From Concord to Lexicon:
Development and Test of a Corpus-Based Lexical Tutor

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ABSTRACT

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Hands-on concordancing is often described as the future of computer assisted language learning, but first there are two problems. Its benefits have been hard to validate empirically, and it is conceived for advanced learners while the majority receiving formal language instruction are intermediate. This study describes the adaptation of concordance technology to lexical expansion, the development of a suitable interface (a concordance-based lexical tutor), and its testing with intermediate university students in Oman. The tutor exposes learners to 2400 words over two terms, the basic high-frequency words of English. The learners are lexicographers using the concordance to make a dictionary, deciding which words to include (metacognition) and searching for clear example sentences (multicontextual exposure and negotiated input). Results from use of the tutor are strong. Used as directed it replicates features of incidental learning from natural exposure but in a much compressed time frame.

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CHAPTER 1

INTRODUCTION

This study describes the development, implementation, and testing of a computer program intended to help second-language learners read more proficiently in English. After two decades of literacy software and a mountain of research literature, what should a new reading program look like and what should it be trying to do?

With a growing proportion of all written communication now taking the form of machine-readable text, computers have a certain inevitability as a principal medium for reading and writing instruction. Computers are the paper of the future, but with vastly greater capacity for storage, interactivity, and links with other message-bearing media. And yet, there is an impression in the educational literature that not much has been found to do, instructionally, with all this text.

In a recent review of first-language literacy software and its related literature, Reinking and Bridwell-Bowles (1991) argued that some problems at a very basic level remain to be solved. At the most basic level, it appears that very little of this software actually gets used by students very much, probably because it is rarely integrated with classroom work. This under-use problem is not, of course, confined to literacy but exists across the curriculum, according to a general report on computer use in Canadian schools by Collis, Kass, and Kieren (1989), and a similar one on British schools in The Sunday Times of May 26, 1996.

Another basic problem is that literacy software is rarely of very high quality. Most tutorials result from one-phase development processes with no formative evaluation. In spite of the amount of research reported, little of it feeds back to the development process, and most of it is speculative or descriptive. Few studies use control groups, refer to learning research, or test specific hypotheses about outcomes. Of course, some of this goes with the territory. Control groups are notoriously hard to organize in the usual free-access environment of a computer lab, especially if a longitudinal training study is intended; and, conversely, increasing control rules out a longitudinal study and introduces novelty effects. Research is hard to build into a development program, since keeping abreast of the latest research and the latest technology are both large undertakings with one or the other likely to get slighted, usually the research. And of course hypotheses are unlikely to drive the development process if both testing and research are in short supply.

Rather than basing their software designs on research, developers usually base them on instructional concepts originating off-line, in classroom materials or coursebooks. These materials may or may not be based on any theory of learning. For example, in the 1970s reading theorists advocated practice in "reading sub-skills" (guessing the meanings of unknown words, finding the main idea of a paragraph, tracking pronoun references), none of which were thought to require actually reading extensive stretches of text, and accordingly the reading coursebooks of this period were largely reading courses with nothing to read (for example Yorkey, 1970), and a number of software applications were developed following this approach. Then, in the 1980s, research emphasized the importance of reading extended text (Nagy and Anderson, 1985; Krashen, 1989), but the

coursebooks persisted with the skills-in-short-texts approach, and the software followed the coursebooks rather than the research. Reinking and Bridwell-Bowles (1991) cite a study of 297 literacy-related software packages of which only 21 required students to read connected text, the remainder focusing on individual letters, words, sentences, or skills. (One reason for this could be that the smaller units are easier to realize as computer exercises; extended text presents some programming challenges.)

But even if good, research-based off-line instruction could be recoded as a computer program, this is no indication that it should be. Anything that can be done as well on paper can be done better on paper, given the relative costs of the two media. Computers are justified only if they can do something that a paper medium cannot, something unique. In 1983 Wilkinson argued that "priority should be given to applications that employ the unique characteristics of the computer for displaying text." However, in 1996 the majority of reading tutorials still do not display text in any unique way that profits from the computer's storage or data-handling powers. Reading and writing software remain, on the whole, little more than "electronic books" doing in the computer lab precisely what is done in the classroom, except that the teacher gets a break and the learner gets slightly increased freedom and feedback.

Turning to second-language software, one finds an almost identical list of complaints. Kleinmann (1987) and Kenning (1990) discuss second-language reading and writing software in terms almost identical to those of Reinking and Bridwell-Bowles. But there is at least one difference; as Kenning notes, the problem of nothing to read is not so prevalent in second-language software. The tradition of text manipulation routines has

at least put extensive texts on screens for learners to process in various ways (Stevens and Millmore, 1990; Cobb, 1993a), which if nothing else involves some reading and interactions with text that may not happen with print.

Still, there is no indication that text manipulation software has ever been used very much, or integrated very deeply into curricula, or subjected to very much research, whether hypothesis-testing or descriptive (Cobb and Stevens, 1996). In one of the few studies of user behaviour, Stevens (1995) found that texts were not necessarily processed at any great depth as learners proceeded through a manipulation activity. One problem with text manipulation may be that it poses questions to students about a text (Which word is missing from this space? What is the correct order of these sentences?), and then insists on literally correct answers, having no way to evaluate alternative answers, or nearly good answers, or give useful hints.

Kenning suggests that the way forward in literacy software is to carry on with the extensive texts but to change the orientation, from having learners answer the computer's questions, to having learners use the computer to ask their own questions. To achieve this change, she proposes a "prosthetic" or cognitive tools approach to software development, in which the computer handles some of the language processing that learners cannot initially handle for themselves, gradually handing over more and more of the work as sub-skills are automatized and integrated into complex abilities.

In writing, for example, if learners cannot initially think of ideas, write sentences, and watch their spelling all at the same time, then the computer can take over some of this work, freeing learners to concentrate on some other part. Special writing tools can help as idea generators, spelling

checkers, sentence completion models, etc. In reading, various tools can be built into or behind texts to help learners look up words, move between texts or parts of texts, highlight patterns in longer texts that might be invisible to them otherwise, etc. The tutor creates a "zone of proximal development" for the learner to grow into, or a "cognitive partner." Salomon, Globerson and Guterman's (1989) "Reading Partner" and "Writing Partner" are examples of this approach for first-language development in children.

While the cognitive tools approach to literacy seems reasonable and even inevitable, it still remains fairly undeveloped, particularly for adult second-language reading. As Kenning (1990) observed, "So far, word processing is the only realisation of the [cognitive tools] model to have received much attention, but there is a growing interest in two other types: database programs and interactive concordancing facilities." The exploitation of databases has been developed somewhat since 1990, capitalizing on the handy supply of databases on the World Wide Web. Interactive concordancing has been exploited less, yet it is arguably an even more promising technology for language learning within the tools paradigm. Concordancing is a text analysis tool, normally used by linguists and lexicographers, but which learners might be able to use for purposes of their own in reading. The intention in the present study is to explore the instructional possibilities of interactive concordancing as an aid to second-language reading.

In summary, developing a piece of second-language reading software in the mid-1990s is a tall order. To compensate for the shortcomings of the past and exploit the opportunities of the present, such a piece of software should

do the following things: It should be extensively used by a large number of students over a lengthy period; it should be integrated into an ongoing curriculum; it should be based on theories deriving from basic research; it should be tested for learning effectiveness against a control group and this information fed back to the development process; it should involve the reading of extended texts; it should use the computer to do things with text that cannot be done or easily done on paper; it should invite students to ask rather than answer questions. The concordance concept and technology make it possible to group these desiderata within an extended program of software development. Chapter 1 discusses the idea and background of concordancing, reviews other attempts to adapt the idea to instruction, and proposes a specific, theoretically motivated, testable application of the idea.

Krashen (1989) offered a backhanded challenge to those who would develop literacy software. In a classic paper, he argued that skilled reading in a second language depends mainly on knowing a lot of words very well, and knowing a lot of words depends mainly on a lot of reading. By reading, of course, he meant reading books:

> If you lack books, get them. My suspicion is that reading is not only a way to develop vocabulary, spelling, and other important aspects of competence, it is the only way. We have no choice. The problem is not always money; often it is a matter of priorities. Just think how many books can be bought for the price of one computer (p. 455).

This should be kept in mind by anyone proposing to divert part of learners' reading time into a computer activity: in what way is this activity more useful than sitting down with a book?

CHAPTER 2

CORPUS AND CONCORDANCE IN LINGUISTICS AND LANGUAGE LEARNING

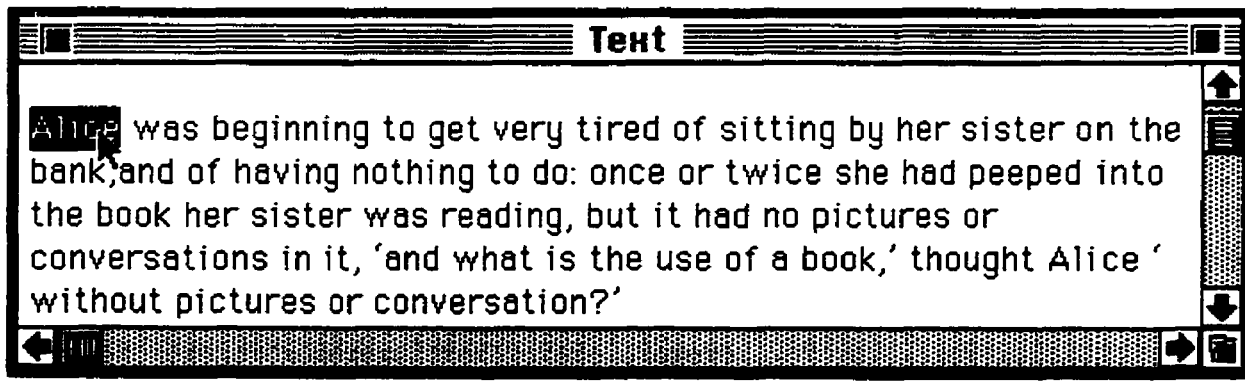
The role of the computer in modern science is well known. In physics and biology, the computer's ability to store and process massive amounts of information has disclosed patterns and regularities in nature beyond the limits of normal human experience (Pagels, 1988). Similarly in language study, computer analysis of large texts reveals facts about language that are not limited to what people can experience, remember, or intuit. In the natural sciences, however, the computer merely continues the extension of the human sensorium that began two centuries ago with the telescope and microscope. But the study of language did not have its telescope or microscope; the computer is its first analytical tool, making feasible for the first time a truly empirical science of language.

Corpus linguistics

The computational analysis of language began in the 1960s when large machine-readable collections of texts, or corpora, were assembled and then typed onto computer disks. An early corpus was Brown University's million-word "computational analysis of present-day American English" (Kucera and Francis, 1967), selected from 500 different sources of 2000 words each in 15 genres ranging from newspapers to scientific journals. As recently as a decade ago a large corpus was thought to be a million words, but now corpora of 100 million words and beyond have become common as capacity, text availability, and processing power expand.

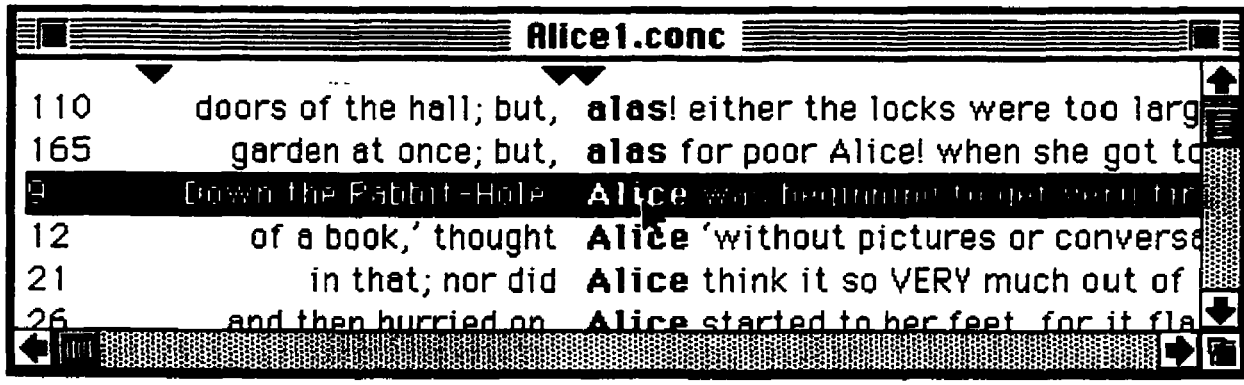
A corpus once assembled is processed by a computer program whose output is a concordance, an index of all the words in the corpus along with their immediate linguistic contexts and some information about the frequency and location of each. Below are the three main windows from a modern concordance program (Antworth, 1993) using a familiar text as its mini-corpus. The first window contains the source text:

Figure 2.1 Text window



Clicking on any word in the source text produces a concordance, usually in the KWIC (keyword in context) format, in this case also giving the line

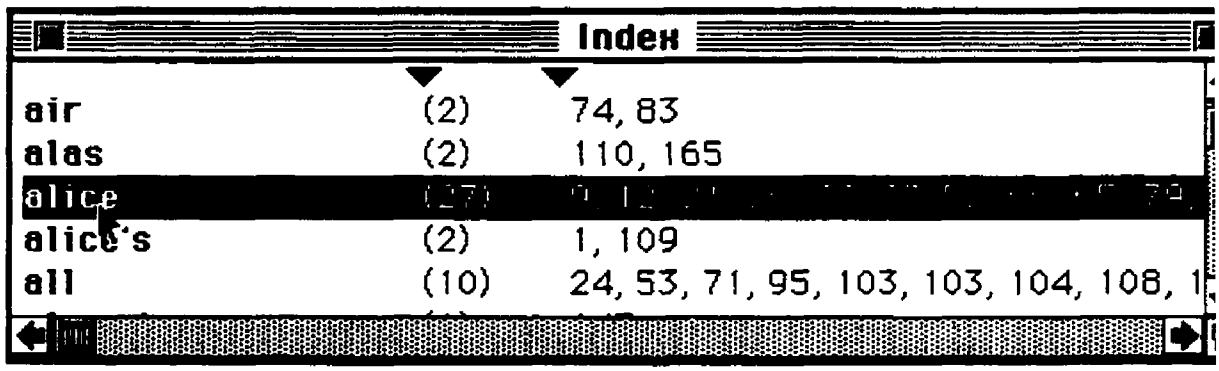
Figure 2.2 Concordance window in KWIC format



number of each in the source text.

In this particular program, a further click on the concordance line has two outcomes: it traces the line back to its source text in the text window, and in a third window gives the frequency of the keyword in the corpus and a list of all the line numbers in the source text where the word occurs:

Figure 2.3 Frequency and index window



In spite of a certain superficiality in this type of analysis—it does not reveal that "cat" and "cats" are really one word, or "draw (a picture)" and "draw (your gun)" really two—concordance data nonetheless reveals language patterns invisible to either naked eye or intuition because of the huge amount of data that can be assembled.

Ironically, one of the main insights provided by assembling large amounts of linguistic data is that languages are in a sense rather small. Corpus analysis shows languages to be highly skewed statistically, with just a few items (whether words, suffixes, or syntactic patterns) accounting for most occurrences, surrounded by a large array of infrequently used options. The classic finding is that about 2500 word families (words plus their inflections and most usual derivational suffixes) reliably account for 80%

of the individual words in English texts, whether corpus-size or page-size, with minor variation for genre. Kucera (1982) ties this finding to people's needs for both redundancy and novelty in language: the 2500 words provide mainly redundancy, the rest mainly new information. Rayner and Duffy's (1986) finding that in reading, low-frequency words are reliably fixated 80 milliseconds longer than high-frequency words lends psychological support to the idea.

A computer is not strictly necessary to engage in "concordancing," as the activity of making or using concordances is called. There were many concordances before there were computers, for example the concordances of the Bible that Reformation concordancers produced entirely by hand. One use of these was to give preachers a handy source of themes for their sermons. One can imagine that extracting the themes from the Bible, a large and unwieldy corpus written by many authors over centuries, would be greatly aided by a concordance. Effectively, concordancing turned the Bible into a hypertext, allowing criss-crossings and juxtapositions difficult to perceive or keep track of in a linear text of any size. A sermon on "sacrifice" could easily be built on a concordance for the word, yielding insights and relationships most churchgoers would not have thought of. Another use of Bible concordances with some modern echoes was their role in doctrinal disputes when enforced interpretations of scripture were confronted by direct examination of textual evidence.

While corpus linguistics is not quite a revolt against an authoritarian ideology, it is nonetheless an argument for greater reliance on evidence than has been common in the study of language. In classical Chomskyan linguistics (Chomsky, 1965), empirical evidence plays a relatively minor

role in building up a description of language. The data to be explained by a linguistic theory, in Chomsky's view, are native speakers' intuitions about their language, not the infinite minutiae of the language itself. Language is learnable because the system is in the head, not in the ambient linguistic evidence, which consists mainly of incoherent bits and pieces—"degenerate input," in the famous phrase (as argued in Chomsky vs Skinner, 1959). However, empirical research has since established that the system is not only in the head. Language learning relies more on linguistic evidence than Chomsky allowed (Larsen-Freeman and Long, 1991, p. 238); and computer analysis of very large corpora has revealed a level of systematicity in surface language that, while possibly inaudible to the naked ear and invisible to the naked eye, is not necessarily imperceptible to the mind over time.

Non-empirical approaches to language study have produced or at least sheltered a good deal of incorrect information. This misinformation is of two kinds. In Sinclair's (1985) words, "On the one hand, there is now ample evidence of the existence of significant language patterns which have gone largely unrecorded in centuries of study; on the other hand there is a dearth of support for some phenomena which are regularly put forward as normal patterns of English." The specific intuitions contradicted by evidence are by now legion (many can be found in Leech, 1987, and Aarts, 1991). For example, intuition suggests the word "back" to be mainly a noun denoting a body region, plus some metaphorical derivatives like "come back"; but, while this interpretation may be historically true, or mnemonically useful, corpus analysis reveals "come back" to be the overwhelmingly primary meaning of the word at present. Yet in a standard English dictionary, with word senses supposedly listed by

frequency, this meaning appears in 47th place (as observed by Sinclair, 1991, p. 112).

Piecemeal accumulation of this type of evidence is forcing the radical restructuring of frameworks in linguistics (discussed in Owen, 1993). For example, corpus analysis reveals that many individual words have their own private quasi-grammatical systems of collocation (accompanying words) to an extent unnoticed prior to computerized pattern extraction, to the point that the basic unit of language analysis may be more usefully characterised as lexis rather than syntax. Whatever degree of restructuring is ultimately necessary, the impact of corpus study on linguistics is likely to be large, and on applied linguistics it could be even larger.

Implications for language instruction

The information provided by corpus analysis is of growing interest to language educators. Initially, when only a handful of mainframe computers in the world could hold enough text to make corpus analysis possible, educators had to take corpus linguists' word on the new shape of language that was emerging; but as the technology became more accessible, language educators could become applied corpus linguists themselves. Leech and Fligelstone (1992) discuss the natural extension of corpus analysis into education:

> In the last few years, a remarkable upsurge of interest in corpus linguistics has taken place. So far corpus work has been largely restricted to those who have access to powerful hardware, capable of handling the large amount of text which it often involves. But as

> hardware becomes both cheaper and more powerful, this will change, and we may expect corpus resources to become more readily available for use, not only for academic and industrial research, but also for educational applications (p. 137).

Applied linguists and researchers in language instruction have recently begun adopting computational techniques, often with striking results. Biber, Conrad and Reppen (1994) discuss the philosophy, methodology, and some of the fruits of applying corpus insights to areas of language instruction like curriculum design.

For example, even after a relatively brief period of applied corpus analysis, it now seems clear that many commercial, intuition-based grammars, dictionaries, and language courses have been guilty of purveying a version of English well out of date. High and low frequency items and structures are randomly mixed for their customers' consumption, in packages ranging from mildly time wasting to plain wrong. A telling example is in the pre-corpus approach to vocabulary acquisition. As mentioned above, the lexicon of English centres on a high-frequency core of about 2000 word families; but most language courses do not emphasize these particular words, offering instead a random smattering of lexis from several frequency zones (also noted by Meara, 1980; Sinclair and Renouf, 1988)—effectively alerting learners to words they may never see again, while keeping silent about those they will surely meet often.

A good example of the benefits of applying corpus analysis to vocabulary instruction can be found in the recent work of Paul Nation and colleagues in New Zealand. Two projects give some of the flavour of what corpora can teach language course developers. First, Sutarsyah, Nation, and

Kennedy (1994) used a corpus study to crack one of the oldest conundrums in second-language reading: How many general English words and how many subject-specific words does a learner need to comprehend a subject-area text? Traditionally, such a question has been considered simply unanswerable. Nation and colleagues compared two 320,000 word corpora, one from 160 different subject areas, and the other from a single academic discipline, economics. They found that a relatively small core of under 3000 general English words was common to all subject areas; and that although the economics corpus had its own private lexis, this was rather small and heavily repeated. In other words, with corpus analysis, the lexical requirement for reading in an academic area is definable.

A second example is Bauer and Nation (1993), which examines among other things the frequency of affixes in English. English morphology (adding -ize, -ation, -ic, etc to words) is one of the many problems of learning English that are traditionally viewed as insurmountable except through long years of familiarization. Some course materials offer learners a shortcut through the maze of affixes; for example the Longman learner's dictionary (Proctor, 1979) isolates the affixes in a special list and marks certain ones as "most common." When Nation and colleagues submitted the main 91 affixes of English to a frequency analysis in a million-word corpus, they found that there were actually few frequent affixes, only 29, once again showing the skewed nature of language and suggesting a definable learning task. Predictably, only a few of these were on Longman's most-common list.

There have been some attempts to use corpus analysis to right some of the wrongs of traditional language instruction. A large-scale attempt to bring

corpus insights into the design of language instruction is the COBUILD project at the University of Birmingham (Sinclair, 1987a). Starting from the assembly of a 20-million-word corpus, Sinclair and colleagues went on to produce a corpus-based learner's dictionary (Sinclair, 1987b), and then a three-volume lexically oriented course based on it (Willis, 1990; Willis and Willis, 1987; 1988). This syllabus attempts to present the language as it really is, simplified yet undistorted, in line with the frequency and other information the corpus makes available. For example, it claims to offer complete coverage of the 2500 most frequent words of the lexicon in their most frequent senses and contexts. Also, it encourages learners to see themselves as mini-corpus linguists, extracting patterns, hypotheses, and rules from samples of authentic language. However, the samples are small and have been selected to make specific points, so the learner-as-linguist fiction is a limited one.

Learner as linguist

For the most part, COBUILD presents learners with the products of computer analysis rather than inviting them to join in the process. There are two reasons for this. First, until recently the technology available in schools and universities would have been underpowered to handle a corpus of any size. Second, educators have felt that computer analysis might be a source of overload and confusion for learners rather than enlightenment. However, the idea of hands-on concordance activities for learners seems a natural extension of trends in linguistics, and has occurred to many CALL (computer assisted language learning) developers on the look-out for new ideas. Also, student concordancing seems a clear application of

constructivist ideas about learning (Brown, Collins, and Duguid, 1989; Bednar, Cunningham, Duffy, and Perry, 1991), whereby learners are characterized as "scientists," in this case linguists or lexicographers, using modified scientific research tools to handle raw rather than pre-encoded data. Further, the analogy between searching a corpus with a concordance and browsing the Internet with a search engine provides some topical cachet.

Of course, any similarity between the linguist's and the language learner's computing needs is superficial, unless there is some reason to think that both require the same types of information about language. It is possible to argue that they do. Learners need to make some of the same distinctions that linguists do. For example, if linguists need to distinguish core from periphery in a language, then learners need to even more since they do not have the time to learn an unedited version of the language as children do. For example, if a learner was anxious about the difference between "will" and "shall" and ran a concordance on these words from the MicroConcord Corpus A (Oxford, 1993), he or she would see that "will" outnumbers "shall" 1224 to 9, in other words that the distinction is disappearing from the language and not worth learning. Using a concordance, a student can learn in two minutes what a native speaker knows from decades of experience. Of course, this information could be provided in a coursebook without learners having to use concordance programs themselves, but it is unlikely that any coursebook writer could predict all the questions about language that a learner might have.

