, ordered IL-English. Only a few had English-IL finderlists. Our observations bore out the importance of providing the English-IL order. It was useful for lookup - Alawa and Warlpiri people without much proficiency in speaking or writing the IL but with better English literacy skills were observed using the English finder-list section of the dictionary (*EWD* and *AD*) in preference to the IL section when they wanted to look a specific word up (for spelling, composition of sentences or translation, as opposed to browsing).

Interestingly, users of *K* occasionally adopted the same strategy; for example a Warlpiri boy at Willowra, who had problems spelling Warlpiri, attempted instead to use searching on the English 'dingo' to find the Warlpiri translation

warnapari,⁹ and a group of Warlpiri children at Lajamanu, disappointed in not finding the English loanword *puluku* in *K*, looked up ‘cow’ instead. English-IL order was also needed both for English learners of Warlpiri (several teachers noted their own need for such a dictionary), and for Warlpiri learners of English, for example an adult literacy student wanted to look up ‘hard words’ in English so as to know how to translate them into Warlpiri - she had had trouble in translating the English word *concern*.

In sum, while the order IL-English has value for IL learners wanting to decode the language, and has prestige value because of the primacy of the IL, its use for IL speakers is limited (Corris et al. 2001). IL speakers wanting to maintain their language need monolingual dictionaries with substantial definitions. IL speakers wanting to decode English need learners’ dictionaries which are ordered English-IL and which contain words such as *bureaucracy*, *fistula*, and *income tax* that are rarely found in English finderlists of IL dictionaries. Problems caused by the lack of English-IL dictionaries have recently been raised in Trudgen (2000), a book on adult education for the Yolngu (a northern group of Aborigines).¹⁰ Finally IL descendants wanting to revive their language and other IL learners tend to want learners’ dictionaries

⁹ He did not find the word due to spelling ‘dingo’ incorrectly as ‘digo’, which suggests the importance of fuzzy spelling search for finderlists as well as the main list.

¹⁰ Trudgen, an adult educator, writes: “Without a good English-to-Yolngu Matha dictionary, the people are stuck whenever they come on a new, intangible English term. There is no easy-to-use linguistic tool to help them. They enter ‘uncharted language’ waters. [...] Many times as a cultural group they will come to an understanding of an English word and will teach each other that meaning. But without a standard like a dictionary to test their understanding, they will continue in their belief that it is correct. In fact, it may be disastrously flawed.” (Trudgen 2000:93-4)

While we are less convinced that English-IL dictionaries are the best way of teaching people the meanings of these words, the issue raised is nonetheless important.

ordered English-IL so that they can express their ideas in the IL. There are very few dictionaries produced entirely by IL speakers or descendants; two such dictionaries of Wangkatha that we located (Wangkanyi Ngurra Tjurta Aboriginal Corporation Language Centre 2000 (ca. 800 words), and Boyle and Boyle n.d. (ca. 3000+ words) were both ordered English-IL. The selection of English words to be glossed in both of these dictionaries reflect the presentday concerns of the authors, and include a few terms such as ‘ambidextrous’, ‘rev up’, ‘glamour’, ‘glucose’, ‘high heeled boot’, ‘quaint’ and colloquialisms such as ‘busting (for toilet)’ which do not appear in the entire Warlpiri dictionary (*WD*), showing the difference between dictionaries which document the past and accepted conventions, and those which have more focus on what people talk about today, and so may include chance coinages.

Concerns of space, money and lexicographers’ time often make it impractical to produce large bidirectional paper dictionaries. Finderlists are useful for people wanting a quick answer, (the spelling of a word, or jogging the memory as to the shape of the word). But when more information is needed, having to search via finderlists doubles the lookup task (see also Stebbins 1999). Electronic dictionaries avoid the problems of space and money (Abel and Weber 2000), but are subject to the same time constraints – preparing a bi-directional dictionary is a great deal of work.

b) alphabetical order A second point concerning macro-structure is the use of alphabetical order for finding words. We have mentioned the fact that some users preferred to use the English finderlist. But many users from all three languages did not grasp alphabetical order in English, let alone in the IL. Through the course of our investigations we often found alphabetical order to be a separate skill from general literacy.

At the headword level, alphabetical order proved an obstacle; Alawa users often flicked randomly through *AD* until they came across the right

letter. One went from *feja* (feather) to *grin gras* (green grass) via the *Ww* section. Others systematically began at the beginning of the alphabet for each look up and went through each letter until they reached the one needed, for example one Alawa speaker went from *gowat* (go out) to looking for *karant* (current) via the *Aa* section, and a Warlpiri student went through *Jj* (the first headword letter) and *Kk* page by page until she reached *karrawari*. Part of the difficulty also comes from unfamiliarity with the size of the letter. Experienced users of paper dictionaries have developed a sense of how long it takes to get through a letter in English, for example that *Qq* will take less time than *Ss*. But, a non-Indigenous teacher with well-practised reading and reference skills observed that he had difficulty with Warlpiri dictionaries because he had no idea how far he needed to go before reaching the end of a letter – in fact, rare English initial letters (J, K, W, Y) comprise the bulk of the Warlpiri dictionary.

These difficulties increased when users needed to check the second and third letter of the word. They then often resorted to browsing through the pages in the vicinity of the word sought until it was located. And once the word was located, it could easily be lost again; for example an Alawa participant who found a word would look momentarily back to the task worksheet, and then have to look back to the page of the dictionary and go through the whole process of having to relocate the necessary word on the open page.

The people most able to look up words were people with reasonable English literacy, because if IL speakers have had any alphabetical order training, it is with English alphabetical order. Familiarity with English alphabetical order created problems when the alphabetical order of the IL was different. Almost all the dictionaries treat digraphs such as *ng* and *ny* (for velar and palatal nasals) as single letters, and separate, say, words beginning with *na* and *nu* from words beginning with *ng*, which caused some confusion.

Discussion, training and local decision-making about ordering are essential for overcoming this kind of problem.

We suggest that people preparing paper dictionaries for ILs consider:

- Providing training in alphabetical order
- Using the same alphabetical order as English, rather than separately ordering accented letters or digraphs (Goddard and Thieberger 1997)
- Cutting an index into each of the sections of the dictionary.
- Having the letter of the section clearly marked at the top of each page.
- Displaying alphabet at the top of each page as a prompt for order and as assistance for checking the second, third, fourth letters of a word. For example:

a i j k l **ly** m n ng p r rr t u
w y

As Burke (1998) and Nesi (2000) point out, the possibility of multiple ways of looking up words is a key advantage of electronic dictionaries over paper dictionaries, in part by lessening the dependence on alphabetical order. *K* allows use of an IL alphabetic scrolling list, typing in an IL word (with fuzzy spelling options¹¹), typing in an English word,¹² clicking on words in a graphic network of related words, and clicking on linked words in definitions. Typing in words was quickly adopted by most users. For some users the scrolling word list down the side was helpful because if they typed in the first three or so letters of a word, the word list automatically scrolled down to that

¹¹ The fuzzy spelling options were designed on the basis of common spelling errors Simpson had observed (e.g. alternation of retroflex ‘rt’ and alveolar stops ‘t’), and need more refinement.

¹² This feature was somewhat hidden in the versions tested, appearing only on the “Advanced Search” panel, and so its possibilities were not explored fully.

point. This displayed a list of words that start with those three letters and the users could choose from there the right spelling. It meant that they did not need to be certain about the spelling of the word. Clicking on the graphical network interface was also adopted by browsing users. The attractiveness of the browser and large font size is appealing – a Wakirti Warlpiri learner spent only a few minutes looking at the electronic data file underlying *WWD*, which could only be searched by typing in a word in the ‘find’ box, or scrolling down. But when presented the following day with the *K* interface she spent 3/4 hour browsing it.

c) design issues Two general design issues arose for users with low levels of literacy. The first concerns small font size and dense text, which were also a problem for users with eyesight problems. The second concerns locating the relevant section of the dictionary. Part of literacy involves being able to scan a page very quickly and determine whether it is in a language one understands. When using *AD* which is three-way (Alawa-English-Kriol), Alawa users would often inadvertently flick between sections of the dictionary within one look-up, for example they would look for the English word *blood* in the *Bb* part of the Kriol section of the dictionary. They would not necessarily recognise that they were not looking in the relevant section of the dictionary and would continue searching for the word until prompted. We encountered a related problem with the *K* interface when different layouts (graphic and definition) were presented simultaneously on the screen.

Solutions for paper dictionaries all involve the kind of expense that typically is out of range for Indigenous language dictionary projects. For example, each section of the dictionary could be printed in a different shade of colour, or just the page edges could be coloured. Page edges could be labelled. A cardboard division between the sections of the dictionary would help to minimise the number of inadvertent flips into the wrong section of the dictionary. In the three-way *AD* a different font style and size is used for

each of the three languages. This is a helpful cue for users and is an example of how (both printed and electronic) dictionaries can be designed to assist speakers and learners of Indigenous languages. Users were observed to have the least trouble locating the words in bold type (Alawa words) despite the fact that this language was the least familiar to them of the three languages in each entry. However, practical considerations prevent using large fonts in paper dictionaries with large numbers of entries. Here computer interfaces have an advantage, in that there is no real restriction on length, and users can have different interfaces with different font sizes and styles.¹³

Overall, the macrostructures of IL dictionaries need careful consideration, as to direction (IL-English, English-IL), content (learners' dictionary vs. documentation dictionary), access (alphabetic or other), and general design considerations for users with low levels of literacy. There is a tradeoff between on the one hand giving the user access to all the information they need and different ways of searching for it, and on the other hand making the interface simple to use for people with low levels of literacy. Electronic interfaces offer solutions to some of these macrostructure problems, particularly access and storing large amounts of information.

6.1.2 Microstructure

The people who prepare IL dictionaries are usually highly literate and have had many years of dictionary training. They are so used to dictionaries that they forget the number of conventions involved in interpreting dictionary entries. In searching for information in a printed or electronic dictionary, users had two kinds of difficulty – finding the word, and, once it was found, extracting the relevant information from an entry. We discuss each in turn.