Learners also need to make some of the same pattern perceptions that linguists do. Linguists use the computer to expose the patterns hidden in a

large distributed data source, learning for example that the current main sense of the word "own" is "my own house" rather than "own a house," a piece of information which, without a computer, is distributed throughout the universe of discourse to the point of invisibility. Similarly, in lexical acquisition research it is well known that a word's meaning is partial in any given instance of its use, so that meeting a word several times in several contexts is necessary for assembling and integrating a complete representation of its meaning. Using a concordance, a learner can bring together contexts otherwise spread over months and years of natural distribution and consider them all at once.

Willis (1990), co-author of the COBUILD course, sees hands-on learner concordancing as the next logical step in the COBUILD process:

> In the Collins COBUILD English Course we, as materials writers, acted as intermediaries between learners and corpus, taking decisions as to what was worth highlighting and when. It is now technically possible to bring decisions of this kind much closer to the classroom.
>
> Students themselves can have access to a corpus. Using the FIND command on a word processing package they can examine a range of uses of a given word in its original contexts. Using a concordancing programme they can bring those uses together and either compare them with a description provided by a teacher or a set of materials, or produce their own description. Given the rapidly improving state of technology it is more than likely that the notion of the learner's corpus will play a progressively larger part in the repertoire of

> the coursewriter, the teacher and the learner. In future we may come to think of the business of designing a syllabus as a process of constructing and exploiting a corpus of language with a particular group of learners in mind (p. 131-2).

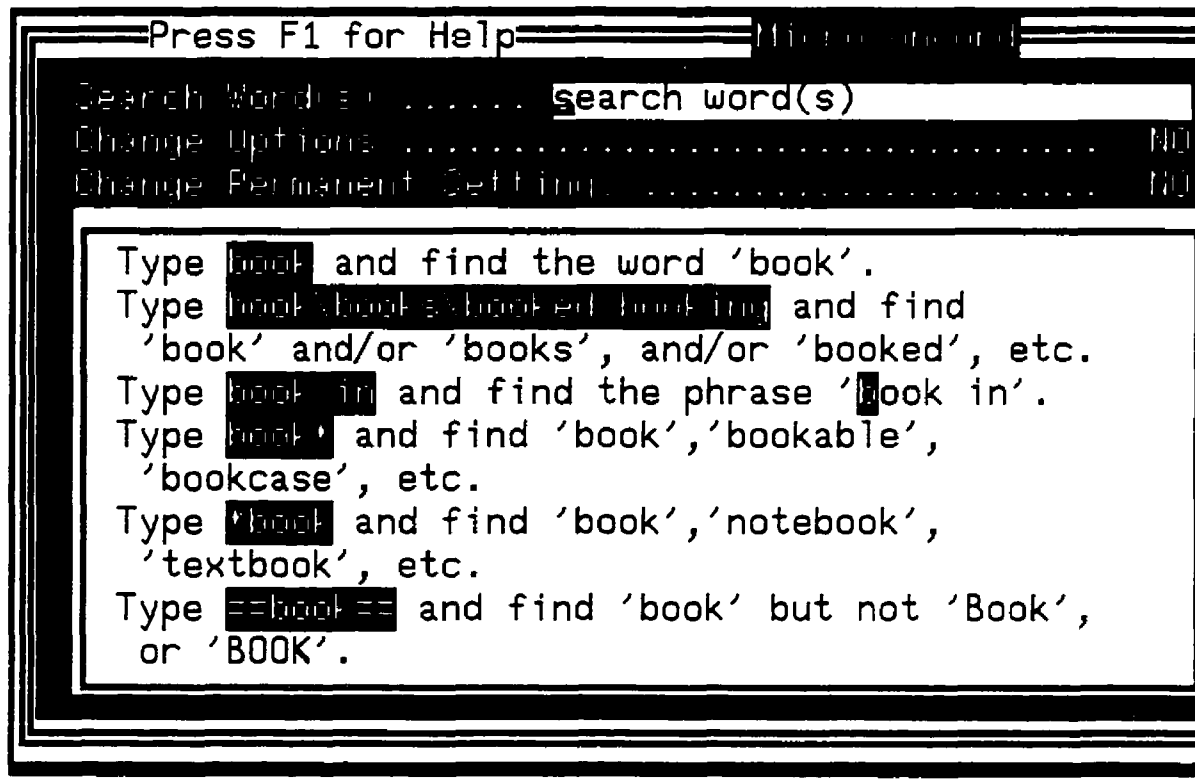
Indeed, the idea of a learner's corpus and concordance has seemed an almost obvious vein for developers and theorists in CALL to work on. In the recent literature, corpus and concordance are regularly described as the most promising current idea (for example Leech and Candlin, 1986; Clarke, 1992; Hanson-Smith, 1993). Concordancing is the centrefold idea in a paradigm-shift within CALL from computer as "magister" to computer as "pedagogue" (Higgins, 1988), from a tutor-dominated, process-control model of language instruction, to an "information resource" model, where the learner is free to explore the language for himself, leaving the instructor in the role of providing tools and resources for doing so.

Hands-on student concordancing

No one has done more than Tim Johns at Birmingham to promote concordancing, or what he calls "data-driven learning," through a series of discussion papers (1986, 1988, 1991a) and the development of several corpora and concordancers culminating in the Oxford MicroConcord package (1993). This package consists of a learner's concordancer, a million-word corpus of British newspaper text, another of academic text, and an accompanying manual expanding on the practice and principles of concordancing (Scott and Johns, 1993).

As its opening screen (Figure 2.4) shows, MicroConcord allows learners several options for satisfying whatever curiosity they may have about English. A word such as "book" is entered for search, which will produce

Figure 2.4 MicroConcord - waiting for a search string

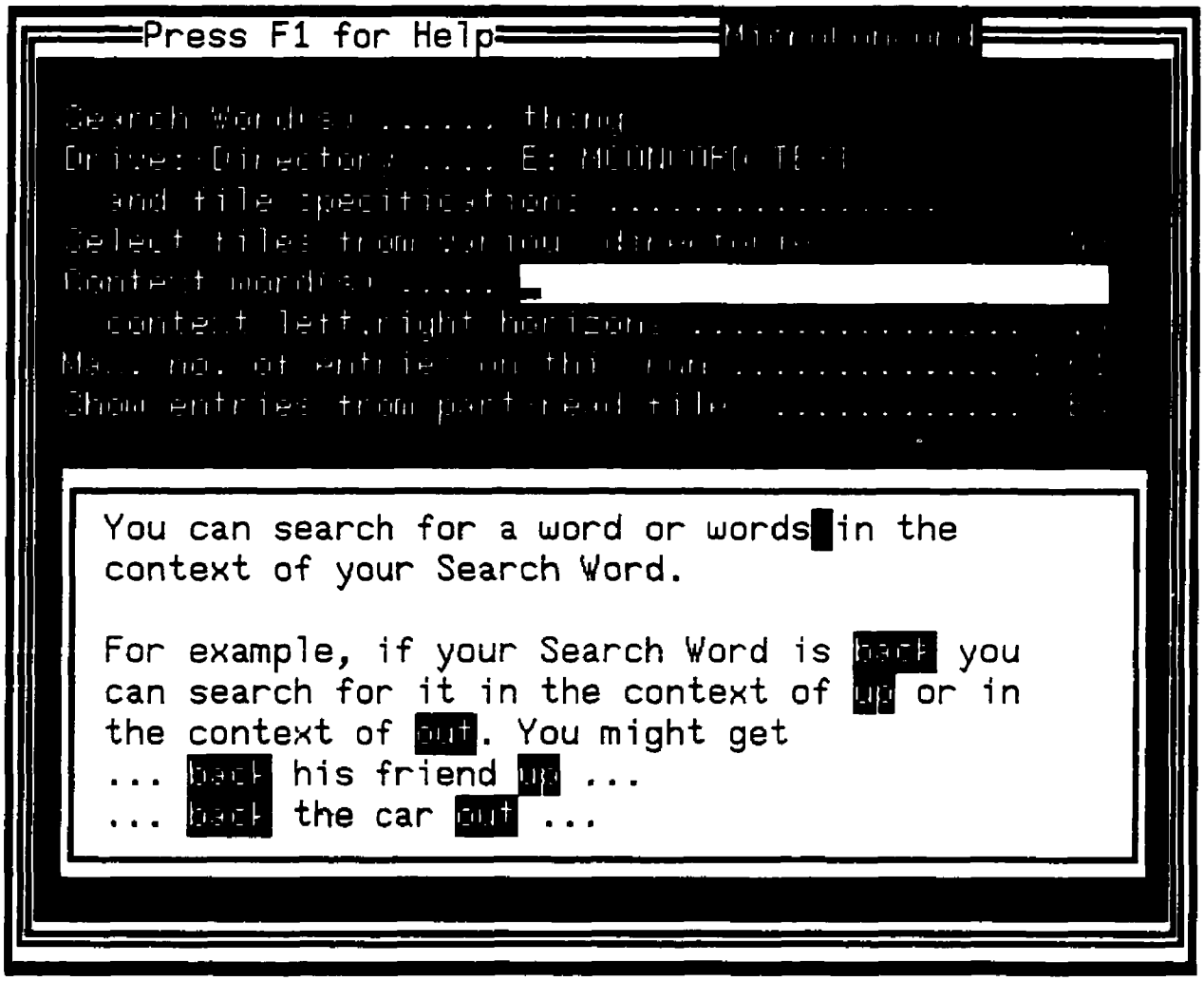


a listing of all occurrences in the corpus containing this string. Or learners can constrain the search to the precise forms of the word, or the collocates, prefixes, or suffixes they are interested in.

A possible limitation on MicroConcord, however, is that its interface assumes a learner with a good deal of curiosity about language, in addition to a fairly high reading ability and knowledge of computing, as for

example would be needed to make sense of the program's collocational search options (Figure 2.5). Nevertheless, it seems that advanced students can be guided to get some benefit and enjoyment from software like MicroConcord, as suggested by several descriptive reports in Johns and King (1991).

Figure 2.5 MicroConcord - search options



But do students actually learn anything from having a massive body of text assembled for them and chopped up by a concordance routine, that they couldn't learn better and easier through the usual media and technologies?

There have been some problems answering this question, or even finding a way to ask it.

Lack of hard research

Student concordancing has generated a lot of enthusiasm but little empirical research. Of the several studies of student concordancing gathered into Johns and King (1991), only one presented any quantitative data about the learning effectiveness of concordances, and that was an off-line study. Vance Stevens (1991) at Sultan Qaboos University in Oman predicted that learners would be able to retrieve a word from memory more successfully when cued by several pre-selected concordance lines with the key word masked than by a single gapped sentence. His prediction was confirmed, so this was at least an existence proof for a facilitating effect of concordance data on some aspect of language processing, and a hint of a possible role in learning.

But other than Stevens' study, none of the other pieces ventured beyond describing students in various concordance activities in guided lab sessions. No theoretical underpinnings were explored, no falsifiable hypotheses formulated, no learning outcomes measured. None of the studies suggested that learners underwent more than one or two lab sessions, or asked whether learners ever consulted a corpus again. Nor did this situation appear to be atypical: asked whether he knew of any empirical study of any aspect of student concordancing, other than Stevens' study, Johns (personal communication, 1994) replied that he did not. And, although he had "often proposed the idea to [his] graduate students", none had ever taken it up. An

ERIC search in February 1996 with "concordance" as the search word confirms the trend: there is lots of interest from teachers who happen to be CALL enthusiasts, but no hard studies of student users.

Reasons for the lack of research

Some reasons for the lack of hard studies could be ventured. First, it is doubtful that students have ever used concordancing enough to generate a very large database so that even initial pattern-perception can begin. Second, if they did, none of the commercial concordance programs can generate user protocols, so research is limited to observation and anecdote. Third, even with protocols, in an open-exploration environment there is no learning task built in and no way of knowing for certain what learners are trying to learn or whether they are succeeding. Fourth, the way concordancing is typically introduced to students does not allow variables to be isolated in any straightforward research design. The introductions to concordancing described in the literature invariably confront learners with three rather novel experiences at the same time: concordance data as a representational format (large numbers of chopped-off lines, source texts that fill entire screens); authentic texts, usually at a level higher than they have seen before; and a series of complex human-machine interactions (as suggested by Figure 2.4 and 2.5 above).

So an empirical study of student concordancing would have to find a way to build up some volume of use, develop a tracking system, attach or build in a specific learning task, and find a way to introduce one novelty at a time.

Consequences of lack of research for development

This lack of hard research is not merely a missing step in an academic ritual, but a real problem leading to an under-implementation of a potentially powerful idea. Without the benefit of an instructional design process guided by research, the concordancing idea is now widely seen as running into trouble.

According to several recent studies and reviews, the open-exploration model of concordancing has apparently over-estimated the needs of learners to get their hands on raw linguistic data—or at least over-estimated the amount of this data they can cope with. For example, in a review of the various types of CALL available for vocabulary instruction, Goodfellow (1995a, p. 223) argues that the information-resource paradigm has now begun to show itself just as "deficient for learning purposes" as the tutor paradigm seemed a decade ago. His solution, however, is not to return to the tutor paradigm, but to look for some middle way, in the direction of research-supported "tutorial support for the use of lexical resources." The idea of supported exploration, and particularly of support built into modified scientific instruments, picks up a theme from the literature of constructivism in educational technology (for example Bednar and colleagues, 1991).

However, the middle way in concordancing has proven difficult to find, and any modification of the open-exploration model has tended to lead straight back to the bad old magister/tutor. A recent approach to using corpora with language learners (Tribble and Jones, 1990; Johns, 1991b) has involved presenting them with pre-selected off-line concordance data (i.e. sheets of paper). For example, learners use a concordance printout

centering on several instances of the word "own" to help them answer some questions, like "Which is more common in English, *own* as in 'own a house,' or *own* as in 'my own house'?" The rationale for presenting computer data on paper is clear; it is to limit information overload by constraining the encounter with raw, voluminous data, and at the same time to eliminate the need to operate the computer interface. The only problem is, the question is the teacher's not the learner's.

Of course, pre-selected concordance data can also be presented on-line with simplified interfaces. Johns (1994) has attempted to increase his students' interest in hands-on concordancing by building a tutor, CONTEXTS, on top of his concordance program (itself on top of a corpus). The tutor poses questions for learners to answer by taking a plunge into the data beneath. However, in this case the data has been warmed up a little; according to Goodfellow. CONTEXTS presents learners with "fixed numbers of pre-selected citations" to make specific points about grammar or lexis. In other words, student concordancers, once modeled as explorers of linguistic data for its own sake (Johns, 1986), are now pupils being shown selected examples of language points that they would never notice for themselves (Johns, 1994).

Whether on-line or off-line, there are two problems with pre-selected concordance data. Theoretically, any learning advantage that might accrue to a genuine process of "discovery" or "construction," in other words to making sense of raw data, is compromised if the data has already been made sense of by somebody else. By selecting what data learners should look at, and why they should look at it, the instructional designer pre-encodes the data for them to an unknown degree. Practically, the labour of

pre-selecting concordance lines to illustrate specific points is very time consuming, and effectively means that learners will be exposed to a limited number of concordancing experiences. This is a pity, because one of the potential advantages of learning from corpora is that there is no limit to the information that an inquiring learner can find there. Surely, it is not beyond the wit of man to bring learner and corpus together in a way that neither compromises the essential idea of concordancing nor pre-limits the amount of program use.

The present study

Goodfellow proposes that the middle way between tutor and information-resource paradigms in CALL will be found only as the result of a "serious research effort." This presumably means experimenting with several types of concordance interfaces, with varying degrees of tutorial support, which can then be tested and compared for their ability to promote use and learning. This seems indisputable; wobbling without principle between open exploration and over-guidance can only send concordancing the way of language labs, television learning and other great technologies that never lived up to their promise. The present study proposes to take a guess at where this middle lies, build a tutor there, get learners to use it, and find out if any learning takes place that can be attributed to the concordance medium per se. The meaning of "middle" here is a concordance tutor offering the maximum tutorial support that does not compromise the essential idea of concordancing.

Before proceeding, it will be useful to expand on this "essence of concordancing" that should not be compromised if the learner is to be described as in some sense "doing research." How much support is too much? The minimum idea of concordancing proposed in this study is that the power of the computer should be used to generate novel, unpredictable information, as opposed to driving a presentational device for pre-encoded information. If this minimum is not present in an instructional activity going by the name of concordancing, then it is doubtful that the activity is making any serious use of computer power or that the learner can be described as doing research.

But as mentioned above, the learning power of concordancing can only be tested if we know what the learner is trying to learn, and so a task should be built into the tutor that can generate testable hypotheses about what if any success he or she is having. There are many things one can imagine learning from a large corpus of language, but in this study the learning task will be learning the meanings of words from meeting them in several contexts. The draft hypothesis, to be refined in the next chapter, is that concordancing can simulate important aspects of vocabulary acquisition from natural reading but in a reduced time frame.

For the study to proceed, the following are now needed: some reasons for thinking that corpus and concordance might be a useful tool for learning words (Chapter 3, 4, 5); some subjects with a specific need and motivation to learn some words (Chapter 6); and a corpus and concordance interface that can facilitate lexical acquisition for these students, track their learning strategies, and isolate the concordance format as an independent variable (Chapters 8 and 10).

CHAPTER 3

READING RESEARCH:

A SPACE FOR CONCORDANCE AS WORD TEACHER

Language learners know there are many words out there for them to learn, and they are ever enjoined by their instructors to learn these words by contextual inference from text rather than from the small bilingual dictionaries they usually prefer. Concordance analysis is able to present learners with words in a wide variety of contexts quickly and efficiently, and also indicate by the number of occurrences roughly how much learning attention each deserves, so a first draft of a falsifiable hypothesis is that some variant of the corpus-concordance configuration could be an effective tool for learning words through inference.

It is often difficult to find a relevant literature to review for novel uses of technology like concordancing. In this case, while the application of corpus technology to vocabulary acquisition may be a novel idea, learning words from written context is not. Learning from context is one of the most written-about topics in language instruction, and it is mainly in this literature that issues relevant to instructional concordancing can be found.

The context movement and its problems

In the 1970s there was a consensus based on very little research that learning words from context was natural and easy, following the so-called psycholinguistic reading theory of Goodman (1967) and Smith (1971). Goodman (1973) argued that the principles of this theory were universal

and therefore applied to second language reading as much as first; Clarke and Silberstein (1977) and Coady (1979) proposed specific ways that the theory could be adapted to second language pedagogy. The practical outcome of this reasoning was that vocabulary instruction changed from direct word-training to indirect skills-training, the main skill being the guessing of word meanings from context. Words themselves were no longer taught in any systematic way; the notion of vocabulary control in instructional materials virtually disappeared, and presenting students with lists of words came to seem ridiculous. Why make students labour over specific words, when with one high-level generative skill all the words can be had for free?

However, when the context idea was subjected to empirical investigation, particularly with regard to second language reading, it was quickly complicated by a mass of complex findings. A series of studies in the early 1980s made guessing seem a very dubious activity for learners to engage in or instructors to promote. For example, a study by Haynes (1983) found that most types of context were actually of quite limited use to most learners. The reasons for this and many similar findings became clear when researchers looked into the thought processes behind learners' inferences. Laufer and Sim (1985) had Hebrew learners of English talk aloud their answers to comprehension questions on a text, and listened for a pattern in the learners' approach to new words. The typical learner "tends to look for cues in the word itself, its morphology, and its resemblance to words in other languages, rather than using contextual clues." For example, reading about people "who took their holidays in spas where they spent their time relaxing in the hot water pools," learners glossed "spas" as

"space" on the basis of an orthographic resemblance while ignoring the total mismatch with the larger context.

Of course, some guessers were more successful than others. Van Daalen-Kapteijns and Elshout-Mohr (1981) performed an experiment with Dutch second-language learners who had previously been classed high and low verbal by an IQ test. The researchers presented each subject with a neologism and then a series of sentences using that neologism. After each new sentence was added, subjects were asked what the neologism meant in the light of the total information. Two very different ways of handling the task emerged: high-verbal learners integrated the growing information supply, searching for a core of invariance while expanding, adjusting, and integrating the contexts. Low-verbal learners were buffeted by each new context, working through a succession of unrelated theories about the word's meaning. In other words, inference may be a game for the bright.

Or, it may be a game especially not for the bright. Language learners in a study by Parry (1991) talked aloud their ways of dealing with novel words in text, showing reasonable ability to get partial sense of meanings. Parry assumed these partial meanings would be integrated with others when the words were encountered a second and third time, but found unexpectedly that after even a short delay the words had often been forgotten. Moreover, it was often the best guessers who were the worst forgetters. Good guessers were able to perceive the main lines of a text very quickly, fill in semantic gaps left by unknown words, and then show no vocabulary gain between pretest and posttest.

But individual differences are not the only source of variance in inferring word meanings. Beck, McKeown and McCaslin (1983) demonstrated that

many natural contexts reveal little or nothing about what words mean regardless of the amount of verbal ability applied to them. They targeted random words in a first-language basal reader, classifying each as having one of four levels of contextual support ranging from totally redundant to totally misdirective, all of which were about equally present. The target words were blacked out, and adults guessed the missing words from the context. Predictably, their success correlated perfectly with the level of contextual support for the target word, from misdirective context (3% correct) to redundant (86%). There is no reason to think this finding would not be replicated in a second-language context—but more so, since the proportion of low-support contexts would rise with the proportion of unfamiliar words.

Better contexts

In the face of the type of evidence just cited, steps were taken to rescue guessing theory. One idea was to present learners with to-be-learned words in very clear, almost redundant contexts specially designed for word-learning, an idea influentially promoted by Schouten-van Parreren (1985) under the heading "pregnant contexts." However, a test of the idea by Mondria and Wit-de Boer (1991) demonstrated that while very rich contexts may make words easy to guess, it also makes them hard to remember. The reason is possibly that when the meaning of the overall sentence or passage is utterly clear, learners assume they know the constituent words and pay no attention to them. In other words, "the inherent difficulty of guessing in highly pregnant contexts is too low to

bring about a positive learning effect " (p. 262). Sharwood Smith (1986), Haastrup (1989), and Stein (1993) provide related arguments.

Another problem with pregnant contexts is that they prevent learners from developing what Beck and McKeown (1991, p. 809) call "one of the most important insights we [teachers] can pass on" about context, namely the conscious or metacognitive ability to distinguish helpful from unhelpful contexts. The importance of this skill comes to the fore when learners leave the classroom and must continue to acquire vocabulary on their own with no one devising pregnant contexts for them.

Good-enough contexts over time

So, if there are problems with both natural and staged contexts, how are words ever learned? One response to the problem of variable learning conditions in natural contexts is just to accept that this is life and the way words get learned, to the extent that they do. Sternberg's (1987) view is that contextual inference is not the best or even a very good way to learn words, just the way most words get learned. Children simply know too many words to have been taught them directly or looked them up in dictionaries. By the end of school, they know at least partially many or most of the 88,700 words of "printed school English," as calculated by Nagy and Anderson (1984), a number instruction could not have much effect on. Whether in a first or later language, the disparity between words taught and words learned leaves either incidental or inferential acquisition from listening or reading the default word-teacher. And since conversations, situations, and even television tend to be lexically repetitious

(West and Stanovich, 1991), vocabulary expansion must take place mainly through incidental exposure during reading.

Logically, incidental learning over time makes sense. In texts, words are visible, noticeable, repeated, reviewable, and so on, and over time a learner will meet words in every type of context (level of support, degree of memorability, etc) required for learning. Empirically, however, the default argument has been hard to demonstrate, let alone build a pedagogy on, and several experimental studies have actually cast doubt on whether it takes place to any great degree (for example Jenkins, Stein, and Wysocki, 1984).

In a long series of experiments starting from a study by Anderson and Freebody (1979), Anderson, Nagy and colleagues at the Center for the Study of Reading at the University of Illinois developed a methodology and instrumentation to prove the existence of incidental acquisition. Acquisition of vocabulary from reading, they argue, is hard to demonstrate only because of the way word knowledge is measured. The finding that words are not normally learned from reading (Jenkins and colleagues) depends on a crude binary measure of word knowledge, a word is either known or unknown. If the measure of word knowledge is ability to define a new word or use it correctly in a sentence, yes or no, then it is easy to show that no learning results from meeting a new word once or twice in reading. However, words are not learned all at once but incrementally, with productive or definitional knowledge at the end of the process not the beginning. Finer-grained measurements can be developed that are sensitive to these increments over the course of learning.

For example, a child reads, "The protagonist went out looking for the lion that had been terrorizing the villagers." The child will then display different understandings of "protagonist" depending on whether he or she is asked to define the word, use it in a novel sentence, or answer questions like, "Is the protagonist a person" or "Does the protagonist like the villagers?" With such questions as the pre-post instrument, it will be seen that measurable learning results from meeting the word in just one context.

Nagy, Herman and Anderson (1985) demonstrated that some appreciable learning takes place on almost every encounter with a new word. The probability of a word being learned in a single occurrence is as low as .15, later revised down to .05 (Herman, Anderson, Pearson, and Nagy, 1987) or 1 chance in 20. Nevertheless, with an average exposure to a million words of text per year at school, incidental acquisition was shown by simple arithmetic to account for adult vocabulary size.

And what about the problems of learning from context, the misuse of context clues and the varying clarity of natural contexts? Nagy and colleagues argue that these problems are simply absorbed by the volume over the course of growing up, the million words of running text per year. Of course, not all students read that much, but—and here is the pedagogy—every student should be encouraged to read as much as possible. Wide reading is the only way to assure that clear contexts outweigh unclear over the long run, and that incremental learning proceeds all the way to roughly standard adult understandings of words.

In other words, Goodman and Smith were right about learning from context, except that it is hard not easy, takes a long time not a short time, and there is no guarantee that the learning will go all the way.

The long-term approach in second language

This first-language research was imported directly into second-language theorizing, notably by Krashen (1989). Empirically, Nagy and colleagues' results have been more or less replicated in second language contexts, although with slower rates of acquisition. A typical finding is that on the basis of a single encounter, 3 out of 28 (11%) new words in a text achieve some sort of appreciable learning for fairly advanced European learners (Pitts, White, Krashen, 1989)—perceptible but minute learning. Horst (1995) replicated the study with Arab students, obtaining even smaller gains between pre-test and post-test: an average of 1.3 words learned out of 16 (8%), an even smaller but still significant gain (t (25)=2.66, $p < .05$).

Looking not just at products but also processes, Parry (1991) confirmed the point that when fine measures of word knowledge are applied then slow incremental word learning is revealed. In a series of talk-aloud studies of academic second-language learners glossing novel words in text, Parry found that the meaning representations derived from a single exposure tended to be not so much wrong as partial: "Each [learner] recorded a substantial proportion of correct glosses and got more than half of the total at least partly correct" (p. 640). And what happens to these partial meanings gleaned from texts? Parry hypothesizes "that a trace of each inference will remain to be modified in subsequent encounters with the word." The partial, semi-correct trace representations will gradually add up to complex, correct ones, provided the word is encountered several more times, presumably within some sort of time limit to accommodate memory.

So, second-language learners should be encouraged to read more, a lot more, to parlay minute learning into functional lexicons. Krashen (1989) and many of the contributors to Carrell, Devine and Eskey (1988) propose various schemes for massively increasing the amount of reading second-language learners will do.

However, it is not clear that the advocates of wide reading in second language have worked out the math in days and hours, particularly for settings outside Europe and North America. Meara (1988) argues that Nagy and colleagues' figures could hardly be directly applicable to second language learning situations, where few learners are exposed to a million words of running text per year, and indeed "the figure is more likely to be in the region of a few thousand" (p. 11). And the years available for lexical acquisition are more likely to be in the region of one or two rather than 10 or 15.

A retreat from context?

If there are so many problems with learning from context in a second language, why not simply return to learning from dictionaries, the cognitive tool of choice for centuries during which words and languages somehow got learned. And of course electronic dictionaries are now widely available, monolingual and bilingual.

Dictionaries have their uses in vocabulary expansion, but there are logical and empirical reasons not to rely on them as the primary tool of word learning. Logically, the traditional genus-and-differentia structure of a definition is inherently unsuited to learning, especially in the case of the

high-frequency words of a language that typically occupy second-language learners. A dictionary definition starts by categorizing the look-up word at the next higher order of generality, i.e. the next lower order of frequency, so that words are explained via others even less likely to be known ("a car is a vehicle which..."). If learners are looking up "car," what hope they know "vehicle"? Or take Merriam-Webster's "give"—"applicable to any passing over of anything by any means." Experiments are under way with the performance properties of definitional formats (Crystal, 1986; Sinclair, 1987b; McKeown, 1993; Cumming, Cropp and Sussex, 1994; Nist and Olejnik, 1995) but with no firm recommendations as yet.

Empirically, several studies have determined that neither young nor second-language learners are always able to get good information from dictionaries. In a study of first-language children's dictionary use, Miller and Gildea (1985) showed children consistently short-circuiting even simplified definitional information. The task was to read a definition and then write a sentence incorporating the word. In a large number of cases, children fixated on a familiar word or phrase in the definition and then built their sentence around that, ignoring the rest of the information, a strategy the researchers called "kidrule." For example, a fifth-grader read that "erode" means "eat out, eat away," and, since "eat out" was familiar wrote "Our family erodes a lot." Kidrule was consistent enough to suggest that the definitional format itself presents a barrier to learning, at least in children. However, the strategy is also used by adult second-language learners. Nesi and Meara (1994) replicated the finding with academic language learners in Britain, and Horst (1994) with similar learners in Oman.

With an on-line or CD-ROM dictionary, the kidrule problem could be predicted to be worse not better. Kidrule is an attempt to limit exposure to the large amount of information contained in a definition, and of course one of the vaunted advantages of electronic dictionaries is the removal of the space limitations of paper so that definitions can contain even more information. Sub-senses can proliferate, examples abound—all the more for kids and language learners to ignore. As Nesi and Meara (1994) suggest, "longer entries may create their own particular problems; it is possible that only part of a longer entry will be attended to, and this part may not even be the kernel definition, but may be an example phrase which simply provides context" (p. 5).

But of course the usual information-management strategy of language learners is not to use kidrule with a real dictionary, but to access brief translation equivalents with a small bilingual dictionary. While this strategy may be justifiable in the early stages of language learning, it is ultimately limiting, resting on an assumption that terms in two languages have identical semantic coverage as they rarely do. Electronic bilingual dictionaries are now available, but more sophisticated technology is of little use unless it somehow promotes a more sophisticated learning strategy. So far, there is no sign that it does; Bland, Noblitt, Armstrong, and Gray's (1990) study of learners' use of on-line bilingual dictionaries reveals mainly the extent of their "naive lexical hypothesis" (that words map one-to-one between languages) and its costs in misunderstanding.

Definitions and comprehension

Whatever the quality of a definition or the capacity of the learner to use it, there is evidence that definitional knowledge is in any case not the most useful kind of knowledge to have about words.

A counter-intuitive but often replicated finding in first-language reading studies is that in spite of the correlation between reading comprehension and vocabulary size, merely learning to state the meanings of words does not in itself affect the comprehension of text using those words. The classic papers on definitions and comprehension are Mezynski's (1983) review, and Stahl's (1991) update. After examining several approaches to vocabulary instruction, Mezynski concludes as follows:

> The results from eight vocabulary training studies demonstrated that it is relatively easy to increase students' word knowledge, at least to the extent that they can give definitions of words. However, several studies indicated that students could know definitions, yet apparently be unable to use the words to comprehend textual information (p. 272).

The few training methods examined by Mezynski that actually did produce word knowledge that affected comprehension had just two features in common, multiple contextualizations for each word and some way of getting learners to become active seekers of information about words. Of course, both of these can be produced in a classroom. The classic instance is a first-language training program developed and tested by Beck, Perfetti and McKeown (1982) and re-tested by McKeown, Beck, Omanson and Perfetti (1983). Beck and colleagues had students recycle words several times as definitions and example sentences, go outside the classroom and find instances in the community, and so on, all with a major teacher

involvement. This elaborate training produced strong gains on all forms of word knowledge, including comprehension, transfer to novel contexts, even speed of lexical access.

However, only 104 words could be taught to this "rich" level in 5 months of instruction, about 20 words a month. In other words, the instructional pace was not much swifter than natural acquisition from reading, as detailed by Nagy and Anderson.

Impasse

J. B. Carroll (1964) expressed long ago a wish that a way could be found to mimic the effects of natural contextual learning, except more efficiently. Beck and colleagues' training program appears to mimic, but not much more efficiently. Maybe efficiency is impossible in this area. Krashen (1989) argued that there are no shortcuts, whether definitions, mnemonic strategies, wordlists, or training in context clues:

> It thus appears to be the case that vocabulary teaching methods that attempt to do what reading does—give the student a complete knowledge of the word—are not efficient, and those that are efficient result in superficial knowledge (p. 450).

Somehow, learners must put in the time, whether it is extensive reading or taking part in a training program like the one described by Beck and colleagues.

And yet there are many educational situations where the time for either is unlikely to be found, and as noted above one of these is second-language

learning, especially where the goal is to get on with English-medium academic courses with the least possible delay. Martin (1984) summarizes the problem and poses the question to be answered in this study: "The luxury of multiple exposures to words over time in a variety of meaningful contexts is denied to second and foreign language students. They need prodigious amounts of information within an artificially short time... How can this enormous amount of information be imparted? (p. 130)"

The efficiency challenge

The main idea of education, arguably, and educational technology definitely, is that learning processes can be made more efficient than they would be left to themselves as trial-and-error sequences. The proposal here is that corpus and concordance software might be able to mimic the main features of natural lexical acquisition from text, so that word knowledge affected comprehension, but more efficiently than through either massive reading or an intensive training program. Mezynski's two distinguishing features of successful off-line training regimes were multiple contexts and active learning set, both of which are integral parts of a concordance program that could form the basis of a lexical tutor.

A corpus-based lexical tutor could also respond to some of the specific problems and paradoxes of word learning raised above:

1. If the time is just not there for massive exposure to text as in first language acquisition, then some sort of compressed exposure to a large corpus might be a substitute. A corpus that comprised, say, a complete term's reading would let learners view or review the texts of their courses

from a time-collapsed focus on individual words, bringing occurrences together for integration that are otherwise distributed through time and likely to be forgotten.

2. The problem of variability in contextual support might be less problematic in a large corpus than it is in smaller texts, since with multiple contexts on display one of them would probably make sense, or some combination of them. This follows Krashen's (1982, 1989) idea that while learning takes place only through "comprehensible input," learners are nonetheless capable of selecting or negotiating (Hatch, 1978; Larsen-Freeman and Long, 1991) from raw input the parts that are comprehensible to them. Concordance might function as an interactive inference-support tool, helping readers make text comprehensible just as conversation with native speakers helps them make spoken input comprehensible.

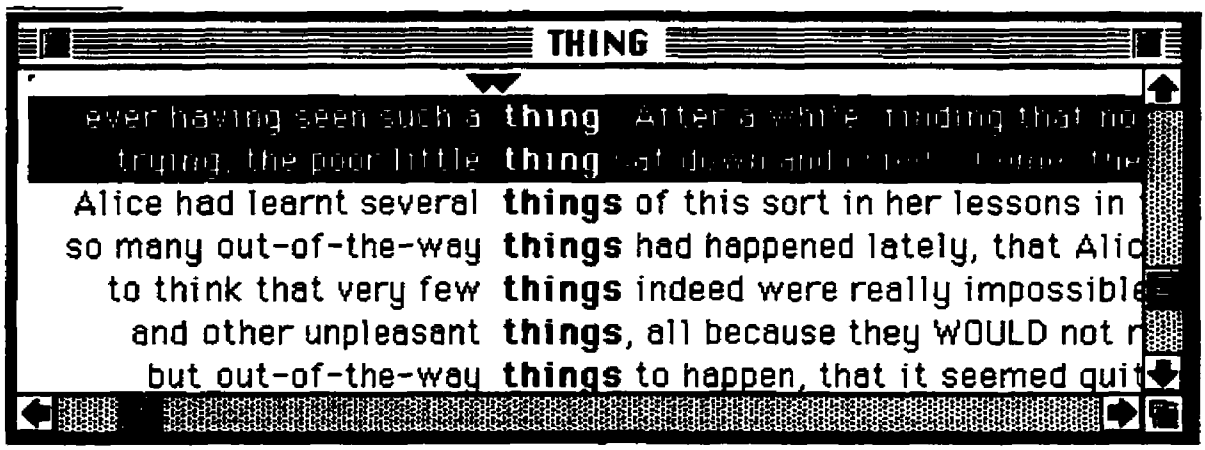
3. The problem of learners not knowing helpful from less helpful contextual information might be reduced by concordancing, since searching through several contexts gives practice in making this distinction.

4. The problem of pregnant contexts would not occur. A new word is unlikely to disappear into its context if it is the focus of the exercise, and a natural corpus of any size is unlikely to contain only or mainly pregnant contexts.

5. The problem of good readers gliding along on meaning, unfocused on individual words, would be unlikely to occur, since the text displayed on a computer screen is long enough to make an inference but too short to build up much glide-speed.

6. A concordance offers little encouragement to the naive hypothesis, exposing in plain view as it does the many semantic and collocational differences between roughly similar words between languages. For example, the Arabic for "thing" is "shay," but if a learner looks at a concordance before consulting his bilingual dictionary the one-to-one hypothesis is unlikely to be confirmed:

Figure 3.1 Non-support for naive hypothesis



"Things" in Alice in Wonderland come in many guises, most of them unequatable to Arabic uses of "shay" in any simple way: "seen such a thing" (unlikely occurrence); "poor little thing" (child); "learnt several things" (facts); "things had happened" (events); and so on. In the concordance tutorial proposed here, no attempt is planned to ban dictionaries of whatever sort from the word-learning process, but merely to delay their entry until several natural contexts have been considered (a sequence also proposed by Anderson and Nagy, 1991).

Refined hypothesis

In other words, a corpus tutor might be uniquely able to overcome some of the specific problems and paradoxes of vocabulary acquisition in a second language. Further, the comprehension issue now allows a refinement in the hypothesis of this study. The draft hypothesis in the previous chapter was that concordancing can simulate important aspects of vocabulary acquisition from natural reading but in a reduced time frame. The refined hypothesis specifies "important aspects"—words will be learned so that they can later be comprehended in novel contexts.

But the intelligence question

However, one problem raised above that a concordance tutor definitely would not solve is the suggestion raised by Van Daalen-Kapteijns and Elshout-Mohr (1981) that low-verbal learners will just never be able to integrate multi-contextual information into complex representations of word meaning. If true, this would limit participation to a certain type of learner, and argue against the development of a corpus-based lexical tutor in any setting where resources were constrained to any degree.

After years of speculation concerning the special mental powers needed to learn new words from context (Jensen, 1980; Sternberg, 1985), or alternatively about the ease and naturalness of learning new words from context (Goodman, 1967; Smith, 1971), some light has just recently been shed on this dark area. Amazingly, it now appears that people of average intelligence are moderately able to learn new words from written contexts, provided (1) they see the word a few times, and (2) they are familiar with most of the other words in the context. In a study of several factors

affecting learners' ability to use contextual information, Shefelbine (1990) showed that intelligence is relatively minor, with the size of one's existing vocabulary, i.e. the base for making inferences, claiming the main variance. Similarly, West and Stanovich (1991) plotted several factors against vocabulary size in a regression analysis, and found that amount of print exposure claimed more variance than score on the Scholastic Achievement Test (SAT).

But has not the verbal intelligence problem gone away only to be replaced by one just as serious for inferential learning, that learners are unlikely to know the words in the contexts they are inferring from? It is indeed a tough paradox that you need words to learn words, but it can be softened by three factors. First, as mentioned, with several contexts accessible, a learner is likely to find one where he knows enough ambient words to make a useful inference. Second, a finer-grained picture of exactly how many words are needed to make inferences is becoming available through corpus analysis, an idea to be explored in this study. Third, a corpus tutor can be designed to contain elements of both direct instruction and dictionary work in the initial bootstrapping phase.

Conclusion

There is a space in instructional research for concordancing as a word-learning tool. Exploring this space has suggested some of the design parameters for such a tool, to be discussed in a subsequent chapter. But first, why should meeting a word in several contexts be so important to

comprehending it in a novel context? An examination of relevant learning research is the subject of the next chapter.

CHAPTER 4

LEARNING RESEARCH:

MECHANISMS OF TRANSFER

The main function of a corpus-based lexical tutor is to present new words in multiple contexts. The goal of the tutor is to help learners gain transferable knowledge of new words, as signaled by their ability to comprehend the words in novel contexts. But what is the connection between multiple contexts and novel contexts?

A good deal of instruction is designed without a clear theory of the learning mechanisms involved. Such instruction may be successful, but even so it is an example of what Brown, Bransford, Ferrara, and Campione (1983) call "blind training." The case for a corpus tutor thus far is a blind argument, since it is based only on a putative analogy with reading. The logic is, words appear in numerous contexts in reading, reading produces rich word knowledge, therefore numerous contexts produce rich word knowledge. But any number of things about reading other than numerous contexts might be the cause of rich learning. A word may simply have to be seen several times to be remembered, not necessarily in any context; or several times in the same context; or several times separated by learning appropriate intervals; or in just one personally meaningful context which may take several instances to locate; and so on. If any of these were the main source of rich learning, then the road to efficiency might be something other than a concordance program that can assemble a random collection of contexts.

However, the notion that transferable learning takes place through meeting the to-be-learned material in a variety of contexts has been extensively validated in psychological and cognitive science studies.

What is transfer?

A common idea of the relationship between multi-contextuality and transfer to novel contexts is that the more variants of a task met in training, the greater the likelihood that any future variant will be one previously met. While this is no doubt true in cases, the claim for multi-contextuality goes beyond increasing the probability of a surface match. The claim is that training will transfer to truly novel tasks.

Schmidt and Bjork (1992) cite several experimental demonstrations of how transfer works. One involves teaching children to play "beanbag," a game that involves throwing a beanbag through a hole in the wall. One group was trained on a single version of the task, with the hole always 3 feet away from them, while the other was trained with the distance randomly varied between 2 and 4 feet. The random group took longer to reach criterion performance, but then were significantly more accurate in their shots, not only at their training distances but also at novel distances they were never trained for, including their competitors' 3-foot distance.

Another demonstration of the transfer power of contexts is a set of studies performed by Gick and Holyoak (1980, 1983) on "analogical problem solving" in which subjects learned a problem solution and then tried to solve a novel but analogous problem. They read about a general who wanted to capture a fortress; all roads to the fortress were mined, but the mines would not be detonated by small groups of soldiers, so the general

broke his army into small groups to converge on the fortress from different angles. With this story in memory, subjects were presented with the problem of a surgeon who wanted to apply radiation to a tumor in an organ but feared the organ would be damaged. The solution was to apply several smaller doses from different angles, but subjects were surprisingly poor at seeing it. However, in a second experiment they were given two analogous problem-solutions before being asked to solve a third—the soldier story plus one about Red Adair putting out an oil fire, not having a hose powerful enough to reach the fire, and using several small hoses from different directions. With two solutions behind them, subjects easily transferred the solution to a third.

Two-for-transfer seems to be a replicable law of learning. These studies tell us what transfer means, but what is the mechanism?

Schema induction

Both Gick and Holyoak and Schmidt and Bjork explain the two-for-transfer effect in terms of a cognitive process called "schema induction" (Schmidt's version of the theory is discussed in Shapiro and Schmidt, 1982). A schema is simply the elements shared between two or more related concepts, situations, or motor activities seen apart from their unshared elements. Without a minimum of two concepts etc, no schema is induced because no elements are shared. For example, a divide- and-converge schema is common to the radiation doses, soldier groups, and hoses, but the radiation, soldiers, and hoses themselves are surface elements irrelevant

to the schema. The surface elements are transformed into variables, possibly with default values.

A schema is thus smaller than any of the concrete surface configurations it participates in, and so "fits" a larger number of novel situations (just as a smaller car fits more parking spaces). A match is more likely with fewer features to match (echoing Thorndike's [1923] common elements theory of transfer). And of course schema induction proceeds with further experience of analogous examples, possibly becoming even smaller as even more common features show themselves really to be variables. Schema induction has been replicated many times, and successfully modeled as a computer program by among others Anderson (1983) and Hintzman (1986).

The relevance of schema induction to word-learning is clear. Suppose an intelligent Martian meets a dog and learns that it is called "dog"; her initial understanding of the concept is simply everything about that particular dog, its size, fur-length, colour, etc. If the first dog was a Dalmatian, then dogs are tall, short-haired, and white with spots. When a spaniel later appears and is also named "dog" by the Martian's hosts, she sees that size, fur-length and colour are not constants but rather variables of doghood, so that the core of invariance must be at a more abstract level, in whatever features the animals still have in common (such as meat-eating). Then, when a chihuahua is entered into the induction engine, a dog-concept comes out with a small body of semantic invariance and a long tail of variables. This schema should be quite adaptable to whatever dogs are met in the future—novel dogs. The point is, one instance would not have produced

transferable knowledge because no abstraction process would have been initiated.

Schema induction and verbal learning

The dalmations and chihuahuas conveniently introduce an interesting point about learning words from examples. It appears that the broader the disparity between instances, the more flexible and transferable the schema induced. This is shown in a study by Nitsch (1978), used by both Schmidt and Bjork and Gick and Holyoak to elaborate their schema theories and extend them to verbal learning.

Nitsch tested subjects' ability to learn new vocabulary items from either a single example repeated several times, or several different examples. In line with the discussion above, she found that items could be learned faster and more easily from several repetitions of a single example (like the 3-foot beanbaggers) but with better transfer from encounters with several examples. But her finding went beyond that in an interesting way. She found that there was a further distinction between learning a word in several contexts, and learning a word not only in several contexts, but also in several different situations.

Two groups of subjects tried to infer the meaning of the word "crinch" (roughly meaning "offend") by meeting it in four context sentences. One group met the word in four contexts within the same situation, an incident in a restaurant (a waitress was "crinched" four times—when a diner failed to leave a tip, another argued about the prices, another knocked the ketchup on the floor, and another complained about the service). The other group

also met "crinch" in four contexts, but four contexts that were also four different situations (churchgoers were crinched by a cowboy not removing his hat in church; spectators at a dog race when a man jumped on his seat and blocked their view; an antiques dealer when a customer flicked ashes on an antique chest; and a waitress when a diner complained). The outcome was that the greater the disparity in situations, the greater the transferability of word knowledge. But the mechanism is once again the same, the more disparate the contexts, the smaller the core of common features.

Variability and corpora

A concordance accessing a large corpus replicates on demand the exact learning materials presented to the second group in Nitsch's experiment. A corpus contains many individual texts, where words are likely to be used in many different types of situations. By contrast, meeting words in natural texts is likely to mean meeting them within a smaller number of situations. In this way, concordance may not only simulate vocabulary acquisition from natural reading, but improve upon it.

Schemas and prototypes

Schema induction entails a view of word learning rather different from some others, for example definitional learning. According to induction theory, concept meaning is dynamic, with semantic cores shrinking over time, more and more features revealed as variables, and semantic

boundaries increasingly "fuzzy." According to definition theory, concept boundaries are all-or-none and fixed. These issues are reviewed in Smith and Medin (1981) and Lakoff (1987) under the heading classic vs prototype theories of concept meaning.

Briefly, classical theory is definitional theory (originating in Aristotle), and prototype theory is the theory that concepts consist of a very small core feature-set (down to none in the view of Wittgenstein, 1958) and a very large variable-set. Prototype theory is so called because it allows for conceptual gradation depending on the number of variables set to default—there are "good" or prototype birds (robins) or fruits (apples) as well as "less good" ones (ostriches and figs). The psychological evidence is almost exclusively in favour of prototype theory (Rosch and Mervis, 1975; Rosch, 1978) as well as the philosophical (Fodor, Garrett, Walker and Parkes, 1980). Armstrong, Gleitman, and Gleitman (1983) wrote that "it is widely agreed today in philosophy, linguistics, and psychology, that the definitional program for everyday categories has been defeated (p. 268)."

And yet for some reason prototype theory does not find its way into vocabulary instruction. Anderson and Nagy (1991) complain that word-learning theory and practice carry on with a mainly definitional basis ignoring the research findings about its inadequacies. Aitchison (1992) makes a similar observation in a second-language context:

> Prototype theory has been regarded as a minor revolution within cognitive psychology. Yet so far, its findings have barely been considered within applied linguistics, even though they are likely to have important consequences for vocabulary teaching and learning (p. 71).