¹³ *K* provides a partial implementation of this idea: dictionary entries can be selected from and differently formatted to suit the user via use of XSLT stylesheets (Manning et al. 2001)

a) *Citation forms* Problems with finding the word (apart from spelling problems) concerned the notion of a citation form. The languages involved are agglutinative and mostly suffixing. Users were disappointed when they could not find particular inflected forms of verbs in the dictionaries,¹⁴ and grasped at the citation form even if it was incorrect for the task; for example a Warumungu participant was given the task of respelling the incorrect *wankanyi* ‘talked’ (correct *wangkanyi*). She found the right citation form of the verb (present tense *wangkan* ‘talk’) in the dictionary, (confirmed by its

¹⁴ The problem is not restricted to Indigenous users of course (Nesi 2000). Margaret Carew explored this further when she set two Warlpiri tertiary students (H, P) with good Warlpiri literacy the task of creating a glossary for a story using *K* which cites verbs in the present tense with a hyphen separating the ending. She writes:

Virtually all of the verb forms in the *ngapa* [‘water’] story were in the past tense, so for example, to look up *kangu* [‘carry-PAST’], one needs to enter *ka-nyi* [‘carry-PRESENT’] into the search box. H and P got the trick of just entering the first couple of letters, but this means scrolling through the many entries that start with eg. *ka* and selecting the right one. This is a difficult job for someone with either bad eyes (P) or limited mouse control (both students) as the scrolling is very fast in *K*. In practice this considerably limited the students' ability to enter searches for words themselves.

For the text glossary the students felt very strongly that words should be given with all their suffixes and put into groups with shared roots, eg:

kangu 'took it', *kangulpa* 'kept on taking'
ngapa 'water', *ngapa-kurlu* 'with water', *ngapangka* 'in the water'

[...] They got the hang of searching for suffixes with more clearly semantic (rather than grammatical) content, eg: *-ngirli/-ngurlu* [‘from’], *-kurlangu/-kirlangu* [‘of’]. Such endings are listed in the dictionary while the tense suffixes are not. I think the basic distinction is that *kanyi* and *kangu* are seen as whole words. (Carew 2000)

English gloss). She then incorrectly wrote down *wangkan*, the citation form of the verb, as the re-spelling.

Separately listing all inflected forms of verbs is not a realistic solution for this problem in paper dictionaries since it would vastly increase the number of headwords. However, a computer interface is not subject to this problem since physical space restrictions are not an issue. All inflected forms could be stored (or derived through morphological analysis (Sato 2000)). A user could look up any form of the verb without having to know the root form. *K* presently does not have this, but it seems to be a desirable addition.

b) *Distinguishing headwords and sub-entries.* Another problem in locating words came from the use of sub-entries. Alawa users found it difficult to locate the right sub-entry when there were a lot of sub-entries. For example, under the Kriol headword *singat* there was also *singat la*, *singat*, *kolumap*, *singat adbala*, *singat brabli adbala* and 14 other words. Although the word needed to complete question 5 of task 5.g (a crossword) was further down the list, users did not look beyond the first one.

A suggestion for printed dictionaries is that they could be designed so that sub-entries below a headword are numbered or significantly indented, with each starting on a new line. Clearly, if available, training could also develop users' skills in reading entries. In contrast, the ability to find a word by typing it in allows an electronic interface such as *K* to eliminate the need to distinguish headword/sub-entry structure in searching for entries. However, *K* preserves the semantic relationship by treating headword/sub-entry relationships as akin to other semantic relationships like synonym, antonym, or possible preverb (see Figure 1). For *K* this seemed to be successful as users enjoyed observing and explaining these relationships without there being sources of confusion, (though this worked best for users who know the language).

Once the word had been found, difficulties arose depending on what the purpose of the word search was.

a) *Pronunciation* When IL learners looked up words to find how to pronounce an IL equivalent, their low levels of IL literacy caused problems. For example, Alawa learners would go through the long process of locating an Alawa word only to not be able to read it, not know what it sounds like, not know how to pronounce the sounds or where the stress falls.

A possible solution to this problem for printed dictionaries is to provide users with training in IL spelling. While proficiency in the spelling would help, it would not completely solve the problem, since such general literacy skills take years to develop and the IL may die in the meantime. These skills can be more quickly assisted to develop and the urgency of the situation can be relieved by a computer interface which allows a sound recording to be accessed through each headword, a more immediate and efficient solution, compared with the printed dictionary solution. This solution was adopted in the Paakantyi CD-ROM (Hercus and Nathan 2001), after an IL descendant pointed out that the paper Paakantyi dictionary did not help him to say the words of his languages (Luise Hercus p.c. Canberra 2001).

b) *Overcrowded entries* Other kinds of problems arose in extracting information. Users with low levels of literacy found overcrowding of information confusing and found it difficult to ignore unnecessary or unwanted information. Often other information in the entry was taken to be part of the translation of a word. Entries which contained long explanations, examples and/or illustrative sentences required more guidance as to which single word, out of all of the words which appeared in the entry, was the one needed to solve the task at hand.