Perhaps a pedagogy of prototypes is not simple to work out. A first draft, following some ideas from Carrell (1988), might be that if words have fixed and independent meanings, then learning words is learning these meanings, presumably from dictionaries, and reading is assembling these fixed meanings into texts. Or, if words have small cores and many variables and optionals, then learning words is a bit about learning meanings and a lot about learning the many ways meanings can be instantiated in texts. In other words, a prototypes approach to vocabulary acquisition is the massive reading approach discussed in Chapter 3, already described as impractical for second language, and a possible reason that prototypes theory has barely been considered.

Conclusion

The mechanisms by which multiple contexts produce transferable, decontextualized knowledge are well known, and a corpus tutor is particularly well suited to exploiting this knowledge in a principled way. Further, the consideration of transfer mechanisms leads to a prototypes model of word meaning, which would be compatible with a corpus approach to vocabulary acquisition especially in a second language. Once again, these considerations suggest design parameters for a corpus-based tutor, as will the review of some other approaches to lexical tutoring in the next chapter.

CHAPTER 5

LEXICAL TUTORING RESEARCH AND DEVELOPMENT

Concordance software is not the only idea ever put forward for using computers to facilitate lexical acquisition. There are dozens if not hundreds of vocabulary tutorials in existence, both on the commercial market and in language-teaching institutions where CALL enthusiasts ply their trade.

Vocabulary has always been seen as one of the most computerizable of learning tasks, mainly because of the apparently manageable size of the learning unit, and also because of the huge variance in learners' prior knowledge. The classic measure of this variance is a study by Saragi, Nation, and Meister (1978), which found that after Indonesian learners had all used a typical language coursebook, only 12% of the words in the book were known to every learner, while every word was known to at least 30% of them. So much variability indicates some sort of individualized instruction.

However, most vocabulary programs, whether commercial or homespun, have little connection to either theoretical or empirical research. There are only a handful of efforts that are theoretically motivated, empirically validated, and which attempt to facilitate contextual knowledge. Five of the best motivated lexical tutors of recent years will be described in light of the themes and issues discussed above, with a view to showing what a concordance approach could add to the existing options.

A caveat: these tutors are at various stages of completion; some were designed mainly for use and others mainly for research; and most are for second-language learners but not all. No systematic taxonomy is intended (for this see Goodfellow, 1995a), but rather a collection of designs illustrating themes discussed in the two preceding chapters.

A mnemonics-based tutor

Coady, Magoto, Hubbard, Graney and Mokhtari (1993) have developed and tested a tutor based on a mnemonic approach to word learning. The problem the tutor addresses is the one discussed in Chapter 3, that naturalistic vocabulary learning in second language is impractical given the time available. The goal is to speed up the acquisition of the 1200 most frequent words of English for a group of academic language learners in the US.

The approach is as follows: Learners meet the 1200 words in 60 groups of 20. Twenty words appear on the screen and the learner selects one for attention. A short definition of the word appears in the learners' first language, along with an example sentence in English, and there is a place for the learner to type in a mnemonic of up to 30 characters in length. The learners have been trained in the mnemonic keyword method of learning words (Levin and Pressley, 1985). In this method, a new second-language word is associated with a word already known in the first language via an "interactive image." For example, a Spanish speaker learning "payment" might think of "pimento," and form an image of handing over money for some peppers, and this memorable image would make the word "payment"

more recoverable the next time it was needed. In this case, "pimento" is stored in the computer with "payment," and can be used at test-time to help the learner remember the word.

The learners are tested by the program after each group of 20 words. They see a Spanish word and are asked for the English equivalent, and they can access their mnemonic to help them recover it. The tutor itself was also tested pre and post in comparison to a control group, showing the students making small but significant gains in both vocabulary knowledge (control 5%, treatment 13%) and comprehension of a text using the learned words (control 10%, treatment 20%).

The authors regard the tutor as a success, which it appears to be up to a point, but it has some weaknesses. First, there is the strong case against teaching learners translation equivalents and encouraging their naive lexical hypotheses (discussed in Chapter 3), especially in the area of the most frequent words which are likely to be the most polysemous and the least equatable to words in the first language. Coady and colleagues know this, and argue that their goal is simply to establish an initial representation for a word, leaving the remainder of the learning process for a later date, presumably in natural reading. This raises the question of whether more of the learning process could not be built into the tutorial.

The second weakness is providing just a single example sentence for a word: transferable knowledge is unlikely to be created, just as Gick and Holyoak's subjects could not transfer a single problem solution to an analogous context.

Third, while mnemonic learning strategies are known to have the power to strengthen memory traces, it is not clear that the strategy is ever actually used when the specific training period is concluded, i.e. that it will ever account for more than a tiny minority of the thousands of words that must be learned. Dozens of studies prove that "mnemonics works" or "mnemonics works better than contextual inference" (Pressley and McDaniel, 1987; McDaniel and Pressley, 1989), but none prove or even examine whether students trained in the strategy ever use it when the study is over.

Fourth, the report does not mention whether the students actually bothered to think up and enter very many "pimentos." Any who were not availing themselves of the theory-based part of the program were then merely using the program to get first-language synonyms for second-language words, leaving the relevant research question to be this: Did they get anything from the computer program that they could not get from their small bilingual dictionaries?

Fifth, the extensibility of the tutor beyond 1200 words could be problematic. Each of the 1200 vocabulary items required devising a first-language synonym and a second-language example sentence, a total of 2400 entries. If, as seems apparent, about 3500 words is the desirable number for direct instruction (Hirsh and Nation, 1992; Sutarsyah, Nation, and Kennedy, 1994), then 7000 entries would need to be written, a task of some considerable labour.

A corpus approach would face none of these objections. There would be no encouragement for thinking in terms of translation equivalents; several examples would be provided for every word, allowing schema induction

mechanisms to operate; the learning strategy involved would be the normal one used outside the tutorial; the computer's processing ability would be used to do more than store a vocabulary list; and the system would be infinitely extensible, since its main resource would be natural text which is now abundantly available.

A pregnant contexts approach

Following Schouten-van Parreren's (1985) theory that words are ideally learned in very supportive, pregnant contexts, Beheydt (1985) has developed a lexical tutor called CONTEXT that introduces and gives practice in recovering the 1000 highest-frequency words of English. Each word is stored in the program in three very simple, very pregnant contexts. Learners are presented with one of the context sentences, with the target word replaced by a gap, and try to guess the word "sensibly." If they cannot guess it, a second pregnant context is presented, then a third, and after that the word is given. Words unguessed are recycled for further practice.

This work was done before Mondria and Wit-de Boer (1991) raised doubts about pregnant contexts. From their results, one might predict that learning words from Beheydt's pregnant contexts would be easy, but then later the words would not be remembered. Unfortunately we do not know if this happened, because Beheydt does not offer any test of his program, either immediate or delayed, on either retention or comprehension of novel text.

What we do know, however, is that devising (1000 x 3=) 3000 dedicated context sentences is a considerable labour. But the labour would hardly be finished there, because with 1000 words in their heads learners' lexical needs have hardly begun to be met. The challenge of a systematic approach to lexis lies not in the first 1000 words, a frequency range already well covered in commercial language materials (Meara, 1993) and classrooms (Lightbown, Halter and Meara, 1995), but in pushing learners toward the 3500 words needed for unassisted reading. To teach 2500 more words with Beheydt's tutor, a further (2500 x 3 =) 7500 pregnant contexts would have to be devised.

Nor would that be the end of it. When words enter remedial recycling in Beheydt's tutor, they are merely presented again in the original set of pregnant contexts. The second time around, of course, the learner can simply rely on a surface association to provide the answer. So ideally, to give the learner an opportunity to process the word as deeply in the remedial cycle as in the original cycle (in other words to fit it to a novel context), three more dedicated pregnant sentences would have to be devised for each word. Hand-coding quickly goes out of phase with the size of the learning task.

Impregnating contexts with AI

A lexical tutor with a similar theory to Beheydt's but a more sophisticated technology is Kanselaar's IT'S ENGLISH (1993; Kanselaar, Jaspers and Kok, 1993). "IT'S" is a pun on intelligent tutoring systems, of which a

growing sub-species is devoted to language instruction, normally with a focus on syntax rather than lexis (Swartz and Yazdani, 1991; Cobb, 1993b).

The starting point of Kanselaar's tutor is once again Schouten-van Parreren's (1985) finding that words are best learned from inferring meanings from context, which as noted raises the problem that natural contexts are not always as helpful as one would wish. Kanselaar's solution to this problem is once again to make contexts pregnant, not by devising special sentences but by providing lexical resources borrowed from artificial intelligence that can be used to make any context pregnant. For example, if a student reading a text comes across an unknown word, he or she stands a good chance of working out its meaning, if for every word in the context he or she can access on-line a definition, a synonym, an antonym, a superset, a subset, a synthesized pronunciation, a grammar rule, and the part of speech as computed by a syntactic parser. These lexical resources should be enough to transform any context into a pregnant one, so that inferential learning can take place from natural text.

But would learners not run into the problem at test time that pregnant learning is unretained? In fact, it is not clear that the pregnant learning actually takes place. The subjects set out to read the texts, in which certain new words are marked for attention. But the subjects, as one might expect, use the dictionary not to clarify surrounding contexts, but to look up the target words themselves (like Coady and colleagues' subjects, failing to follow the learning strategy proposed for them). So it is no surprise that when tested for learning results, using IT'S ENGLISH produces the usual outcome described in Chapter 3: small gains over a control group in definitional knowledge, but no gains in comprehension of a novel text.

Loaded up with so many resources, IT'S ENGLISH apparently runs slow enough to irritate its users, at least on the machines used in the experiment. This is ironic, since only three of the many facilities lugging the system actually get used to any degree (definitions, pronunciation, and occasionally example sentences), a usage pattern similar to one found in a similar study by Bland, Noblitt, Armstrong, and Gray (1990). Still, the commitment to AI seems to predominate over the commitment to learning, because Kanselaar and colleagues' plan is to proceed with more intelligent lexical resources, not fewer. As of 1993, however, IT'S ENGLISH is effectively a collection of texts linked to a CD-ROM dictionary inviting all the problems of dictionary learning already discussed.

On-line dictionary support for reading

Addressing the paradox that children appear not to learn words very well from either context or dictionaries, Reinking and Rickman (1990) hypothesize that the problem with dictionaries might really be with problems of paper dictionaries that could be remedied by using a computer.

In the studies that show poor learning from definitions, the problem may have been that stopping to use a dictionary distracts attention from reading, as well as raising confusion about which senses and examples are applicable to a given context. An on-line dictionary, particularly one linked to a text that learners will be reading, can have instantaneous look-up as well as pre-coded linkage to the relevant senses and examples of words that the learners will encounter. With these advantages, dictionary learning might have a more positive effect on comprehension.

Reinking and Rickman selected appropriate texts and located 32 they thought would be difficult for their subjects. They connected these words to an on-line dictionary, pre-linking the senses and examples relevant to particular contexts. On a definitional measure, an experimental group using the on-line services slightly outperformed control groups who used either a paper dictionary or a paper glossary (87% of words learned on-line, 78% off-line). However, in terms of comprehending a novel passage using the target words, scores were both lower and equal for all groups, with one exception. If the program forced the on-line subjects to look up every target word before allowing the text to advance, then a comprehension score difference was produced (76% for the on-line group, 62% off-line).

However, by forcing a visit to every definition for one group, the study loses both internal validity (introducing a time-on-task confound) and external validity (being told which words to look up corresponds to nothing in the wider world of either school or life). In a normal learning environment, learners are always meeting a mix of known and unknown words, and they must somehow be left the responsibility of deciding for themselves which ones to pay attention to.

Further, just as there are pregnant contexts, what Reinking and Rickman propose here is pregnant definitions. Pregnant contexts, as discussed above, are easy to get meaning from, but often with no retention in a delayed test. The default assumption is that pregnant definitions would be the same, with uneffortful learning unretained. Unfortunately the authors have not provided a retention measure; both comprehension and vocabulary tests were administered immediately after the subjects had finished reading.

Reinking and Rickman's approach also has extensibility problems. It is not easy to see how the principles of their tutor could ever be the basis for a training program of any practical size. Here they have developed a super-intensive system capable of presenting 32 new words: how many texts would have to be found or created and hand-linked to dedicated dictionary information to support the learning of 1000 words let alone 3500? It seems unlikely that this type of tutor will move beyond the in-principle phase.

On-line dictionary and concordance support for reading

Goodfellow (1994, 1995b) has developed and begun testing a lexical tutor called LEXICA. The initiating activity is for learners to begin reading a text on the computer screen, and any unknown word can be selected for further information from either a linked monolingual dictionary or a concordance program accessing a 50,000-word corpus. Once a learner has selected a word for attention, the tutor suggests several things to do with it, in order to process it further and learn it. The word can be stored in one of two lists, either under the heading "form" or "meaning," depending on whichever is most interesting or problematic; words from these lists can be sorted into further lists with the learner's own headings. The main role proposed for the dictionary and concordance is to aid with these sorting tasks, and any information a learner thinks is particularly interesting can be added to a notes window in the program.

At any point learners can volunteer to be tested on the words they have been working on. The test is to replace each word into the (gapped) line

from the text where it was first seen. Various clues can be requested if the word cannot be recovered, namely the sortings and notes the learners themselves have previously entered. For example, they can see that they sorted the word for meaning rather than form, and look at their companion notes with some concordance or dictionary information (with headword deleted), or their mnemonics—or their first-language translations.

LEXICA clearly offers a large number of strategy options, and Goodfellow has developed a strategy-tracking system and is currently experimenting with ways of relating strategies to outcomes. In fact, it is the tracking system that seems to hold the most interest for Goodfellow at present rather than the tutor's practical or institutional uses. The information the tracking system provides may eventually be fed into further development of the tutor, so the project must be evaluated long term. But for the moment, it has a number of weaknesses.

First, while Reinking's tutor specifies exactly which words learners should pay attention to, at the other extreme LEXICA offers no guidance at all about which words in a text might be worth paying attention to. Since the words are presented in running text, chances are good that Mondria effects will operate in some unknown proportion of cases, i.e. when the overall meaning of a text is clear, then learners will not be especially aware of which words they know well and less well.

Second, the outcome measure is to match a word to the exact context it was first presented in, not to a novel context, so the crucial dimension of transfer is not emphasized or tested. In other words, only initial learning is attempted, surely an underestimation of the tutorial potential of a corpus, which contains a great deal of information about how words adapt

themselves to different contexts. Why not use the concordance to get out novel contexts, and ask the learner to fit words to these, promoting and testing transfer? A possible reason is that the theory-base of LEXICA is not the literature of reading research, where transfer is a key issue, but instead an adaptation to lexical acquisition of Marton's (1986) very general theory of "deep" vs "surface" learning styles (discussed in Goodfellow and Powell, 1994).

Third, the level of motivation and metacognitive awareness LEXICA presupposes will strike readers with teaching experience as optimistic. Not every learner could make much sense of dividing words by form and meaning, and indeed no evidence is offered that the pilot subjects ever took to the idea. What the test subjects seemed to do most, in fact, was use LEXICA to look up words in the dictionary, which leads straight back to problems with the quality of definitional knowledge.

Fourth, Goodfellow's user data suggest that his subjects dealt with remarkably few words over the course of a session, roughly 18 in 4 hours in one case (Goodfellow and Powell, 1994) or a word every 13 minutes. While a novel word may be worth 13 minutes and more of a learner's attention, this is not a quick way to build up vocabulary size.

A multicontextual approach

None of the tutors reviewed so far ask their users to infer the meanings of new words by reading text on a computer screen. This is odd, because as shown above few any longer doubt that "most words are learned from context," however ill. Definitions, pregnant contexts, and mnemonics are

all dubious contenders, and yet these are the strategies of choice for lexical tutors.

In an attempt to find out what type of on-screen information best helped second-language students learn new words, Markham (1989) devised a program to teach the same 15 words in two versions, one providing a definition for each word, the other presenting each word in three paragraphs of running text. The subjects were then tested using a measure with two parts: a definitional task (multiple choice) and a contextual task (choose the most appropriate use of the word from a series of novel sentences). In an immedate post-test, learning was about equal between treatments on both measures (around 72%).

However, on a surprise repeat post-test four weeks later, there were interesting differences. There was still no difference in ability to choose correct definitions, but there was a difference in ability to choose correct contextualizations. The group that had read the three paragraphs now chose 71% of the contextualizations correctly, as originally, but the definition group had dropped to 60%, a loss of 15% [(71-60)/71=.15]. Markham concludes that "long-term, depth oriented gains [are] associated with exposure to words embedded in a variety of natural paragraph level contexts" (p. 121). In other words, with definitions you get a weak grip on novel contexts, but with context you get definitions for free.

So here at least is an existence proof for words being learned from text on a computer screen. Further, it confirms that definitions provide easy learning while texts provide deeper and more transferable learning. This is support in principle for the concordancing concept, because three

paragraphs of context for each target word is just the sort of thing a concordance excels at providing.

The only problem, however, is that Markham does not specify whether his texts are hand-coded or authentic. If they are hand-coded, then teaching 1000 words would mean finding or devising 3000 paragraphs of pregnant text. But if they are authentic, or pulled from a corpus set for a certain lexical range, then this is a good basis for the development of a corpus-based tutor for the present study. Also, Markham does not appear to have tested his tutor in an ongoing institutional curriculum, which will also be a feature of the present study.

Conclusion

Each of these tutorials has points of value and interest, but each also fails in one or more of four important ways.

First, most of these tutorials fail to deal with some important piece of the relevant research information available, mainly regarding the pregnant contexts issue, or the naive-hypothesis issue, or the nonequivalence of definitional and contextual knowledge of words.

Second, they all fail to provide a basis for expansion. It seems unlikely that even the most capacious of these tutorials could go much beyond 1000 or 1200 words, either because of the amount of hand-work involved for the developers, or the pace of learning proposed for the learners, or both.

Third, all the evaluations except Markham's fail to test for learning on the dimensions indicated by current research, i.e. for both definitional knowledge and transfer/comprehension, both immediately and at a delay.

Fourth, all the tutorials except Markham's attempt only initial word knowledge, leaving it to further natural encounters with text to complete the job (with the well-known haphazardness that entails), while in fact there is no reason that these further encounters cannot be provided by the tutorial itself given the computer's ability to store novel contexts.

These are all points to consider in the development of a corpus-based tutor and in assessing its effectiveness. A good lexical tutor, of course, is likely to be designed with a particular learner in mind. The next chapter looks at the proposed users of the corpus tutor and their particular lexical needs.

CHAPTER 6

SUBJECTS AND NEEDS

Learners with large lexical needs are not difficult to find in second-language settings, especially where the goal is to perform academically in the second language with minimal delay. Many studies have determined that academic performance in a second language mainly involves building up a large vocabulary (Saville-Troike, 1984; Laufer, 1992). The subjects of the present study are first-year students from the College of Commerce at Sultan Qaboos University (henceforth SQU) in Oman. The following analysis shows that these students do indeed have large lexical needs, and further that these needs can in principle be met with a computer tutorial based on contextual inferencing from a corpus.

All language students need to learn words, and most of them know it. As Krashen (1989) observed, learners walk around with dictionaries in their pockets, not grammar books. Arabic-speaking learners have an especially pressing need to learn words because Arabic has so few cognates with European languages. This fact was noted by Praninskas (1972) when she began teaching English at the University of Beirut, was experimentally confirmed by Ard and Homburg (1983), and has been the ever-present background to English instruction in the Arab world ever since. Even so, few learners have as pressing a need to learn words as students in the College of Commerce, for reasons relating to a particular language test they are required to take.

The PET

Since September 1993, first-year students in the College of Commerce have been required to reach Band 4 on a standardized English proficiency test, the Preliminary English Test (Cambridge University, 1990) before proceeding to their English-medium academic courses. Students test in at Band 1, 2, or 3, and have three terms (one academic year) to reach Band 4. The Preliminary English Test (PET) had been used as a placement measure at SQU since 1991, but its use as an exit measure was an experiment, to be tried first in the College of Commerce and then used in other colleges if shown to be a useful measure. When the PET was adapted as an exit measure, there were few guidelines as to what would be involved in getting Band 1 students to Band 4 within a year.

Although not particularly difficult by international standards, at SQU the PET has been an enormous burden on students, instructors, and even the institution as a whole. Many students have been simply unable to reach Band 4 in any reasonable amount of time using the instructional resources available. Here is a letter from a commerce student caught in the PET process, giving some of the flavour of the experience (copied with permission):

> Dear Nawal,
>
> I heard that you are going to join the College of Commerce and Economics after you finish your high school. I have a lot to tell you about this college. The first and important thing is the PET test. You must pass this test so you can continue your studies in the College. The PET test is not easy as it seems. It is so difficult and we have to do a lot to pass it.... The English that we learned at school is too easy and it's nothing compared with the English in the University. Let me tell you about myself as an example.

> I thought that I knew English and really in the school I was from the three best students in the class in English. But here my English is nothing, then I thought I learned nine years English in the school but I don't have any knowledge and I don't know anything about real English. I really don't know the fault from who.
>
> My advice to you is you must think carefully before you make your decision and think about the PET that tired all the students and I don't know how to get rid of it. Again before you join this college take a course in English. I hope you will understand what I meant. I hope for you good life.
>
> Your friend, F.

This student is unwilling to point any fingers, but "the fault from who" is not a difficult question.

The fault from who

First, the PET is a proficiency test (measuring a learner against a native speaker) not an achievement test (measuring a learner against the content of a course), and used as an exit measure it is likely to test students on things they were never taught. The PET was designed for placement, and its use as an exit measure is controversial.

Second, Omani students arrive at university vastly underprepared for academic work in English. Their high school English is taught almost exclusively by non-native speakers, in a rigidly structured memory-based approach involving almost no communicative use of English in any medium. This use of non-native teachers and dated methods is hardly a matter of economic necessity. As noted in a recent World Bank report (1994), primary and secondary education in Oman are underfunded while money is lavished on the high-profile University, with predictable results.

The only change since 1994 is that the public school system has now gone onto half-day shifts to accommodate the burgeoning youth population (median age in Oman is 16).

Third, once arrived at university students are placed in a time squeeze. Cambridge recommends an average 250 hours of language instruction to move a student from Band 3 to 4 of the PET, while SQU grants only 170 hours (Scott, Gerber, Salem, Marzouqa, and Sherazee, 1995). This squeeze is no anomaly, but consistent with a long-standing approach. Even before the University opened in 1986, Adams Smith (1984) reported that the administration wished to grant 150 hours of language instruction to students entering English-medium academic courses, while 500 hours was the area average (as established by numerous British Council experiences). Commerce students are given one year to reach Band 4, or leave the College.

So the task of the CALL developer is to rescue the students from some part of this instructional non-design.

The main problem: reading

The PET tests separately the skill areas of reading, listening, and writing , and the main problem has consistently been reading, even when modest success has been achieved in listening and writing. Table 6.1 shows a typical score profile from a PET testing session. Even when Band 4 is reached, the students enter their academic areas with weak reading ability.

Table 6.1: Typical band levels by skill areas (4 = high)

	Listening	Reading	Writing
Student 1	4	3	4
Student 2	4	3	4
Student 3	4	3	4
Student 4	4	3	4
Student 5	4	3	4
Student 6	4	3	4
...			
Student 100	4	3	4

Beyond the short term need to deal with the PET, reading is generally viewed as the key skill for academic performance in a second language.

In fact, the PET merely documents a reality about the students' reading ability that has been true since the beginning of the University in 1986. The Language Centre started out with a very ambitious plan to teach the students English via their academic course materials in a scheme known as "content-based English" (Holes, 1985). But as actual students were injected into the plan, it quickly became clear that they were much weaker than course planners had expected, particularly in reading. When tested with a British test called the IELTS (roughly equivalent to the TOEFL) "most students failed to achieve higher than band one and even the best only reached band two, where at least band six would be required for entry to a British degree course" (Flowerdew, 1993a, p. 122). As a result, between 1987 and 1990, the scientific texts the students used were continually simplified and shortened (Flowerdew, 1993a), and content-course lecturers were forced to spend an inordinate amount of class time explaining scientific words (Flowerdew, 1992), doing for the students what students normally do for themselves, at home or in the library. Oddly, during this period it was never thought useful to inquire into the students' knowledge of general or sub-technical English terms.