Possible solutions to this problem involve taking into account the fact that many of the participants we worked with were beginner adult IL learners and/or had at best emerging literacy skills. For them, a simple word list may be the most appropriate sort of printed 'starter dictionary'. Over time, if language and literacy proficiency increase, so will learners' ability to manage information in more detailed versions of the dictionary. One dictionary is not suitable for all learners. When shown a modified (ie reduced, re-formatted, simplified) version of a few pages of the comprehensive *AD*, three Alawa participants reported that this learner's version would be more suitable for their needs since it included entries in a larger, clearer font, less information and more spaces between each entry. Ideas like this (or simply the display of a single entry in a window) are again easily achievable for electronic dictionaries.

c) *Reading definitions.* The register and conventions of definitions were unfamiliar to users, many of whom spoke English as a second or third language. Problems included the use of obscure and overly technical terms, the use of reversed forms in finderlists (e.g., users did not understand that a headword such as *kangaroo*, *stone* stood for *stone kangaroo*) and not understanding that *to* before a word indicated that it was a verb. Such dictionary listing conventions are foreign to users and require skills training. Alternatively, awareness of this barrier could be incorporated in the design of printed dictionaries. All of these items point to the need for more care in realising a user-centred dictionary design, for both printed and electronic dictionaries.

d) *Grammatical information in entries.* Part of speech abbreviations were puzzling to users, most of whom had very limited familiarity with such grammatical terms. Only a few tertiary educated students knew anything

about such terms – of the 95 people we worked with, three of the Alawa participants, several of the Warumungu participants and six Warlpiri participants had begun to learn about a few of the basic parts of speech, such as *noun*, *verb*, *pronoun* and *preposition*. However they were thrown by descriptions in the dictionaries such as *can reduplicate*, *intransitive*, *does not seem to take agentive/instrumental*, *adj.*, *adv.*, *loc.* Classification exercises set by Carew (2000) suggested that even students exposed to these terms used semantic principles rather than morphologically based part of speech classifications to group Warlpiri words.

Possible solutions for printed dictionaries predominantly involve training. That is, revitalization users need to be taught a) the sort of grammatical terminology necessary to learn an Indigenous language as a second/third language, b) that grammatical terms are not part of the translation of the word, and c) that they can ignore such information if they don't need it. Again electronic dictionaries can allow several different levels of interface, some with grammatical information, some without it, as well as facilities like 'balloon help' for describing what abbreviations mean.

e) *Semantic links* Users had difficulty with following links at the end of an entry with cryptic abbreviations or symbols, SYN, ANT and so on. As with grammatical information, users had little familiarity with such terminology as synonym, antonym, hyponym. Thus, when users were asked to find a synonym in the Warlpiri dictionary *FD* for the word *kararrpa* 'bush raisin', they needed to be guided to the end of the entry where **Syn. yakajirri** appears. In fact six Warlpiri adult tertiary students had more trouble completing task 4 (find synonyms) than any of the other tasks on the dictionary worksheet.

Simpson then asked these Warlpiri participants to try to translate such terms (so that the Warlpiri words could be incorporated into *K* to make them more transparent for future users). The idea of 'antonym' in particular was

difficult to get across (noted also for speakers of a neighbouring language, Pintupi (Lesley Hansen, p.c. Alice Springs 2000). Margaret Carew suggested trying a collocational relation not included in the dictionaries using an Aboriginal English term ‘countryman’; a *cigarette* and a *cigarette-lighter* are ‘countrymen’. This relation was readily grasped and other instances volunteered, e.g. *bed* and *mattress*.

The discussion of semantic links thus raises two issues, determining which semantic links are useful to users, and, once this has been decided, training users either to interpret or ignore such semantic links.

Unlike a paper dictionary, electronic interfaces allow easy graphic network displays of links. A line between two words on a display as in *K* shows vividly that there is a link between two words, and seems more intuitive and memorable than the use of the abbreviations for technical terms such as SYN, ANT. Clear colour coding shows that there are different kinds of links, although not all *K* users appreciated the differences, as Simpson’s worksheet testing in 2000 showed. Many users (especially non-IL background) wanted to have simple definitions along with the colour coding e.g. ‘same meaning as’. Another point concerns that fact that the *K* display links words, not senses. Interesting problems arose when words with more than one sense appeared in networks. For example in a *K* display *ngapa* ‘water’ and *milpa* ‘eye, soakage’ are linked because soakages are major water sources. But some younger Warlpiri users focussed on the primary ‘eye’ sense of *milpa* and were baffled by its link with *ngapa*. More research on effectively visualizing senses in such a graphical display is needed.

In sum, in considering functionality one must consider the uses that intended users may have, and then how to optimise the dictionary so that these users can easily find the word and then the relevant information about it. Solutions to some of the problems can be found by using electronic interfaces, but many are general problems for learners’ dictionaries, whether electronic or

paper. In the next section we briefly describe our findings on testing the electronic interface *K*.

6.2. Computer literacy

We have mainly informal feedback on the usability of *K*. Simpson tried to test the usability of paper vs electronic dictionary by giving six Warlpiri students a worksheet to be answered from the dictionaries, having the students work in pairs, one using a paper dictionary (*FD*) and the other using the electronic interface (*K*), and seeing who could answer the questions fastest. While the observations and discussion of the worksheet tasks proved useful, the comparison of usability was ineffective; some students had been shown *K* before; on one occasion *K* was too slow to load; some students wanted to cooperate rather than compete, and some students wanted to use *K* rather than the book. All that can safely be said is that one student H was faster looking up words in *K* than two other students using the paper dictionary, but that student probably would have been faster than the others using a paper dictionary, since her IL reading skills are better.

Findings from discussions and observations of various user types and ages follow.

6.2.1 Primary school children

The version of *K* demonstrated to the children plunges them straight into the dictionary, with three kinds of information (apart from the labels linking other information) on the screen at once: an alphabetically ordered word-list, a semantic network, and the definition of one headword from the semantic network. This did not cause great difficulties for the children Corris and Simpson observed. At Yuendumu and Lajamanu, primary school aged children (years 1-6) were found to have competent typing and mousing skills, and were interested in clicking and seeing different things happen, especially

looking for pictures and hearing word pronunciations. They negotiated the various windows of the interface easily, although the actual content (e.g., working on sense relations and definitions) was of less interest than the moving things, different colours and sounds. The facilities that *K* provides for dealing with poor spelling (i.e, word lists, spelling correction, browsing links) were found to be helpful. The fact that the dictionary was on computer seemed to help maintain their interest.

An exceptional Lajamanu 10 year old came back for a second session during which she spent two and a half hours looking at the interface. She started by wanting to look up a word from the day before, *panyapanya*, ‘lerp’, a word outside her range, and was also interested in other hard words (eg *warlu-parnta*, a special register word for ‘women’s ceremonial camp’) which she came across as she browsed through the interface. She also found homophones (actually extensions), used the ‘sort words by rhyme’ feature with interest, and continued to enjoy finding words with pictures and sounds, and wanted to know who had recorded the sounds. Her browsing often led her to ponder the meanings of, and the relations between, not only Warlpiri but also English words. She could read English faster than Warlpiri and could only read the Warlpiri definitions haltingly. But she could read the single words in the graphic display fairly quickly. She seemed to enjoy looking at them, using them as a clue to what words meant and also as a way of navigating to find words she did want. Since this is an exceptional child, we do not want to extrapolate from her interests and ability to use *K* to those of other children. However, observations of her use of the dictionary indicate that Kirrkirr has potential to be an engaging self-directed learning tool for gifted and talented children.

6.2.2 High school students

Older children at Willowra and Yuendumu liked the word list and enjoyed the semantic linkages in the network displays, which they could appreciate more than the younger children. Corris observed that post-primary girls were quite thoughtful in browsing the interface, and discussing the purposes of the links in the semantic network. The post-primary boys were enthusiastic about the computer side of things and negotiated the various windows and commands easily. Several girls found the interface sufficiently interesting that they turned up to play with it during lunchtime of their own accord.

While the version Corris showed did not have much on line help implemented, computer interfaces allow links and pop-up displays of information (like 'Balloon Help'), which may make understanding dictionary structure easier for fairly literate users. That is, they can click on a label and get instant information about what it means, rather than having to track it down in the front matter. We did not test this, but we note it as a possible benefit of computer interfaces.

However, in discussion with potential users, Corris found that some wanted more control over what information is immediately on display, to avoid confusion for inexperienced dictionary users. It may be that a simple front page is needed, allowing the user to choose different levels of interface.

6.2.3 Adult students

Not all adults had the computer literacy skills necessary to operate *K* efficiently, for example one student had problems trying to type before having clicked in the search box. However, one of the introductory Warlpiri literacy students, who had not been very interested in the literacy class, spent nearly forty-five minutes looking at *K* in absorbed concentration. She was not especially interested in the sound and picture possibilities. Rather, she moved between words, scrolling through the list, typing in searches and clicking on

words in the network pane. She was not even put off when the dictionary definitions stopped appearing,¹⁵ looking at the networks of words instead. After the demonstration she asked if she could have a printed dictionary to take away with her to use at camp to learn the words. Simpson interpreted this to indicate a desire to learn words in her own time and place.

6.2.4 Literacy workers and teaching assistants

Compared with the primary and secondary school aged children, the adult literacy workers were less interested in the graphic interface and were mainly interested in looking at definitions. Even for them, the improved access to the dictionary provided by *K* stimulated discussion about word meaning and some were eager to make use of the notes feature for annotations.

One teaching assistant, who speaks Warlpiri as her first language, found the displays of alternants a useful feature of the interface. After she had typed in on request *yaparalji* ‘River Red Gum lerp’ when the graphic display came up, she became animated, picking immediately the version she uses, *yapuralyi*. The same user found the displays of semantic relations useful - when looking for the opposite of *kankarla-rra* ‘up’, she was pleased to find *kankarla-rni* ‘up on’ as a link.