The arrival of the PET in 1991 marked the final dissolution of the content-based approach and a recognition of prior needs at the level of general English. Of course recognizing and testing those needs in itself said nothing about how to meet them. (Some of these background issues are discussed further in the context of computer-assisted learning in Chapter 5.)

Prime suspect in weak reading: words

But is the weak reading caused by weak vocabulary? There are general and specific reasons for treating vocabulary needs as primary, both of them admittedly correlational.

Generally, it has long been established that vocabulary size correlates more highly than either syntax or culture knowledge with reading comprehension. A long series of factor analyses in the 1940s and 1950s found vocabulary size to be the highest loading factor in reading comprehension (ranging from .41 to .93, discussed in Anderson and Freebody, 1979). Further, vocabulary size correlates higher with reading than it does with listening (which relies on a smaller word stock) or writing (which relies on the imagination and syntax a student has for recombining whatever words happen to be available). Of course this research does not prove that a large vocabulary guarantees skilled reading, but it does suggest that a small vocabulary makes it quite difficult.

Specifically, there is a huge gap between the number of words these students know and the number they need. On one side of the gap, the PET is a lexically explicit measure; all its texts, tapes, and questions are

constrained to a particular list of words. This list consists of the most frequent 2387 words of English according to Hindmarsh's (1980) Cambridge English Lexicon. On the other side of the gap, students entering Band 1 often know as few as 350 English words—a shortfall of about 2000 words. This figure was determined through repeated administration of Nation's Vocabulary Levels Test with entering commerce students between 1993 and 1996, and confirmed using the Eurocentres Vocabulary Size Test (Meara and Jones, 1990).

The Vocabulary Levels Test

Nation's test is a simple but well-researched instrument (Nation, 1983; 1990) and arguably the most reliable of the various vocabulary size measures available (Schmitt, 1995), particularly with learners whose first languages are not derived from Latin. The test samples from several vocabulary frequency zones, asking learners to match the words to simple definitions phrased in terms from the next lower frequency zone. The test is quick to administer so that it can be repeated with the same subjects without building up covert resistance. The format is a variant of multiple-choice, with six choices for each word reducing the role of chance.

Figure 6.1 is Nation's Levels Test, slightly compressed, showing most of the 2000 and 3000 levels (but not the 5000, University, and 10,000 levels). Even if this test measures a fairly crude type of word knowledge, definitional rather than transferable, it has been of enormous use at SQU in delineating some approximate task dimensions for helping learners deal with the PET.

Figure 6.1 The Levels Test (abridged)

A VOCABULARY LEVELS TEST

2000 LEVEL

1. original
2. private _6_ complete
3. royal ___ first
4. slow ___ not public
5. sorry
6. total

1. apply
2. elect ___ choose by voting
3. jump ___ become like water
4. melt ___ make
5. manufacture
6. threaten

1. blame
2. hide ___ having a high opinion of yourself
3. hit
4. invite ___ something you must pay
5. pour
6. spoil ___ loud, deep sound

1. basket
2. crop ___ money paid regularly for doing a job
3. flesh
4. salary ___ heat
5. thread ___ meat
6. temperature

1. birth
2. dust ___ being born
3. operation ___ game
4. row ___ winning
5. sport
6. victory

3000 LEVEL

1. administration
2. angel ___ managing business & affairs
3. front
4. herd ___ spirit who serves God
5. mate
6. pond ___ group of animals

1. bench
2. charity ___ part of a country
3. fort
4. jar ___ help to the poor
5. mirror
6. province ___ long seat

1. darling ___ a thin, flat piece cut from something
2. echo
3. interior
4. opera ___ person who is loved very much
5. slice
6. coach ___ sound reflected back to you

1. marble
2. palm ___ inner surface of your hand
3. ridge
4. scheme ___ excited feeling
5. statue ___ plan
6. thrill

1. discharge
2. encounter ___ use pictures or examples to show the meaning
3. illustrate
4. knit
5. prevail
6. toss ___ meet ___ throw up in the air

1. annual
2. blank ___ happening once a year
3. brilliant
4. concealed ___ certain
5. definite ___ wild
6. savage

5000 LEVEL

...

UNIVERSITY WORD LIST

...

10,000 LEVEL

A problem raised by the use of the Levels Test is that 2000 does not equal 2387. The Levels Test, at the zone of relevance to the learners in question, is based on West's (1953) General Service List (GSL) of the 2000 most common English words, while the Cambridge Lexicon is a list of 2387 words. These lists are only about 65% overlapping (see Appendix A). However, all the sample items of the Levels Test are also Cambridge Lexicon words, so the provenance of the test does not affect its usefulness. In the present study, the 2000-word Levels Test will be the yardstick for

measuring the task facing the students and their progress in getting control of it.

Scores on the Levels Test correlate well with PET success at SQU over the course of the band process. Students entering Band 1 have a remarkably consistent profile of about 15-20% at the 2000-word level. Admittedly, there are some questions about how to interpret a figure this low. It is probably not as simple as extrapolating a vocabulary size of (2000 x .2 =) 400 words, since the test does not sample from the 100 or so prepositions and other function words that the students probably know to some extent. But even supposing the average student knew 500 words, that would still leave 1500 to learn in one academic year .

Admittedly, some number of words less than the complete 2000 will probably see a learner through Band 4. The Word Levels test appears to show students reaching Band 4 (but with Band 3 reading ability) with scores as low as 70-75% at the 2000 level, or 1400-1500 words. In that case the to-be-learned number drops to about 1000 words. But this is still a formidable number; to put it in perspective, the average lexical growth for English learners in western Europe is about 275 new words per six-month term, or 550 words a year, by a recent calculation (Milton & Meara, 1995). And this is achieved in an environment permeated with English pop-culture, by learners whose first languages share many cognates with English.

Over the course of repeated testing in the College of Commerce, it became apparent that vocabulary size correlated consistently with PET success and failure. The groups selected for presentation below were intact groups of students who had either just passed or just failed a PET band. In spite of

some predictable noise in the data, there appears to be a remarkably steady rise in vocabulary size for successful students, and a stagnation for failing students.

Table 6.2 Lexical correlates of PET success and failure

	PASS BAND 1		FAIL B2	PASS BAND 2		PASS BAND 3	
	FEB94	FEB95	FEB94	FEB95	FEB95	FEB95	FEB95
GROUP	"1A"	"1B"	*"2D"*	"2B"	"2C"	"3A"	"3B"
	33 %	39 %	*27 %*	33 %	44 %	88 %	50%
	33	22	*39*	33	50	61	94
	22	5	*33*	50	50	66	83
	22	33	*33*	33	66	77	77
	28	39	*27*	39	61	66	83
	39	17	*27*	44	61	66	72
	39	39	*50*	72	33	61	66
	16	33	*27*	44	33	88	83
	50	39	*33*	55	66	72	72
	33	28	*39*	83	44	61	
	39	27	*33*	61	72	72	
	22	28	*33.5*	77	61		
	61	61	*7.1*	55	44		
		44	*17*				
		11					
MEAN %	**33.6**	**31**	***33.5***	**49.7**	**52.7**	**70.7**	**75.5**
S. Dev.	12.4	13.9	*7.1*	18.8	12.7	9.9	12.6
# Words	672	620	*670*	994	1054	1414	1510

There is a consistent pattern of 30-50-70% in the 2000-test results over the course of moving through the PET bands, replicated with hundreds of students over several terms. Multiplying percentages against 2000, it appears that successful students know about 600 words at the end of Band 1, 1000 words at the end of Band 2, and 1400 words at the end of Band 3. Repeating groups consistently weigh in one size-range below par, so that the Band 2 failing group in Table 6.2 has the same mean vocabulary size as the Band 1 groups. These vocabulary size differences by PET band are real, in the sense that within-band means are not statistically different while between-band means are. By this measure, then, successful students seem to be learning about 400 words per four-month term, well above the

European average. The problem, of course, is that many students are not successful.

Resources for vocabulary growth

But what resources are available for learning these words? In the era of the lexical syllabus, one might assume that the authors of major English course books would know which words were the lexical core of English and then make a point of exposing learners to all of them. In fact, most course books do nothing of the kind.

Given that the PET is a creation of Cambridge University, which is based on the Cambridge Lexicon, and that the students prepare for the PET with the New Cambridge English Course (Swan and Walter, 1990), one might think they would have every opportunity to learn all the words they need. In fact, the Cambridge English Course presents learners with about half the PET list by the end of its third volume. (This makes some sense when one remembers that the PET is a proficiency test, not an achievement test.)

This information was obtained by the following method (discussed in greater detail in Cobb, 1994a): 20 consecutive words from the PET list were selected at 10 random sampling points, and each of these was checked against the word lists of the Cambridge course books. For the first Cambridge book, 50 of the 200 sampled PET words appeared in the course word list, or 25%, by extrapolation about 600 of the 2387. For the second book, 80 of the 200 sampled PET words appeared in the course word list, or 40%, about 950 of the PET words. Even the third (advanced) book

Table 6.3 Cambridge course v. Cambridge list

	CA1	CA2	CA3
Sample 1	6/20	9/20	11/20
Sample 2	3	6	10
Sample 3	6	9	11
Sample 4	2	6	8
Sample 5	8	8	10
Sample 6	4	12	14
Sample 7	6	9	11
Sample 8	2	5	10
Sample 9	5	5	10
Sample 10	8	11	12
TOTAL	50/200	80	107
MEAN	5/20	8	10.7
S.Dev.	2.2	2.4	1.6
% of PET Words	**25**	**40**	**53.5**

(CA1 = Cambridge English Course Book 1, etc.)

would take learners only a little over half way. Similarly, the non-Cambridge courses also occasionally used at SQU to prepare students for the PET, such as Oxford's Headway (Soars and Soars, 1991), also come up short of PET words even in their final course books. Only the COBUILD course presents the full 2500 words by its final book, but it is not used at SQU. (Additional data on these course materials and how the information about them was gathered can be found in Appendix A.)

The lack of 2000-level coverage is not confined to the particular commercial courses that happen to be used at SQU. A decade and a half ago, Nation (1982) complained that the lexical coverage of coursebooks was excessively light. Even graded readers are surprisingly weak in the lexical ranges they claim to cover; Wodinsky and Nation (1988) examined a popular set of readers finding that stories graded for 2000 words in fact contained a poor sampling of those words, so that a learner would have to

read several stories to run into most of them even once. In other words, most commercial materials have poor provision for learning the words that comprise 80% of English.

To summarize, these students are forced to take an external English test based on 2000 words or more; this test can and does determine academic fate; for some this is a learning task roughly double that expected of European learners; and the instructional resources available to these students expose them to about half these words—effectively far fewer, since the final course books in these series are almost never reached.

The case for computer learning

Nation (1990) argues that no academic English course can afford to neglect instructing its learners in the highest-frequency words of the language, and the point has never been contested. However, it is often ignored, and in fact very few English courses ensure that their students will meet a significant portion of these words by their end.

Of course, coverage could be guaranteed by giving students supplementary word lists, but this solution is anathema to most instructors, because it presents words out of context and invites students to learn translation equivalents. Nonetheless, the idea of supplementation may be on the right track. What seems to be needed is some sort of supplementary vocabulary course, running concurrently with the normal syllabus and guaranteeing introduction to core lexis if the syllabus does not provide it, further practice if it does, and plenty of recycling in either case. Arguments for a

supplementary approach to vocabulary coverage are made by Beck, McKeown, and Omanson (1984), and Carrell (1988), although not necessarily involving computers. But a computer tutorial would be the obvious medium to deliver such a supplement, especially if one could be found that guaranteed full coverage of particular word lists and yet allowed words to be met in context—a paradox concordance technology should be able to crack.

Another reason for considering the computer as the medium of choice for this instruction is the usual one that it makes individual learning possible. Students exiting Band 1 seem to have about 800 words to learn for entry into the passing zone of the PET, but that does not mean they all have the same 800 words to learn. Vocabulary instruction, at least at the sub-technical level, is a classic candidate for some sort of individualized instruction such as a computer tutorial where students can determine for themselves which words to work on.

An inference-based tutorial for memorizers?

But how suitable for Arab learners is a computer tutorial based on inferential learning from text? These students belong to a Muslim culture that endorses memorization as the main learning strategy, often to the detriment of comprehension. Non-Arabic-speaking Muslims in countries like Pakistan and Indonesia regularly memorize the Koran in Arabic without knowing the language. Even native Arabic speakers are not necessarily able to understand the classical Arabic of the Koran very well, and even if they do, interpretation and comprehension questions are not on

the instructional agenda (see Gardner, 1993, for a relevant discussion of traditional education). Surely by university age these learners have developed a learning style that suggests a more deductive approach to their vocabulary expansion. For example, they could be given short definitions for the words they need to learn. This might be a low-transfer kind of learning, but nevertheless the kind they are capable of.

There is actually no reason to think that Arabs' learning-style repertoires have been significantly restricted by their upbringing. In their famous study of the supposed cognitive effects of different literacies, Scribner and Cole (1981) empirically tested the notion that Koranic scholars would remember the surface of a text more than its semantic depth. The test turned on whether a reader can distinguish between sentences actually read and propositions merely inferred (good readers cannot). For example, a good reader cannot remember whether he read "three turtles rested on a log, and a fish swam under <u>them</u>," or "and a fish swam under <u>it</u>," since both decompose to the same situation model. Scribner and Cole expected Koranic memorizers to fixate on the surface of a text, failing to comprehend or remember the gist in significant ways. However, they found that these scholars, while indeed excellent text memorizers, nonetheless constructed deep semantic representations of text under normal circumstances just like anyone else:

> Contrary to our speculations, Arabic literates, along with all other populations, made false recognition errors on true inference sentences while correctly accepting or rejecting other recognition items. While this result is impressive evidence for the universality of a tendency to make sense of what one is hearing by constructing an integrated

> representation of incoming information, it was a disappointing failure to anticipate a specific effect of practice in the kind of Arabic literacy encountered [i.e. practice in Koranic memorisation] ... (p. 222).

So there is no reason to think that Arabic speakers would be worse at inferential tasks than anybody else.

The role of context in Arabic script

There is even some reason to think they might be better, because Arabic readers have had a lifetime of practice in contextual inference by virtue of how their writing system works. Arabic script does not encode most of its vowels, with the effect that most written Arabic words in isolation could actually point toward several spoken words, just as the de-vowelled English word "ct" could be shorthand for any of "cat," "cot," "cut," "cute," or "coot" although the reference would be obvious in even a short sentence ("The ct sat on the mat.") Of course, any script, vowelled or not, contains ambiguous words that can be resolved only by context, like "bank" (of a river) and "bank" (your money), but an unvowelled script has far more; Sampson (1985, p. 93) estimates that such ambiguity, "rare" in a vowelled script like English, characterises 3 out of 10 words in an unvowelled script.

In English, it is established that it is not ability to use context that characterises skilled reading, but rather ability in word recognition out of context (Stanovich, 1986). But this finding has no meaning when applied to a script like Arabic. Out of context, "ct," "tlt," "brk" are only skeletons of words to which a reader must add flesh from his understanding of the ongoing context. A study by Abu Rabia and Siegel (1995) establishes

empirically that skilled reading in Arabic is largely a matter of contextual interpretation from minimal graphic input, the converse of English. Of course, one could argue that the contextual sensitivity required for reading Arabic would not necessarily transfer to reading a vowelled script like English, but it appears that at least some reading habits and strategies indeed do travel from first language to second, usually with disadvantages but maybe here with advantages. Koda (1988) provides empirical evidence for "cognitive process transfer" between Arabic and English reading. So, in principle, a lifetime of reading Arabic may well have made SQU learners sensitive to words' contexts and so good contextual learners.

Some "mystery" information about Arabic readers cropped up in one of the studies of inferencing mentioned in Chapter 3. Haynes (1983) had students from four language groups infer word meanings from text, where the meanings were implicit in either the local or the global context. Local context was moderately useful to most second-language readers, but global context, where crucial information often lies, was much less. But there was a surprise exception: for monolingual Arabic speakers, global context was as useful as local for inferring new word meanings.

Capacity vs present ability

All this is only to say that Arabic-speaking students are as capable as anyone of learning words inferentially. In fact, however, any instructor in the Middle East knows that his students are actually quite poor at exercising this skill (demonstrated empirically at SQU by Arden-Close, 1993a, and Horst, 1995). There are two reasons for this that could have little to do with

ability. The first is that to learn words you need words; to make an inference about a word, you need to know most of the other words in the context, which of course these students almost never do. For students who know 1000 words, one word in four in any text is unknown (Nation, 1990), so any inferential skill their first language might give them can hardly enter into play.

Second, to say that memory-based education does not definitively destroy the cognitive ability to construct deep representations is not to say that cultural influences can not produce some unuseful learning habits. SQU students' learning habits have been the subject of many studies since the University opened in 1986. A recent example is a survey conducted by the College of Education and Islamic Sciences (Barwani, Yahya, and Ibrahim, 1994) which asked faculty members to rate 34 learning-related skills and attitudes in terms of two dimensions, perceived importance in academic success and actual availability in SQU students. Their responses were entered into a factor analysis, and only one of the 34 skills came out as both desirable and available: "ability to memorize and recall information." Highly desirable, but totally unavailable, was "knowing how to learn."

Study skills at the College of Commerce

Many of the constituent colleges of SQU have expressed similar views about their students and proposed measures for dealing with the study skills problem. The College of Commerce and Economics was set up in 1993 as a high-flyers' college under the advice of INSEAD in Paris (the European Institute of Business Administration), including an information centre with

four networked computer labs and the PET as a stiff guarantee of students who could cope with English. But at the end of a disappointing first term (only four students arrived in Band 4) a task force was set up to look into the students' study skills (Scott, Gerber, Salem, Marzouqa, and Sherazee, 1995). Faculty members perceived these to be effectively non-existent and made several recommendations to members of the language unit, who of course meet the students first and set their initial academic course: Language instructors should encourage students to rely less on rote memorization, depend less on instructors, take responsibility for their own learning, and so on, in preparation for their upcoming academic courses.

Three of the recommendations are specifically relevant to the present study because they feed directly into the design specifications for the computer tutorials about to be described:

1. Students should adopt a problem-solving approach with emphasis on the transfer of information and the application of rules or principles in new situations.

2. Students should learn to synthesize information from several sources.

3. Students should become responsible for their own work by using the Information Centre's resources to find things out for themselves (Scott and colleagues, 1995).

One way to help students use the Information Centre is to make sure there is some information there that they need in a form that they can use. And one way to make students more independent is to download some

significant part of the curriculum into an self-access activity that nonetheless "counts" back in the classroom.

Conclusion

Many students in the College of Commerce are in desperate need of rapid lexical growth, and their courses are unlikely to help them sufficiently. Some sort of individualized course supplement seems indicated, such as a self-access computer tutorial, for which the concepts and machinery are available. An inference-based lexical tutor would probably be challenging for these students, but there is nothing in either cognitive research or local task analysis to rule against it. Students have been working with texts on computer screens for several years at SQU, and there is extensive experience in CALL development to aid in the design of a 2000-size lexical tutor. This experience will be discussed in the next chapter.

CHAPTER 7

CALL AT SQU

The design of a corpus-based lexical tutor evolved naturally out of trends in educational computing at the Language Centre of Sultan Qaboos University. Several kinds of programs had already been developed and used by students—mainly text reconstruction and a hand-coded lexical tutor—so designing a corpus-based tutor was a matter of adapting and integrating found concepts and technologies.

Text reconstruction

SQU students have been using CALL activities as part of their language training since the University opened in 1986. The initial design concept for CALL development was text reconstruction, in which a supply of texts is stored in a computer along with templates for transforming them into activities such as cloze passages, systematic deletion passages, scrambled sentences, crosswords, and many others. The learner chooses a text and an activity, and when the computer has deconstructed the text in the chosen way the learner reconstructs it. He or she presumably gleans insights, gets practice, and gains confidence with the language in the process, especially if the computer uses its "knowledge" of the original text, or other texts it can access, to help out. Stevens and Millmore's TEXT TANGLERS (1987) was under development even before SQU opened, later joined by SUPERCLOZE (Millmore and Stevens, 1990), and then TEXPERT (Cobb, 1993a) when a Macintosh lab was added. Cobb and Stevens (1996) discuss

the rationale for reconstruction; Stevens (1995) discusses some patterns of students' use.

Initially, the texts were adapted scientific texts which the students had already met in the reading classroom. Science texts were used because the Language Centre at SQU was an experiment in "content-based English," teaching English through the medium of content courses. Professors in the College of Science supplied the Language Centre with the biology, chemistry, and physics texts they wanted the students to read, often simplified in collaboration with language course designers, and it was the task of language instructors to help the students understand these and learn English through them. One means of doing this was to put the texts into the computer lab and invite the students to work them over as many times and as many ways as possible.

There was also a practical reason to choose the text reconstruction technology for the CALL lab. Once developed, this technology was not tied to any particular set or level of texts. Flexibility was an advantage in the early days of SQU, where professors who had never taught foreigners met foreigners who had never seen professors, to the mutual mystification of each. In the search for a workable relationship, there was a great deal of curricular turmoil; a succession of approaches and materials came and went. For CALL designers, the instability of this environment indicated a type of software with as little hand-coding as possible, since any approach tied to a particular text or teaching point could quickly become obsolete. Software was needed that could build useful activities from whatever texts were thrown at it. With text reconstruction, the science professors could

change their courses as often as they liked, as long as they provided their new materials on computer disk.

Text reconstruction and concordancing

This text-reconstruction pedagogy and technology has evolved over the years at SQU, in line with new ideas, new hardware, and user feedback. An obvious way of extending text reconstruction was to build a concordance routine into the students' interface, since the textbase (corpus) was already in place. The concordance could appear as an exploratory tool, or as a HELP option within a reconstruction activity. For example, a learner requesting HELP to fill a gap in a paragraph could be given, instead of the usual first letter then second letter etc, a concordance of other sentences using the missing word. The learner's search of memory is constrained rather than short-circuited, and steered onto the semantic not phonological plane. TEXPERT contains many schemes for making concordancing available to learners as an option within text reconstruction activities.

Vocabulary by computer

Text manipulation can be seen as practice in vocabulary, but it is not a useful way of introducing new vocabulary. Finding a word for a gap assumes the missing word is already known. So in a separate line of development, a more specific attempt was made to deliver lexis by computer.

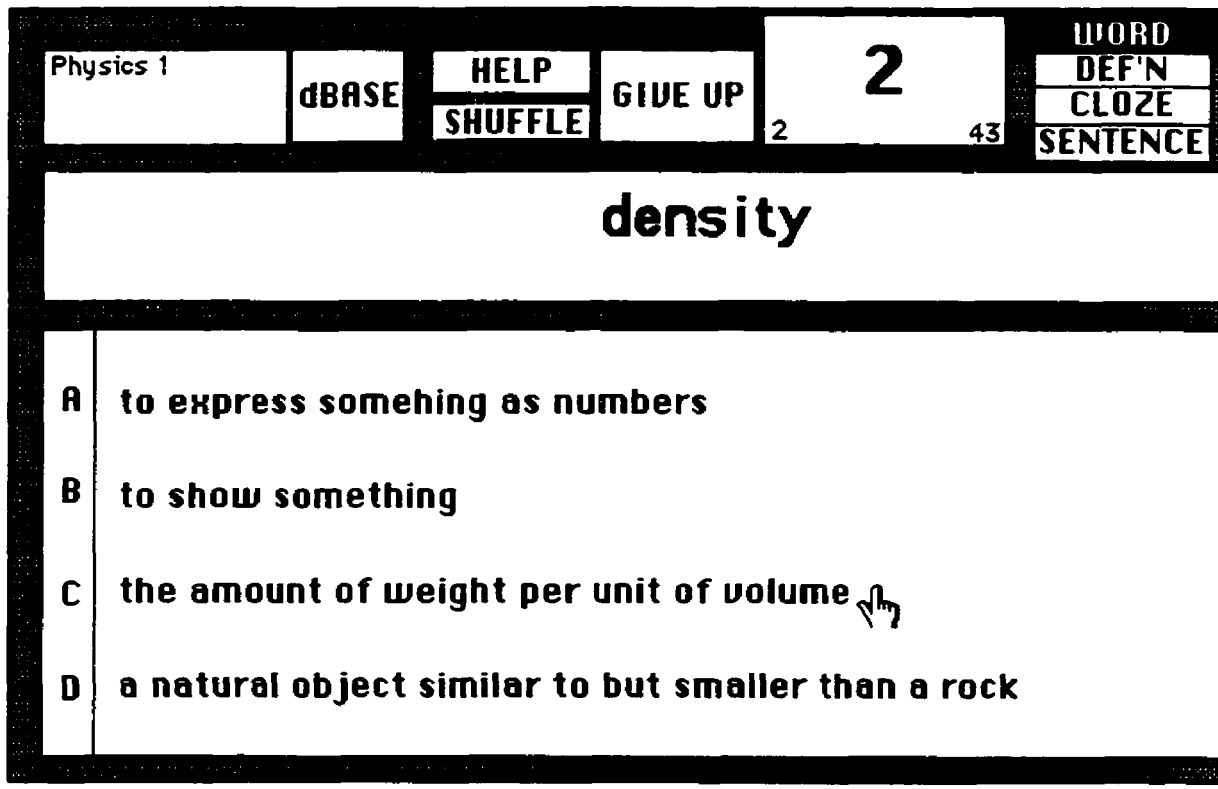
It has always been clear that SQU students were extremely weak in English vocabulary, as lamented by their science lecturers. Arden-Close (1993b) observed chemistry lectures extensively and interviewed the professors, concluding: "Language problems in these lectures are seen as almost exclusively vocabulary problems" (p. 251). Yet it has not been easy for the Language Centre to address these problems.