6.2.5 Non-Indigenous school teachers and teacher-linguists

Non-Indigenous teachers at Willowra, Lajamanu and Yuendumu generally saw *K* both as a tool for themselves and the Indigenous teachers, and as a tool in encouraging children to learn Warlpiri and in teaching dictionary skills and concepts, although in our view they tended to underestimate the children’s ability to use *K*. They wanted more English help in it. They liked the spatial layout and thought that children would browse in it and learn from

¹⁵ This bug has since been fixed.

it. They suggested further development, such as adding games and puzzles, to make it a basis for classroom activities (such developments are currently being undertaken).

6.3 Attitudes

Aside from the tension between functionality and exhaustiveness, the other major topic to be raised are the attitudes of IL users to dictionaries. People's attitudes towards dictionaries are inevitably coloured by what access they have to them, and what uses they can make of them. IL users by and large had very little familiarity with dictionaries, (although even people with low levels of literacy still considered the existence of the dictionary as providing symbolic status to their language). The experience of trialing the dictionaries brought home to us how many assumptions we took for granted about dictionaries, based on our backgrounds as educated speakers of a language with long traditions of literacy and of dictionary use. Two areas in which our assumptions and those of the people we were working with were most at odds were what dictionaries are used for, and the symbolic functions of dictionaries.

6.3.1 *What dictionaries are used for*

We attempted to observe natural dictionary use (i.e., dictionary use which was not forced by the tasks we set for users to complete, or by us giving people dictionaries to browse). In our initial visits in 1999 we did not see IL dictionaries being used in community school classrooms. Teachers in Warlpiri schools (apart from teacher-linguists) did not use the *WD* printout of the Warlpiri Dictionary or *SD* in the classroom.¹⁶ The few instances of natural uses of dictionaries included:

¹⁶ But on a return visit to Lajamanu in 2000, the teacher linguist had done excellent work on providing dictionaries for class rooms (*SD* and *EWD*), and both Indigenous and non-Indigenous teachers were seen using them.

- (a) people used the dictionary for encoding the IL when making materials for school language programmes.
- (b) people in adult education courses used dictionaries primarily for checking spelling.
- (c) people doing translation jobs and documenting paintings used a printout of *WD* for decoding, to find out meanings for Warlpiri words now used only by older speakers;
- (d) one exceptional learner/speaker wanted a copy of the dictionary to take home and read through by herself.

Linguists and lexicographers believe that, potentially, dictionaries of endangered languages are a key tool in language maintenance and revival work, that dictionaries can play a role in classroom and non-classroom language acquisition, that dictionaries can free learners (both of language and of literacy) from dependence on teachers, allowing them to learn independently. To some extent this view is shared by speakers of Indigenous languages - the Indigenous people most able to use dictionaries and most keen to have them were those who had been through adult education courses in linguistics and Indigenous language literacy. However, many IL users are not used to the idea of a written work as a port of call for learning. For example, after Poetsch completed two two-hour sessions with three Alawa women on different activities introducing them to *AD*, she proposed finding all the Alawa words for different kinds of kangaroo. The women wrote down all the words in Kriol, and then said that they would go home (350 kilometres away) and ask the old people for the Alawa words, even though the dictionary was on the table in front of them. Poetsch took this incident to mean, at least in part, that the speakers did not yet see the dictionary as a language learning tool.

Of course, asking a speaker for a word has several advantages over looking it up in a dictionary. First, you don't have to know how to write the

word (whether in English or the Indigenous language). Second, you can hear the sound of the word. Third, people may appreciate the excuse to talk about language with a speaker (Margaret Carew, p.c. Alice Springs 1999). Finally, and most importantly, speakers may be seen as more reliable sources of information than a dictionary which consists of material out of context and whose authority is not necessarily accepted, especially if seen as the product of a lexicographer who is not a native speaker of the language. Relevant to this is a wishlist for dictionary content that Warumungu adult education students came up with in a dictionary workshop (Margaret Carew p.c. Alice Springs 1999). As well as part of speech, meaning and illustrative sentence, they wanted each entry to include who provided the word and when. Understandably they wanted a check on the validity of information in a dictionary prepared by an outsider who is not a fluent speaker of the language.

Even supposing that speakers do think that dictionaries are useful language learning tools, the problem with these potential uses is that currently, the majority of people in the communities do not have good access to dictionaries, do not use them, typically are not aware of their potential as language learning aids and do not necessarily have all of the literacy and reference skills required to use the dictionary. This lack of consciousness is by no means restricted to IL speakers; on the contrary most dictionary use surveys seem to be in agreement that dictionaries, even of languages like English, are generally under-exploited (Corris 1999). It merely underlines the important point that the many uses lexicographers imagine for dictionaries are not at all transparent; dictionary users everywhere require training.

6.3.2 *Symbolic functions*

It is well established that dictionaries, apart from their practical uses, and regardless of whether people use them, also serve a symbolic function. Hansford (1991:17) argues that in Ghana '(a dictionary) has tremendous

prestige value, putting the ethnic group ‘on the map’’. Bartholemew and Schoenhals (1983) also note in Mexico that ‘the bilingual dictionary ... provide[s] the best tangible evidence that the Indigenous people speak a real language.’ As Crowley (1999:9) has noted with regard to his dictionary of Paamese ‘whatever copies were originally distributed have ended up locked away from prying eyes ... it seems that it is something highly valued, and at the same time irreplaceable.’ To a certain extent it is really this symbolic function which dictates how people feel about dictionary content, discussed below. As Lindstrom (1985:329) points out;

‘Dictionaries in literate societies, are folk attempts to standardise a society’s classifications and definitions. They are part of the apparatus by which cultural knowledge is codified and transmitted. Codification systematises cultural definitions and their linguistic labels.’

Certainly in literate societies there are as many opinions about what should and shouldn’t go into dictionaries as there are users, in recognition of the understanding that a dictionary transmits information about a language and the culture of its speakers through time and space.

For the potential dictionary users we worked with, we found that the most important content issues was felt to be the kinds of words to be included. We also report on a major area of tension with regard to makers and users, namely the amount and kind of information to be included. The difficulties of determining what words to include are related first and foremost to language ownership. Many speakers of Indigenous languages regard their language as a form of intellectual property, in a way which is foreign to speakers of a world language like English. Communities may not want dictionaries of their language given wide currency,¹⁷ because that potentially allows someone to

¹⁷Some Indigenous groups have given permission for dictionaries of their languages to be put on the web (e.g. Austin and Nathan 1998), but many have been very wary of giving language material widespread exposure.

learn about the language independently of the speakers of the language. Even if they are in general happy about publication, they may not wish all words of the language to be available to any reader of the dictionary; this is especially true of words relating to ritual matters, and, for some speakers, words to do with sexual intercourse and excretion.

Two middle-aged fluent Warlpiri speakers from Lajamanu expressed the view that the Warlpiri dictionary should not contain names of places or of people.¹⁸ While we did not find out what the source of their concern was, a possible source is debate over land ownership and the view that placename use should be authorised by the owner of the place - traditional dictionary entries do not include this information. On the other hand when browsing through the computer interface, three Warlpiri adult students, one teaching assistant and one high school aged user at Lajamanu looked to see whether personal names, skin names and diminutive names were included. Users at Alice Springs were interested to see if personal names (their own and their families') were included.

It was also observed that speakers often have strong views on language purism, in part resulting from the idea of language as intellectual property. They may not wish words from a neighbouring language, (even if used in everyday speech by most speakers), to be included in the dictionary of their

¹⁸ Regarding community views on the inclusion of proper names in a dictionary we note two examples from other locations in Australia: David Nash (p.c. Canberra 2000) reports that speakers of a geographically distant Australian language, the Lardil of Mornington Island, in the Gulf of Carpentaria, expressed concerns similar to the Warlpiri at Lajamanu over the inclusion of placenames in the *Lardil Dictionary* (Ngakulmungan Kangka Leman and Hale 1997). However, Gedda Aklif recorded over 300 Bardi placenames on the north-west coast of Australia, in the *Bardi Dictionary*, and put them on maps (Aklif 1999), because she was asked to do so by an old speaker, who was worried that younger people did not know all the placenames (Gedda Aklif p.c. Canberra 1999).

language. For example, Warumungu speakers complained about a number of words in *WrD*, saying that they were Warlpiri. This puts the linguist's desire for documentation (documenting actual use of borrowings illustrating language contact) at odds with the speakers' desire for a record of their language. It also contrasts with the interest some Warlpiri users (at Lajamanu and Alice Springs) showed in geographical dialect variation information.

A related issue concerns differences between young people's speech and old people's speech. Linguists and lexicographers have tended to give priority to older people's speech, as part of the documentation of an endangered language, and older people may dislike the inclusion of words they consider babytalk. However, the younger people are more likely to be literate and to use the dictionary. If the dictionary reflects the pronunciation and usages of an earlier generation, this makes it harder for the younger people to use and perhaps makes them feel inadequate, in that they are not speaking in the way that older people speak. In the case of a new IL, Kriol, the pronunciation has changed significantly since it was first recorded, and it is less clear that the pronunciation of older people should guide the standard spelling of head words. Against this, in the case of an old Indigenous language like Warlpiri, can be balanced the fact that younger speakers are now using the dictionary to check the meanings of old words used in tapes recorded many years ago.

Linguists and lexicographers working on Indigenous Australian languages tend to want to include as much information as is known, in terms both of numbers of words and of information about words, i.e., what it is a person knows in order to be able to use a word correctly. To some extent this view is also shared by many older illiterate speakers of Indigenous languages, who want information 'put in the book'. Such people have also wanted a range of cultural information to be included in dictionary entries, making them

more like encyclopaedic entries. This can result in very large entries spanning several pages.