Course instability meant among other things that it was difficult to identify any lexical base to build a vocabulary course on. However, as the collection of machine-readable science materials grew into a sizable corpus (Griffiths, 1990), it became apparent that it would be possible to use a concordance program to scan for whatever lexical bedrock might be forming below the shifting sand. (This use of concordancing in the early days of SQU is discussed in Stevens, 1991, and Flowerdew, 1993b). Gradually a lexical base was discerned, comprising several hundred scientific terms that seemed to recur whatever the approach or subject matter. These terms were fashioned into a 500-word vocabulary course consisting of a workbook and computer program.

The computer program, LEXIQUIZ (Cobb and Poulton, 1991), gives students additional exposure to the 500 scientific terms they have already met in their workbook. The rationale is simply that a great deal of practice and recycling is required if the students are to learn and retain any significant portion of these words. The tutorial interface resides atop a database of science terms, each tagged to a short definition and example sentence. The program asks multiple-choice questions about words in 25 groups of 20, and the learner cycles through the items until each has been answered correctly. The questions are presented in one of four modes,

from which the learner chooses. Here is the interface in one of it modes, with the user about to select a definition for "density":

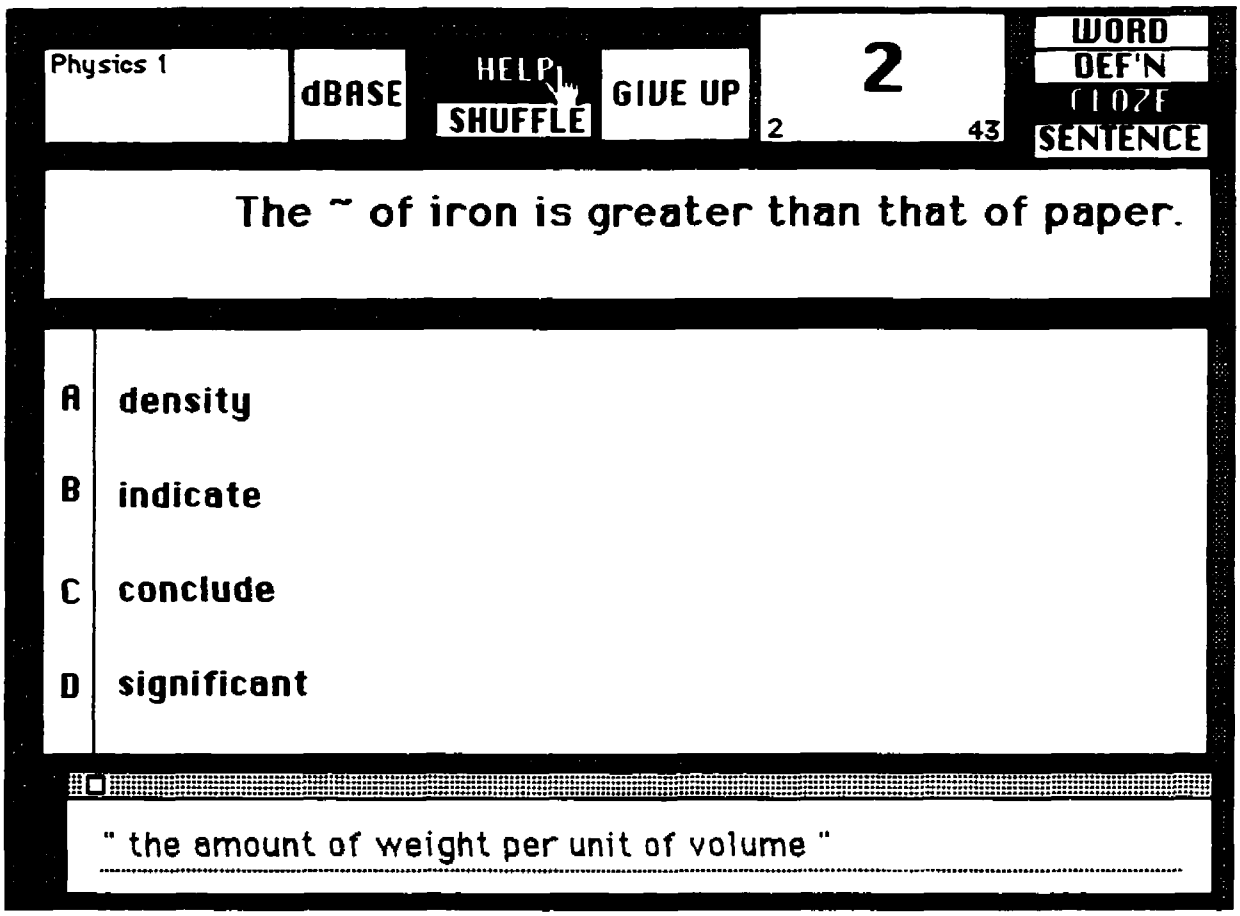
Figure 7.1 LEXIQUIZ - word + definition mode



The modes consist of all possible combinations of the three items in the database: a word with four definitions to choose from; a word and four gapped sentences; a definition and four words; or a gapped sentence and four words. The third, leftover item in each case becomes the HELP, should the learner get stuck.

Figure 7.2 shows another interface mode, with the user requesting help—in this case the leftover definition.

Figure 7.2 LEXIQUIZ - gapped sentence mode + HELP



LEXIQUIZ has been used by hundreds of science students over at least five years, and could be described as a modest success. Students have shown a strong interest in using the computer to learn words, far more than they ever did for text manipulation. A common pattern of use has been to sit and review hundreds of words at a time, suggesting a thirst for vocabulary on the part of the students, as well as a role for self-paced word-learning opportunities.

The limits of LEXIQUIZ

Nevertheless, LEXIQUIZ is far from the last word in vocabulary tutors. In fact it resembles some of those criticized in Chapter 5 in that it purveys pregnant contexts, does not have much for students to read, and is not extensible without giant labour. The biggest limitation, however, is that short definitions and single contexts are unlikely to affect learners' ability to comprehend newly learned words in novel contexts, as discussed in Chapter 3. This might not be a problem, since the words are being met in other contexts in both language and science classrooms. Unfortunately, no research has attempted to test the tutor's effectiveness.

An even more serious problem with LEXIQUIZ is in the kind of words it draws to the students' attention. It gives students practice in medium and low-frequency scientific words, while they actually do not know very many high-frequency words—a case of going about things backwards. The highest frequency 2000 words of English are crucial for any sort of reading, including scientific, since with heavy repetition they comprise about 80% of the words in any text. It seems unlikely that either reading or listening to science lectures could proceed very smoothly for learners with few words in the 0 to 2000 range, however many they knew at other levels. The theory of English-through-science had somehow obscured this problem.

Technical vs sub-technical lexis

Arden-Close (1993b) provides some touching anecdotes that indicate where the main vocabulary problems at SQU lie. His research consisted of observing numerous science lectures, where professors unversed in language issues attempted to communicate with students. He describes one chemistry lecturer backing up further and further in a search for common lexical ground. Trying to get across the idea of "carbon fluoride bonds" and meeting incomprehension, the lecturer tries a succession of progressively more common analogies: teflon pans, a tug of war, an assembly line—to no avail. In the light of the size-testing undertaken in the present study, it is no wonder; "pan," "war," "line" and other words from the 2000 wordlist were no doubt themselves unknown, let alone any compounds derived from them.

In another anecdote, a biology lecturer describes searching for a common analogy to convey "hybridization," and in the process indicates the real level of the problem:

> The first time I gave a hybridization analogy, I talked about dogs, and then I switched to goats; and then it even dawned on me that some of them aren't going to be in touch with the fact that if you mix two different kinds of goats they come out looking in between, and I didn't know all the specific terms there, what their two different breeds of goats are called—you can talk about [mixing] colours, <u>but a lot of them don't know their colours yet</u> (p. 258, emphasis added).

Numerous similar interchanges have taken place over the years. There is no common lexical ground for lecturers to retreat to.

The lexical profile suggested by these and many similar anecdotes is supported by size testing. When Nation's (1990) test was given to SQU students for the first time in 1993, this was the typical profile of words the students knew at various levels after one year of study:

Table 7.1 Words known at five levels

Level	2000	3000	5000	University	10,000
Student 1	27 %	22 %	17 %	0 %	0 %
Student 2	39	22	11	27	22
Student 3	33	27	11	11	0
Student 4	33	44	17	27	17
Student 5	27	17	5	22	5
Student 6	27	17	0	5	5
Student 7	50	33	22	0	0
Student 8	27	11	22	5	0
Student 9	33	33	17	11	11
Student 10	39	17	0	0	0
Student 11	33	17	11	17	0
MEAN %	**33.5**	**23.6**	**12.1**	**11.4**	**5.5**
S.D.	7.1	9.7	7.8	10.5	7.9

As predicted, the students had a smattering of words at all levels, but only about (2000 x 33.5% =) 600 words at the 2000 level. In fact, they had more words beyond the 2000 level than within it—words met only in the 20% of text left over when the high-frequency words have claimed their 80%.

Further, it appears that high frequency words, not scientific words, are precisely the ones students have the most trouble learning. English scientific terms are often already known in the first language, as concepts merely awaiting new labels or even as loan-words. They are often inferable from context and diagrams, get emphasized in lectures, and so on. Numerous empirical studies from English-medium universities in

developing countries trace student reading difficulties to high-frequency (sub-technical) lexis, rather than technical (Sutarsyah, Nation and Kennedy, 1994; Marshall and Gilmour, 1993; Parry, 1991; Robinson, 1989). A revealing study by Cohen, Glasman, Rosenbaum-Cohen, Ferrara, and Fine (1988) tracked the words Arabic and Hebrew-speaking learners looked up in dictionaries while reading an academic text: 85% were sub-technical.

Arrival of the PET

So introducing the PET into SQU in 1991, with its emphasis on general English and its lexical base of high-frequency words, was probably a good move. However, the nature of the challenge it posed became clear only gradually. From one point of view, the PET was just one more upheaval in a landscape already strewn with curriculum wreckage. From another, the arrival of a test with a 2400-word base was a challenge unlike anything that had gone before. It is doubtful that SQU students had ever had to learn anything like that many words, of whatever type, however counted. Further, the PET included a stiff reading comprehension section, so these words would have to be learned well enough for use in comprehension of novel texts. No wonder the first PET result was called "the slaughter of the innocents."

Re-tooling LEXIQUIZ

There appeared to be a role for CALL in the new PET era, but it could not be merely an expansion of LEXIQUIZ for two reasons. One, hand-coding

2400 definitions and example sentences would be a labour of huge proportions; as noted in Chapter 2, hand-coding normally trails off at about 1000 words. Second, many words in the 2400 range are extremely polysemous (such as "run") compared to lower-frequency words (such as "density"), so that writing short definitions for them is not simple, nor is finding a typical example sentence. In other words, some approach that did not require hand-coding was indicated. And given the reading comprehension aspect of the PET, an approach with more text for the students to read and operate on was desirable.

What was needed was a marriage of text reconstruction and LEXIQUIZ. For example, this could take the form of some sort of list-driven text reconstruction, where particular words would be learned by meeting them several times in text-based activities. The two technologies were already well developed, so only an integration was required, as well as the development of a corpus of non-scientific texts.

The prospects for a text-based tutor

But could a vocabulary tutor appeal to Arab learners if it did not give them practice with definitions? Arab learners are well known to tend toward a deductive learning style and to be fond of memorizing short definitions. But (as discussed in Chapter 6) there is nothing inevitable about this learning habit. Language learners, even in the Arabian Gulf, cling to definitions less and pay attention to use and context more as they become more proficient in a second language. Evidence of this can be found in the following mini-study of user responses to LEXIQUIZ. As mentioned

before, the program offers four ways of setting up its multiple-choice questions. The reason for this design, other than to provide variety and motivation, was to see if there were any patterns to student learning preferences. Unfortunately, no tracking system was built into the program, so no large scale information is available, but the following survey information is still suggestive.

LEXIQUIZ's four modes really boil down to two: fitting a word to a definition, and fitting a word to a context. Instructors who had supervised lab sessions for several terms consistently reported that students preferred to choose a word for a definition (as could be predicted, if only because it involves less reading). However, putting questions to the students themselves revealed some subtlety. The following questionnaire was completed by a class of 11 male engineering students at the end of a six-week summer course with several sessions on LEXIQUIZ. The number of students choosing each option is indicated in parentheses after each choice:

Figure 7.3 How LEXIQUIZ was used

END-OF-COURSE QUESTIONNAIRE, AUGUST 1993
Here are the four ways to use LEXIQUIZ:

1. Find the definition that goes with a word (1 word, 4 defs)
2. Find the example sentence that goes with a word (1 word, 4 sents)
3. Find the word that goes with a definition (1 def, 4 words)
4. Find the word that goes with an example (1 sent, 4 words)

• Which way of using LEXIQUIZ do you think is most useful for learning new words? Circle one.	1(2)	2(2)	3(**5**)	4(2)
• Which way of using LEXIQUIZ have you used most of the time?	1(3)	2(2)	3(3)	4(3)
• Which way did you mainly use LEXIQUIZ at the BEGINNING of the term?	1(2)	2(2)	3(**5**)	4(2)
• Which way did you mainly use LEXIQUIZ at the END of the term?	1(2)	2(2)	3(2)	4(**5**)

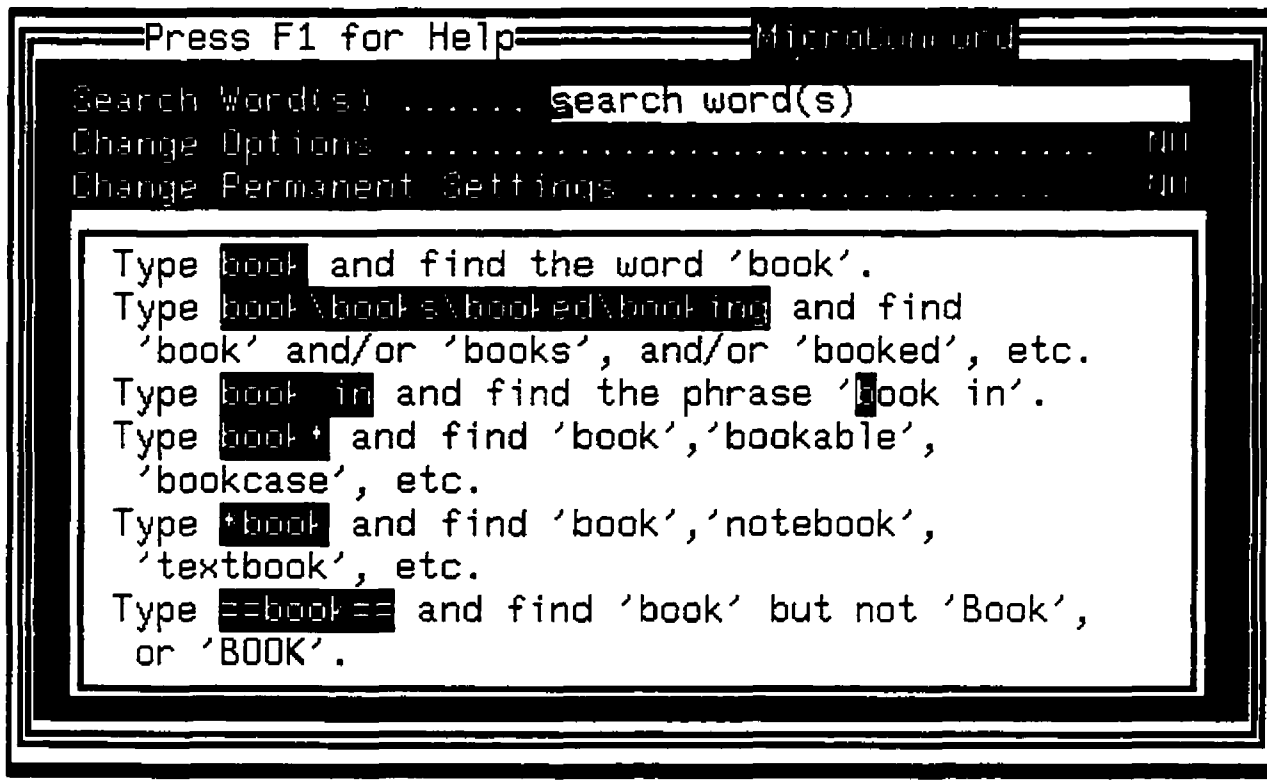
In line with expectation, the students believe that definitions are the most useful way to learn words (mode 3), and the options with the most to read are the least to get used (modes 1 and 2). Counter to expectation, between the beginning and the end of the term three students had switched from a definitional to a contextual learning strategy (mode 3 to mode 4). This trend appears not to be a fluke, inasmuch as it was replicated in the following term.

Design implications

This finding suggests two principles for the development of a text-based training program: most students will gradually adapt to a contextual approach, but in the beginning they will probably find a definitional component useful and motivating. So a decision was made to develop a text-based lexical tutor in two stages, in line with PET Bands 2 and 3. The first would incorporate definitions as well as concordances, and the second would be a text-based, concordance-driven system with no definitions or other hand coding. The next chapter discusses the design and implementation of the first tutor, PET•200.

Looking at the MicroConcord interface in the light of the learners and tasks discussed above, one sees how improbable it is that SQU students would get much use from the interaction it proposes.

Figure 8.1 MicroConcord - introductory screen



Any of the advantages of concordancing hypothesized in Chapters 2 and 3 could in principle be gained by using MicroConcord, but there are some reasons that extensive use of the program by first year SQU students is unlikely. The interface requires complicated keyboard entries. The corpus is authentic samples of academic text and quality-press editorials

(admittedly it can be simplified). But the most serious problem, pedagogically, is that once a mass of lexical information has been delivered to the screen, there is nothing further for an unsophisticated learner to "do" with it. Not surprisingly, an informal poll of SQU language instructors showed that most of them saw student concordancing as impossible for learners at any but the highest levels.

However, MicroConcord is not the only possible interface for a concordance program. The proposal here is that the corpus-concordance concept can be adapted to less sophisticated tasks and learners through interface and corpus design. For example, keyboard entry can be made unnecessary to launch searches; little meta-language might be required to get across the idea of multiple contexts; a corpus could be assembled that was roughly within the learners' zone of proximal development, and yet still authentic (i.e. not set up to illustrate specific points); and things can be found for learners to "do" with the fruits of their corpus searches. This chapter will show how these design ideas were realised in PET•200.

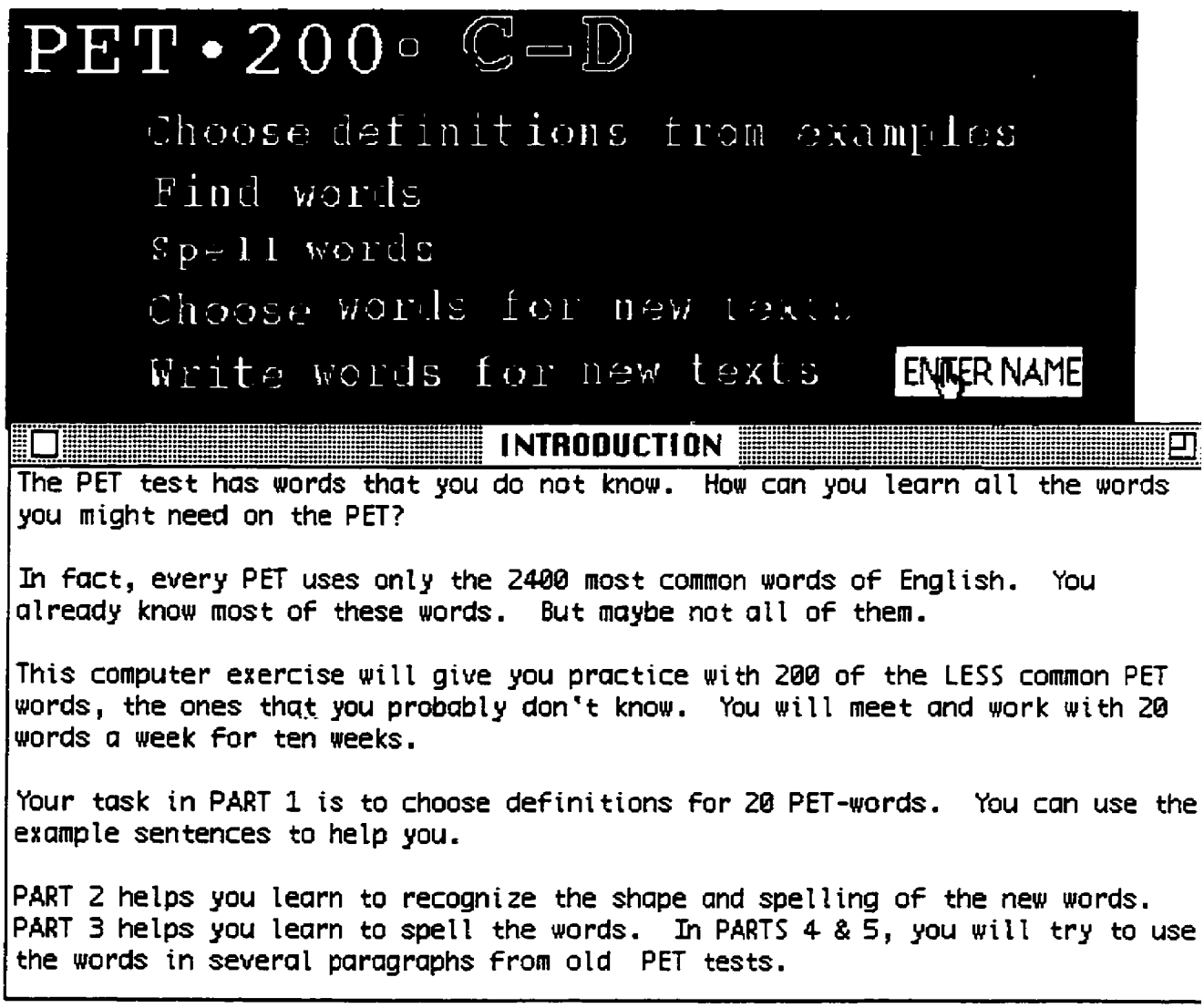
PET•200

PET•200 is a vocabulary training system that attempts to incorporate all of the foregoing pieces: to link with the students' prevailing definitional strategy, build on the tradition of text reconstruction at SQU, give Band 2 students a start on the 2400 wordlist, and prepare them for more open concordancing in Band 3 with PET•2000.