Tension arises here between the users' lack of familiarity with dictionaries and the lexicographer's desire for completeness of information in an entry. While highly literate dictionary users may not understand everything in an entry, they at least know that some information can be ignored and they generally know which parts of the entry to ignore, depending on the purpose of their search. But as we have mentioned earlier, most of the users we worked with have, at best, emerging literacy skills in English, Kriol, Alawa, Warumungu and Warlpiri. They found it difficult to ignore unnecessary information and found overcrowding of information confusing.

7. Conclusion

To return to the four questions we raised at the beginning:

1. What uses are dictionaries of Australian languages actually put to, and by who?

Our answer to this is that, for the languages we looked at, the dictionaries are sometimes used by IL speakers in regular language learning programmes (as in bilingual schools or adult literacy classes), or for a few work tasks (transcribing old tapes, preparing lessons for school). But they are not heavily used.

The second and third questions are answered together:

2. Are the available dictionaries of these languages suitable for the tasks they are already put to?
3. Can users use these dictionaries effectively?

The answer to these two questions consists of three broad conclusions, each of which reflect competing pressures on lexicographers and dictionary users.

Firstly, our investigations indicated a tension between attitudes towards, and functionality of, dictionaries, i.e., between the symbolic function and the practical/actual uses of the dictionaries we investigated.

Exhaustiveness of coverage is often the desire of the lexicographer and older speakers of the IL. However a dictionary with such complete coverage is often less accessible to IL speakers with low levels of literacy or members of the speech community who are at the beginning stages of learning their IL. The majority of users we worked with experienced dictionary use difficulties, especially with the rigid structure of printed dictionaries. This led us to consider how dictionaries can be redesigned to maximise their usability, which leads to our second general conclusion.

Our investigations indicated the importance of considering both dictionary design and the need for dictionary use training. Where lack of knowledge of, or experience with, dictionary conventions prevents a user from using a printed or computer dictionary, there may still be some room for redesign of the dictionary by the lexicographer prior to the publication of the dictionary. In the absence of training opportunities, design assumes a greater importance. We have made practical suggestions regarding dictionary layout throughout this paper.

Good printed dictionary design may also involve producing a learners' as well as a comprehensive version, the former for revival and/or maintenance purposes and the latter for proficient users and/or for documentation of the language for posterity. For example, following the results of Poetsch's testing the usability of the Alawa comprehensive dictionary (Sharpe 1999), Sharpe has made an accompanying Alawa learners dictionary (Sharpe 2001).

If users are familiar with dictionaries at all, they are familiar with vernacular word-lists, and to a small extent with English dictionaries. We concur with previous arguments (Austin 1983, Stebbins 1999) which advise using people's skills in using English dictionaries as a springboard. That is, serious consideration should be given before creating either a macro-structure or micro-structure which is radically different from what they have learned from English dictionaries.

Design issues must be considered in conjunction with training opportunities for users. Dictionary skills training needs to begin by making explicit the view that although learning words does not equate with learning language and although a dictionary is not a substitute for talking with older speakers, it is nonetheless a useful language learning tool. This tool requires some skill to use and it needs to be recognised that people will not acquire the necessary literacy and dictionary skills within a time frame of one or two training workshops. Rather, they require a lot of ongoing training opportunities, or constant practice in their work. Unfortunately it is difficult to imagine who will provide such training for IL speakers in the communities we visited. And if this is a problem in a first world country such as Australia, it is far greater in countries such as Papua New Guinea.

The final question was:

4. What are the prospects for computer dictionaries in solving usability problems?

One possible way of redesigning a printed dictionary is to make an electronic version which can cater for various levels of user IL knowledge and literacy skills. In this regard we have found that an electronic dictionary (specifically one with a graphic interface) more efficiently overcame many of the limitations typically presented by printed dictionaries. However it must be acknowledged that each type of dictionary has its place, especially considering advantages and disadvantages of a practical nature.

Advantages of printed dictionaries include that a) as one user poignantly pointed out to us, they can be read under a tree, b) they are cheaper and can be more easily afforded and owned by individuals and can be more easily stored, transported, maintained, written on, and c) users are not required to develop computer literacy skills in addition to reading skills in order to use them.

Advantages of computer interfaces (see also Abel and Weber 2000, Nesi 2000) include a) they have no space restrictions, b) they allow different ways of looking up words, c) each user, depending on his/her skills and purpose, can be selective about which parts of an entry he/she needs or wants to view, d) they can include sound and pictures, and e) they are novel and engaging.

Other practical considerations, pertinent to both electronic and printed dictionaries, include lack of skilled lexicographers (let alone ones who are native speakers of the language), lack of computers among members of a dictionary-making team, lack of time to produce more than one version of a paper dictionary, and lack of money.

Whilst Haas (1962: 48) states that ‘the perfect dictionary is one in which you can find the thing you are looking for preferably in the very first place you look,’ our investigations show that a lexicographer and a speech community need to consider a) both functionality and attitudes in determining dictionary content, b) dictionary design as well as dictionary use training, and c) the possibilities of printed and electronic formats, in order to decide what is a ‘perfect dictionary’ for the various actual and potential users of the dictionary, in each specific speech community, according to the resources available.

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