The tutorial presents Band 2 learners with 240 new PET words, 20 words a week for 12 weeks, tested off-line weekly in the classroom. The target is

to bring a learner with the Band 2 average of 600 words up to 800, a size-gain of 33%. Each 20 words can be practiced through up to five types of text-based activities, meant to replicate in some measure the extensive recycling and re-contextualizing of words that characterizes Beck, Perfetti and McKeown's (1982) "rich" in-class training program. But more than double their 104 words will be attempted in half the time, a considerable

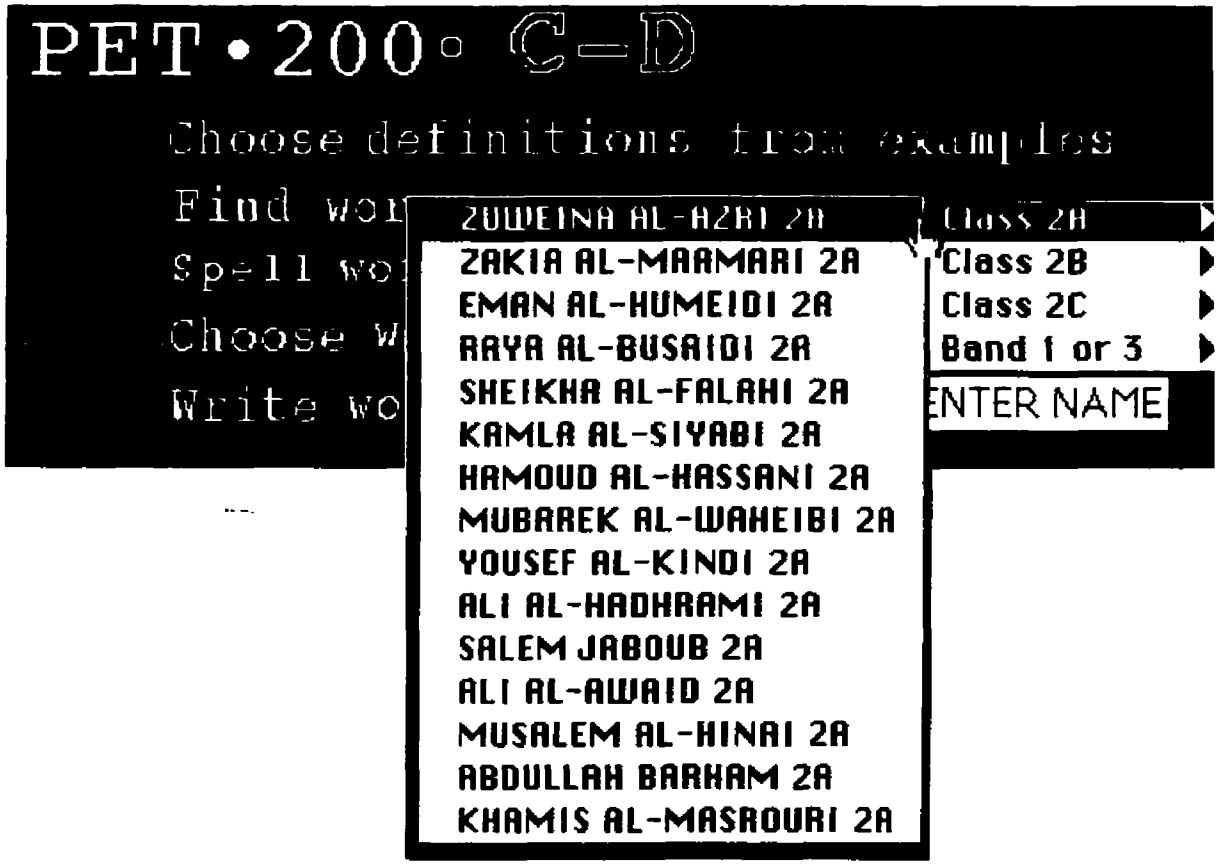
Figure 8.2 PET•200 - Introductory screen



gain in efficiency if the results were comparable. The five activities can be accessed in any order, and choices are offered at all decision points, so that learners can only use the program by taking some role in the design of their own learning.

The best way to proceed is to describe and depict the tutorial, jumping between user level and program level as needed, picking up design and learning issues along the way. When the learners boot the program, they meet an introductory screen that indicates the alphabetical range of the wordlist of the week, previews the five activity types, and waits for a name to be entered:

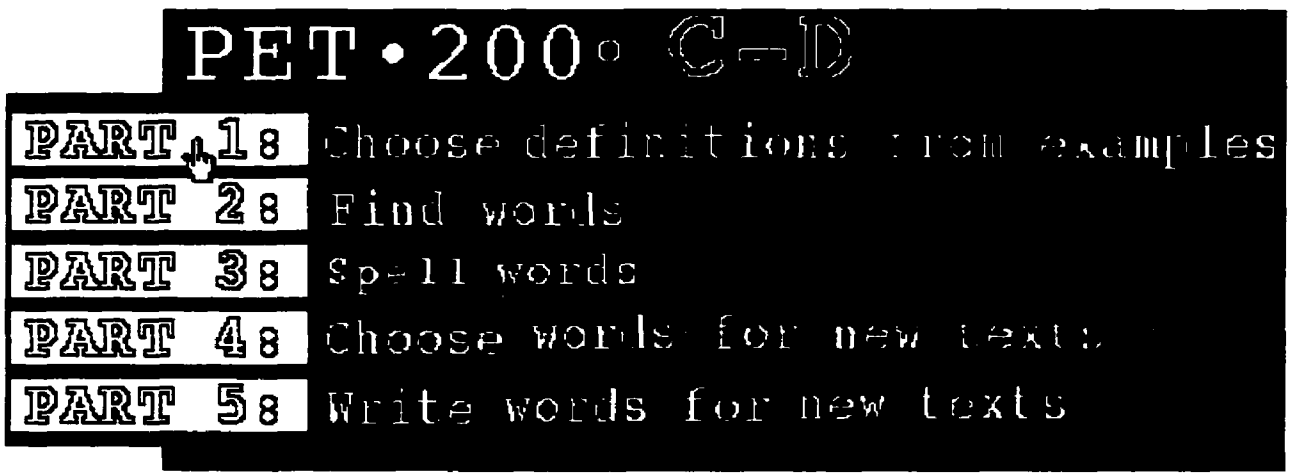
Figure 8.3 PET•200 - Class and name entry



To get reliable user data, the system does not allow students to enter their names with various misspellings etc but rather asks them to indicate on a menu who they are and which class they are in. They are told that the computer keeps a record of what they do, and that their language instructor has access to this record (but they also know this information cannot be used against them since only the PET determines their success or failure).

When the name is properly entered, five buttons appear allowing the student to go to any of five activity types—for example allowing Part 1 to be completed on Monday, Part 2 on Tuesday, and so on. The idea is to maximize use by making the system as flexible as possible.

Figure 8.4. Access buttons

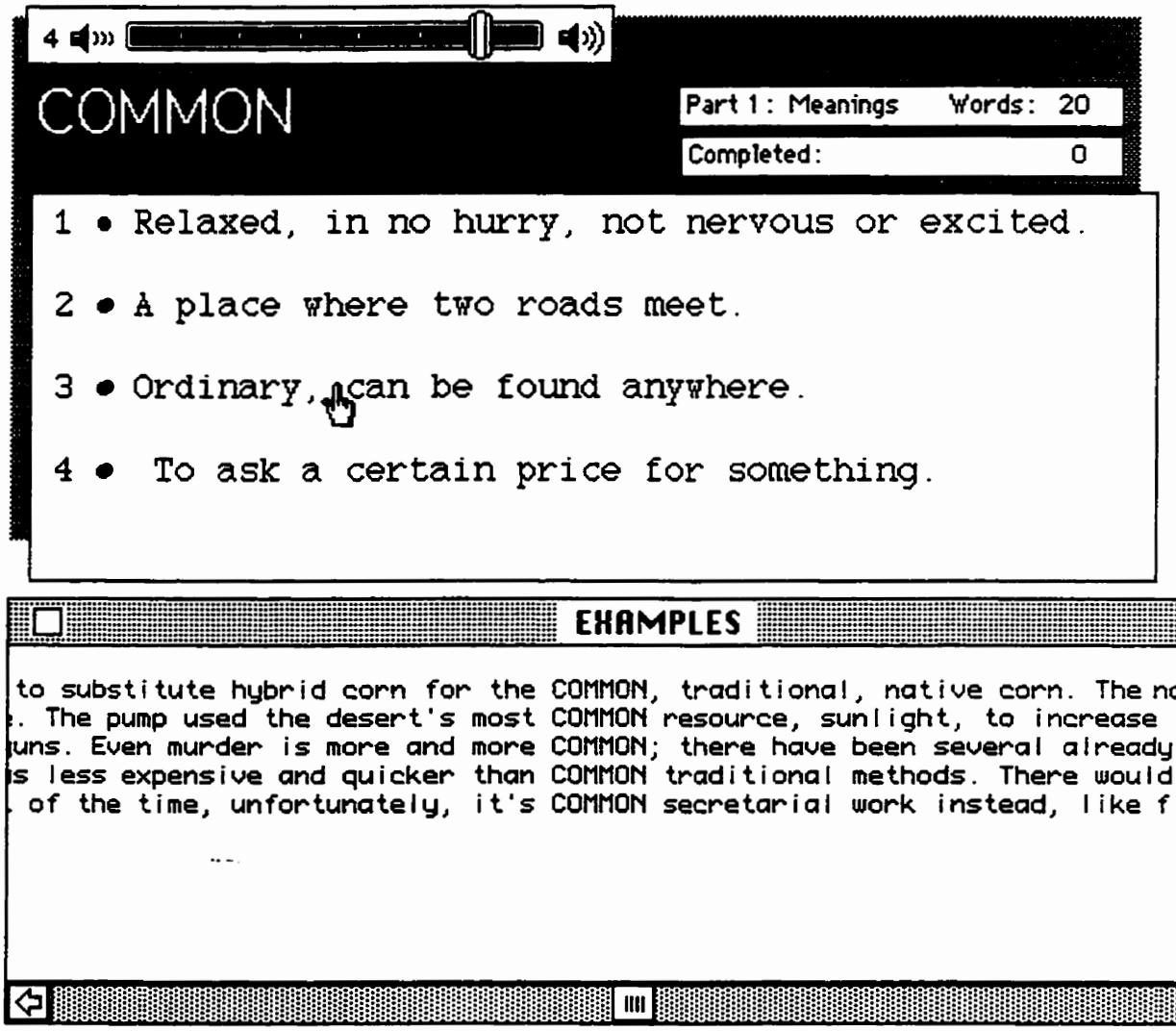


Part 1: Definitions from examples

In Part 1, the week's 20 words come through the interface one at a time in random order (Figure 8.5). The learner can listen to a digitized recording of each word by clicking on it, and in the black window at the bottom of

the screen there is a small concordance for the target word culled at run-time from a corpus of 20 PET-level texts. In the centre window there are four brief definitions culled from a small database of the current 20 words, one of which is correct and the others randomly selected. The task is to use the concordance information to choose the correct definition.

Figure 8.5 Choosing a meaning



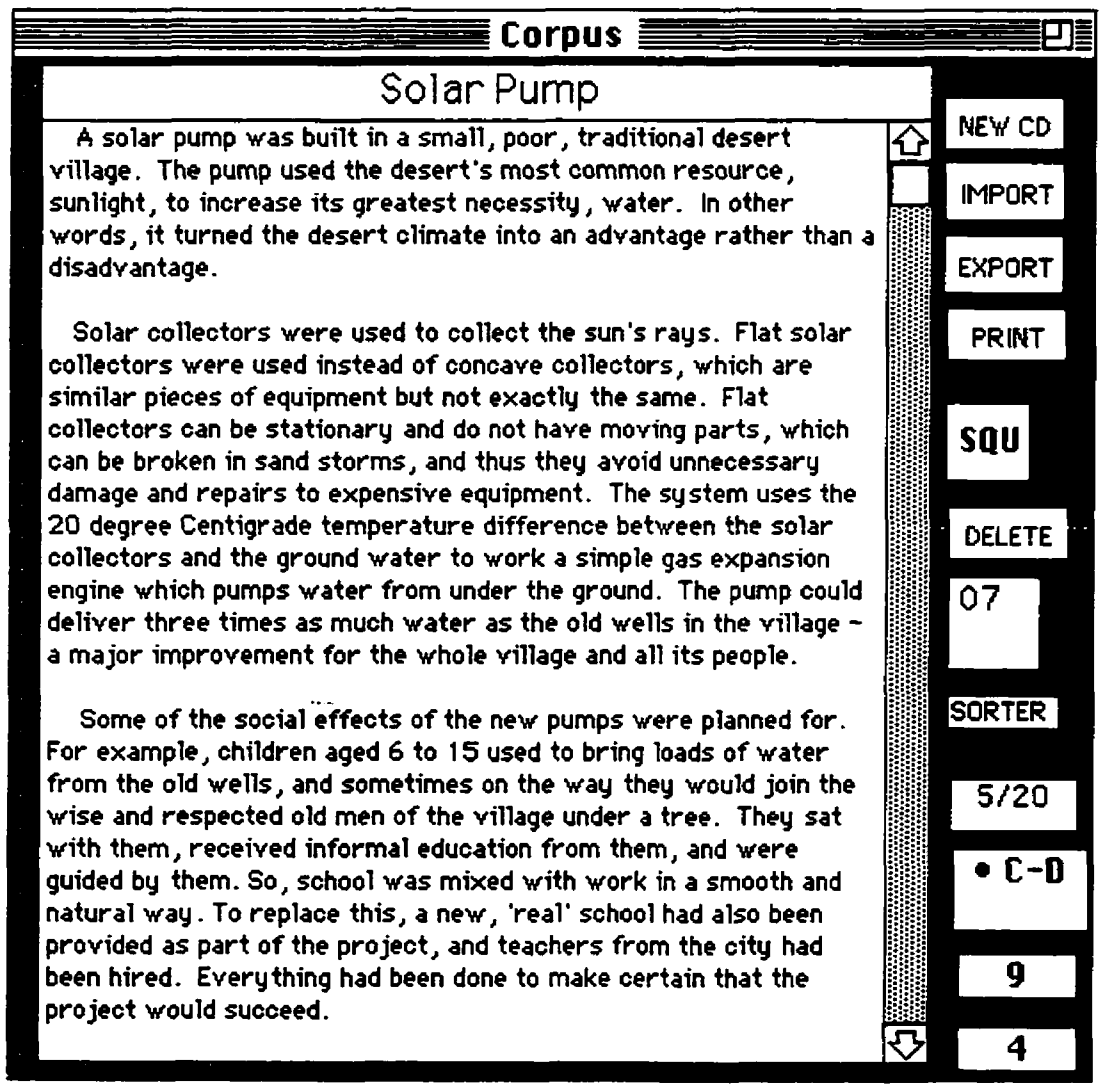
Each concordance line is actually triple the length shown here, and more context can be accessed via the slide control at the bottom of the window or

by the arrow keys. The activity of choosing a meaning for the word is intended to simulate encountering a word several times in natural reading and inferring an integrated meeting for it, but with less hit and miss.

System architecture

Take a detour into system design and architecture for a moment. The corpus is normally invisible to the learner but accessible to the program, as

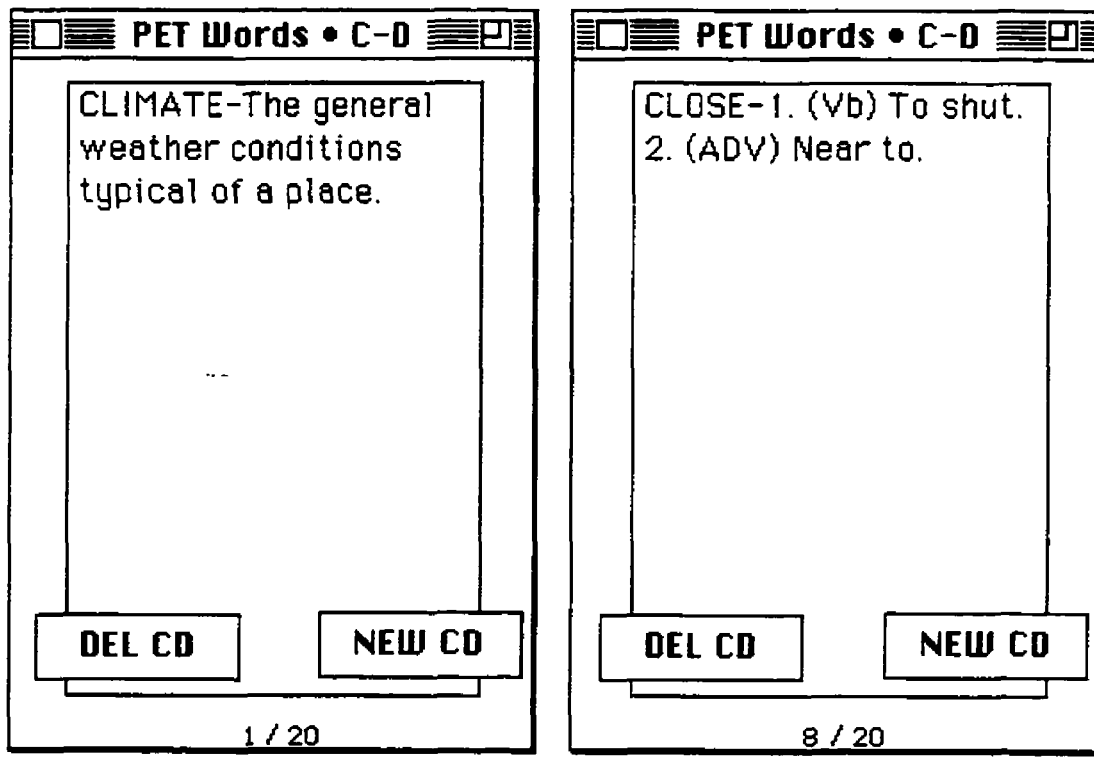
Figure 8.6 20-text corpus



is the word database that provides the words, sounds, and definitions. Figure 8.6 is a typical text from the corpus. The texts are all from either old or practice PET tests, or from lower intermediate course books, and the students will have seen many or even most of them before. They were assembled on the basis of rough level, PET-typicality, and topic appeal. "Solar Pump" in Figure 8.6, from Oxford's (1984) Exploring Functions, has been chosen for its likely interest to desert dwellers in a developing country. The texts are "authentic" inasmuch as they have not been manipulated to make contexts particularly "pregnant"; learners must search through raw albeit scaled text for contexts that are clear to them.

The word databases, also invisible to the learner except in a brief fly-past as the program opens, carry the words, brief definitions, and soundbytes.

Figure 8.7 Database of words



The database loads into memory and then proceeds to open the corpus stack and finally PET•200 itself, which of course is independent of any particular corpus or wordlist.

Word selection

There are two possible ways of supplying PET•200 with its words and matching corpus. One would be to choose 240 words from the PET's 2400, deemed more important than the others for whatever reason, and then find or write texts to illustrate these. This would be very much a hand-coding approach, as criticized in Chapter 3, and likely to verge in the direction of pregnant contexts. Since enough of such texts would be difficult to find, they would probably end up being composed by instructors specifically to explicate the target words. Another way would be to start from a corpus of texts within the learners' range and interests, and find PET words unlikely to be known to the students. The second way is closer to the temper of corpus linguistics, and was adopted.

The method was as follows: 20 machine-readable texts were combined into a corpus; a concordance program extracted a frequency list and matched it against the PET list; from the matches, 240 words were chosen that occurred at least four times in the corpus and were unlikely to be known by the students. No hand-coding or corpus-rigging was required. Of course, hand coding was required to provide a definition for each word selected. Each definition reflected the particular sense of a word as it occurred in this particular corpus. How was polysemy handled? Whenever a word

appeared in two senses, as in the case of "close" in Figure 8.7, a dual-sense definition was written to reflect the two senses present in the corpus.

Word presentation

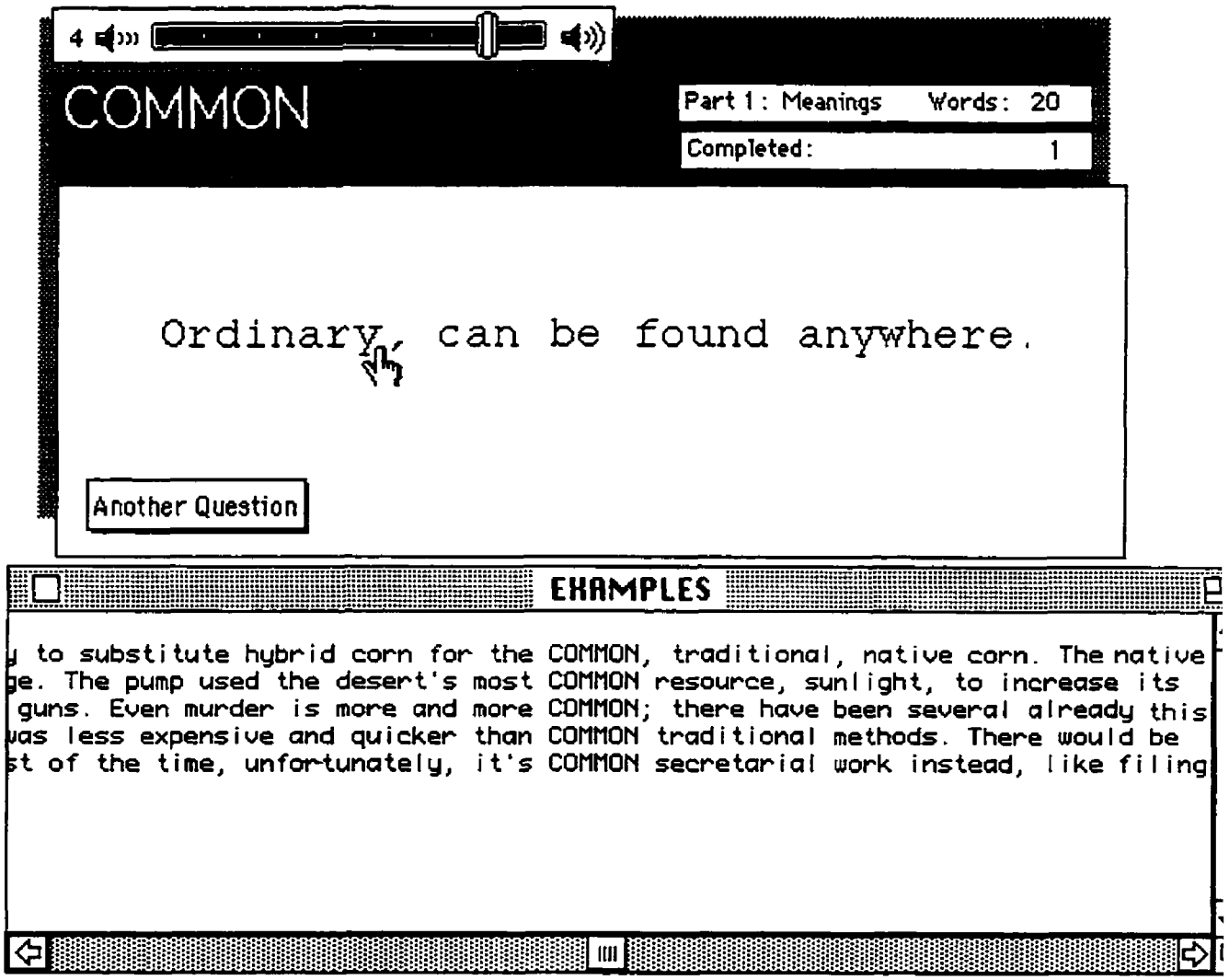
Why present the words in alphabetical lists? The normal way of presenting new vocabulary items is semantically related groups. However, there are two reasons for choosing alphabetisation, one related to system design and the other to learning design. First, system design: these words are eventually to be used in gap-filling activities in Parts 4 and 5 of PET•200, and a well-known problem with such activities is that two words often fill a gap equally well. CALL folks normally see no way around this, except to make learners privy to the secret that computers do not really know language, they merely match strings. However, an interesting insight that emerged from the design of this software is that when a gap-filling routine is driven by an alphabetical wordlist, the two-good-words problem never crops up. Words close together alphabetically are sometimes related but rarely synonymous. "Certain" and "certainly" will never contend for a gap, while "certain" and "sure" may.

Second, learning design: research has shown that counter to intuition, words are better learned in random groups than in meaningful groups (Higa, 1963; Nation, 1990; Tinkham, 1993). The fact that words eventually to drift into semantic groups in memory does not imply that they should be learned that way, i.e. that they should be initially encoded in their terminal configuration. It is well known that similar items interfere with one

another in the encoding process. Alphabetization is a simple, computable way of producing lists of semantically disparate items.

Back now from system to user: In Part 1, when the learner has chosen a definition, he or she is either told it was correct, or else the incorrectly chosen definition simple disappears from the screen.

Figure 8.8 Correct choice

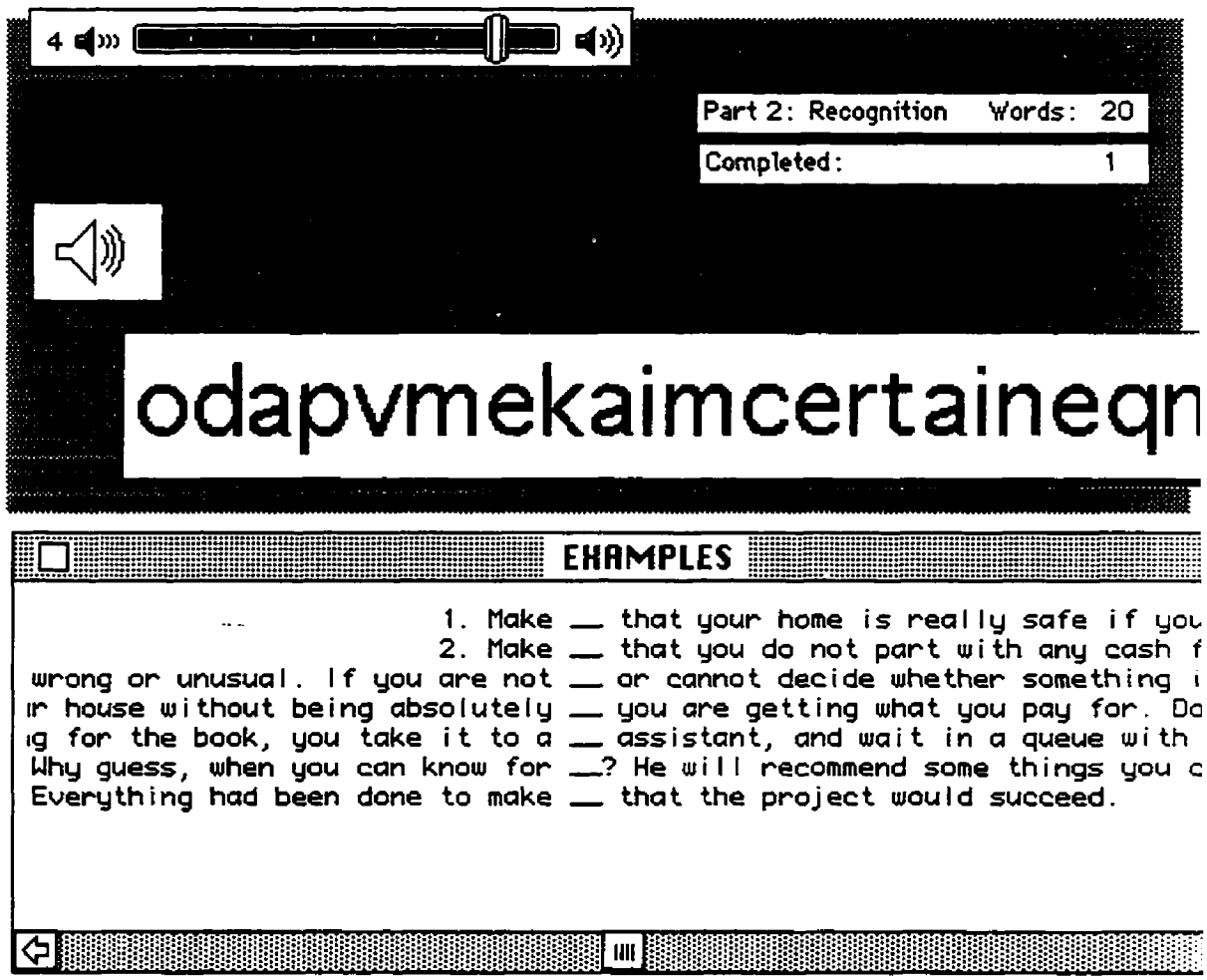


In Figure 8.8, the learner has chosen correctly, and is prompted to request another word. When the words are used up and errors recycled, the system proposes Part 2, though in fact users can move anywhere any time.

Part 2: Finding words

After Part 1, the learner meets no further definitions. The soundbyte and the concordance—now with the keyword blanked—provide the information on which choices are made. In Part 2 (Figure 8.9), the 20 words again

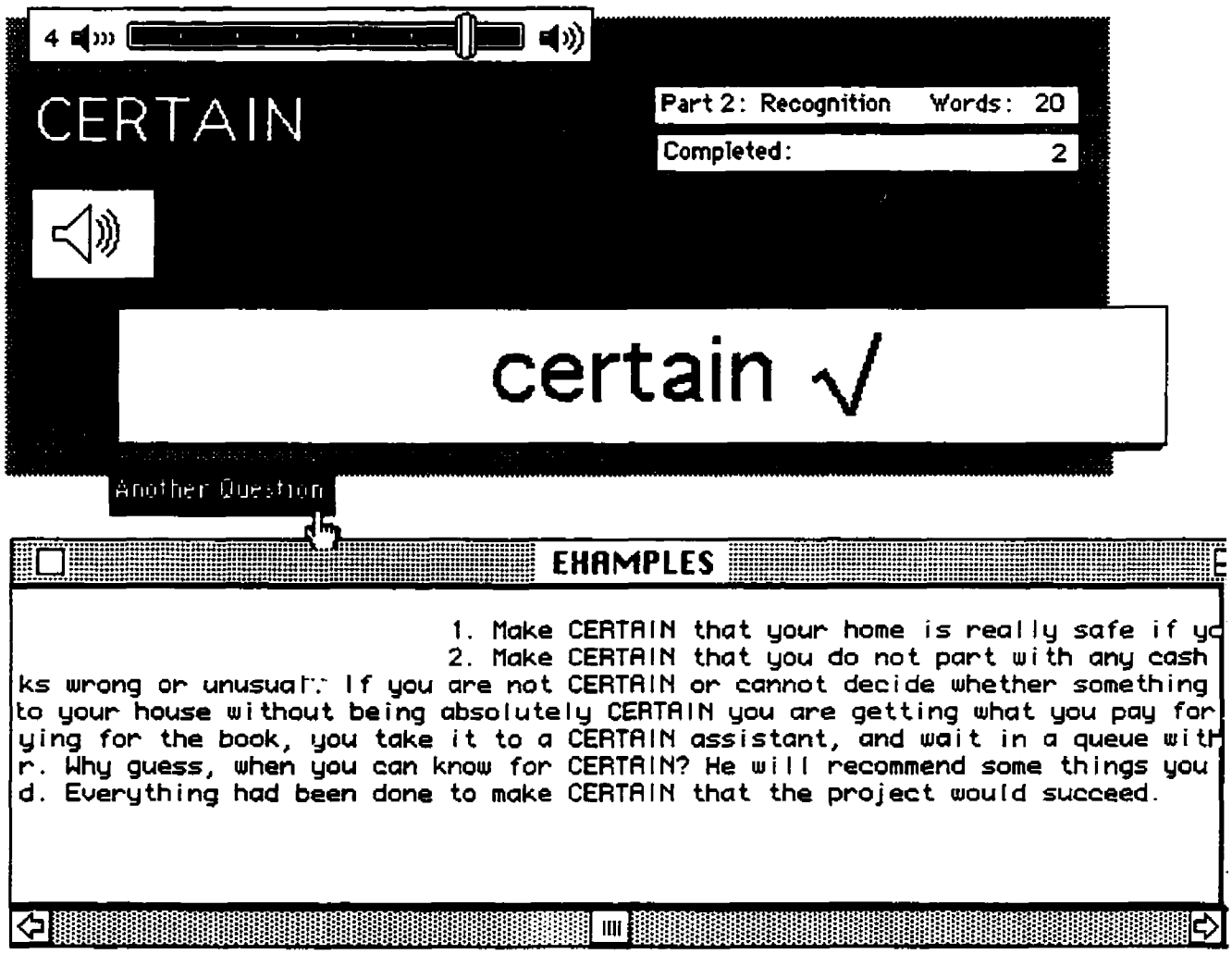
Figure 8.9 Word recognition



come through in random order, and this time the task is to pull the target word out of a random jumble of letters (adapted from an idea in Meara, 1985). The learner drags the mouse across a group of letters, and on release finds out whether the word was correctly identified.

The hope is that the learners will pay some attention to the concordance lines as they try to listen to the word and find it on the screen. (Whether they do or not is the subject of Chapter 6.) If the answer is correct,

Figure 8.10 Recognition feedback

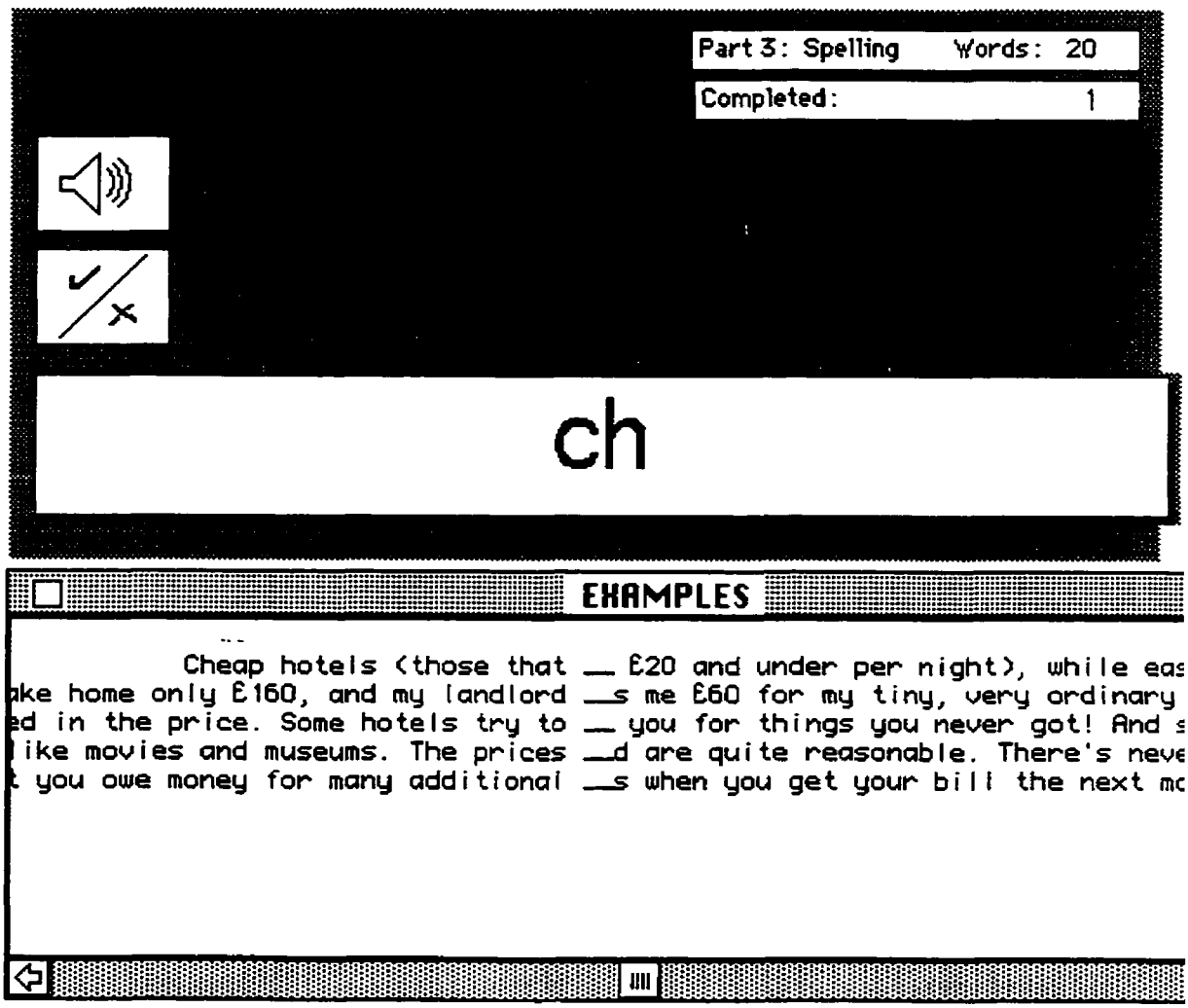


only the word and a large check-mark remain in the centre window, and the concordance lines are filled in for contemplation.

Part 3: Spelling words

In Part 3, the 20 words are once again recycled in random order, and this time the learner is asked to type the correctly spelled word into the centre window. A feature not visible in Figure 8.11 is a routine called

Figure 8.11 Interactive spelling

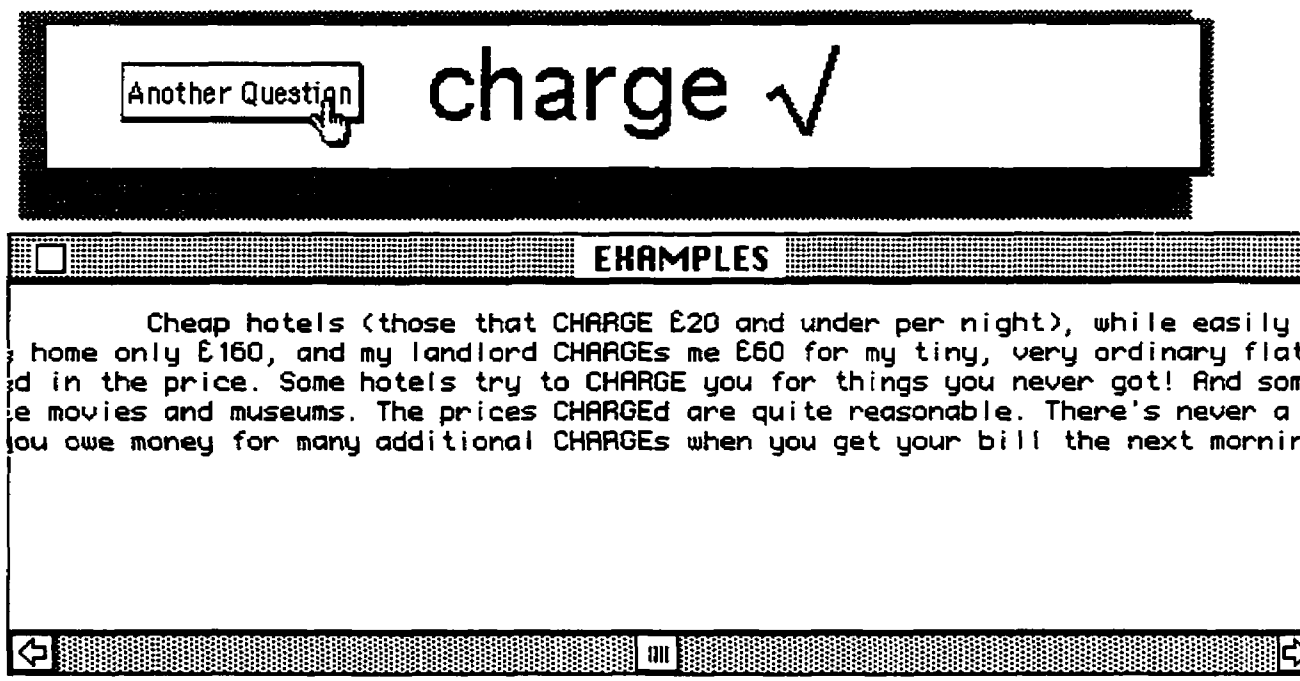


GUIDESPELL, that helps learners shape an answer incrementally. For example, if the target word is "certain" and a learner types "certin", GUIDESPELL will indicate how much of the word was correct—i.e., will back-delete to "cert" for the learner to try again from there, as many times as necessary. Most commercial CALL software, by contrast, insists binary-fashion on fully correct entries. Some recent artificial-intelligence approaches allow fuzzy matches. But neither of these alternatives allows a cumulative test-and-generate interaction as GUIDESPELL does.

Figure 8.11 shows the feedback following an attempt to enter "charge" as "chrg". The system informs the learner that the string up to "ch" was correct, incidentally reminding a speaker of (unvowelled) Arabic that English writes its vowels.

In Figure 8.12, the learner has gone on to enter the correct spelling.

Figure 8.12 Spelling feedback



Parts 4 and 5 change the language focus from words to texts, and the cognitive process from recognition and recall to transfer. The assumption is that if the 20 words have been learned well, this knowledge should be transferable to novel texts. In Figure 8.13 the system has found five texts using C-D words, and deleted these words for the learner to replace.

Figure 8.13 Transfer task

Part 4: Choose words for new texts | 1 of 5 texts | BLANKS = 7

Solar Pump

A solar pump was built in a small, poor, traditional desert village. The pump used the desert's most • resource, sunlight, to increase its greatest necessity, water. In other words, it turned the desert • into an advantage rather than a disad

cash
certain
climate
collect
common
damage
deliver

Solar collectors were used to ays. Flat solar collector were used instead of concave col are similar pieces of equipment but not exactly the sa ectors can be stationary and do not have moving parts, wh ken in sand storms, and thus they avoid unnecessary • an xpensive equipment. The system uses the 20 degree Centig re difference between the solar collectors and the ground a simple gas expansion engine which pumps water from un . The pump could • three times as much water as the old wells in the village - a major improvemer for the whole village and all its people.

Some of the social effects of the new pumps were planned for. For example, children aged 6 to 15 used to bring loads of water from the old wells, and sometimes on the way they would join the wise and respected old men of the village under a tree. They sat with them, received informal education from them, and were guided by them. So, school was mixed with work in a smooth and natural way. To replace this, a new, 'real' school had also been provided as part of the project, and teacher from the city had been hired. Everything had been done to make • that the project would succeed.

However, the project leader had failed to consider the traditional power structure of the village, and soon his pump project ran into some trouble that he had not intended or expected. It surprised him to find that as soon as the foreign experts left the village, the two richest, most powerful men took control of the pump and made everyone else pay

The learner goes through the text filling in the blanks (bullets, "•") with contextually appropriate words from the standard drag-and-release menu.

The program has quite a lot of work to set up text activities for 12 word lists and twenty texts. Its first task is to find some texts that contain a suitable number of the user's current words. When the user begins either Part 4 or 5 for the first time, PET•200 goes to the corpus and ranks the 20 texts by the number of occurrences of the 20 target words present in each, discarding texts below a certain minimum. Then, it further ranks the remaining texts by how many of the target words are repeated more than three times. Texts with many repetitions of the target words are reserved for Part 5, the rest are used by Part 4 (normally about five or six texts of about 250 words are dedicated to each).

Three design points should be noted in Figure 8.13. First, while the text is novel, the learner has already seen the contexts for many of the target words in the form of concordance lines. The principle is that concordance lines should be seen to source back to larger texts, and that "massed" concordance information should always be linked to "distributed" natural occurrences. (So this is transfer of word knowledge to comprehension of a novel text only up to a point.) Second, the interaction is entirely mouse-driven, on the principle that learners are already dealing with a larger unit of text than they are used to, and every attempt should be made to focus on only one operation—not make them struggle with keyboard entry when they are already struggling with voluminous (in their terms) text. Third, the pull-down menu will drop from any point on the text window, so there is never a problem of obscuring the very context that should be the basis of an answer.

In Figure 8.14 a learner has successfully entered "common" and is about to grapple with "collect." The various types of feedback and trail-marking are evident in the illustration.

Figure 8.14 Menu placement & feedback

Solar Pump

A solar pump was built in a small, poor, traditional desert village. The pump used the desert's most COMMON resource, sunlight, to increase its greatest necessity, water. In other words, it turned the desert • into an advantage rather than a disadvantage.

Solar collectors were used to • the sun's rays. Flat solar c were used instead of concave collectors, which are similar piece equipment but not exactly the same. Flat collectors can be sta and do not have moving parts, which can be broken in sand storms thus they avoid unnecessary • and repairs to expensive equipment system uses the 20 degree Centigrade temperature difference betw solar collectors and the ground water to work a simple gas expan engine which pumps water from under the ground. The pump could times as much water as the old wells in the village - a major improvemen for the whole village and all its people.

cash
certa
clima
colle
comm
dama
deliv

The HELP available is a concordance of further examples of the needed word. In Figure 8.15, a learner searching for "certain" might be cued by some of the other occurrences of the word that have been seen before.

Figure 8.15 Concordance as HELP

eplace this, a new, 'real' school had also been provided
f the project, and teachers from the city had been hired.
g had been done to make • that the project would succeed.

er, the project leader had failed to consider the

NEED HELP?

MORE EXAMPLES OF SAME WORD

1. Make __ that your home is really s
2. Make __ that you do not part with
ong or unusual. If you are not __ or cannot decide whether s
house without being absolutely __ you are getting what you p
for the book, you take it to a __ assistant, and wait in a q

Part 5: Writing words for new texts

Part 5 is like Part 4, except that the entry is by keyboard, random sequence is possible, and there is a high degree of repetition in the target words.

Figure 8.16 Part 5 - keyboard entry

Part 5: Type words into new texts | 1 of 4 texts | BLANKS = 14

Crime Prevention Officer's Advice

IF YOU ARE AT HOME:

1. Take all precautions when answering the door. DO NOT allow strangers into your home without proper authority. These $$$$, anyone could be carrying a gun. Let me remind you that criminals look for lonely older people who they think will open the door to them. Don't trust anyone - you could regret it.

2. Make $$$$$$$ that you do not part with any $$$$ for any objects $$$$$$$$$ to your house without being absolutely $$$$$$$ you are getting what you pay for. Do not sign any papers if you do not know that they are valid. And never lend money or any other household equipment to a stranger at your door.

3. Report to the Police any telephone $$$$$ that seem out of the ordinary, or $$$$$$$$ to the Telephone Company.

4. Contact the Police when you hear or see anything that looks wrong or unusual. If you are not $$$$$$$ or cannot $$$$$$ whether something is suspicious, dial 999 anyway. You may help us $$$$$ a criminal, or even better help us prevent a terrible, ugly $$$$$. Help us stop trouble before it happens.

IF YOU PLAN TO BE AWAY:

1. Make $$$$$$$ that your home is really safe if you intend to spend some time away, even if only for a short time. $$$$$ and lock ALL windows and doors. Put powerful locks on all doors. As soon as you notice that a window is broken, repair it. Do everything possible to prevent anyone from getting in. Don't guess that your home and property are safe, be sure! You're mad if you don't.

2. Tell the Police, milkman, newsagent, and neighbours when you expect to leave on holidays, and cancel milk and newspapers. Remind them again just before you leave. But NEVER leave a message for the milkman about being away outside in a milk bottle - it might be a

The learner looks at a context like "The dog chased the $$$," decides on a text string hidden by the dollar signs, types it, and presses <ENTER>. Any correct part of the string "goes in" (replaces dollar signs in the text).

Keyboard entry is meant to make the activity more difficult, in the sense of productive rather than receptive. The word for each gap must be recalled rather than chosen from a list, leading to a type of processing on the borderline between reading and writing—or "reading as writing" as discussed in Cobb and Stevens (1996).

Yet keyboard entry also makes the activity easier—technology support for the upgrade in cognitive difficulty, in line with "cognitive tools" theory. Because of the GUIDESPELL feature, any correctly entered string will fill in matching strings throughout the text, so that repeated words need only be entered once. A single good entry can yield an enormous harvest of information that may be useful in further choices. This means that although the text is large, it can be reconstructed fairly rapidly. This is the point of dividing texts into high and low amounts of word repetition. (Many CALL activities look like this one, but have fewer repeated items or do not allow multiple matching, and can bog learners down for hours—or, more likely, inspire a premature bail-out.)

Figure 8.17 shows two of the interactive support features that make a long text tractable for this level of learner. First, the learner is piecing together the reconstruction little by little with the help of GUIDESPELL. "Day" has gone in, although the full answer is "days" (incidentally focusing the learner's attention on the syntactic as well as semantic requirement of the gap). Second, PET•200's routine for selecting words for deletion is intelligent, to the extent that if "day" or "deliver" is in its list of target

words, then "days," "delivers," and "delivered" are included—by computation, not hand coding.

Figure 8.17 Interactive reconstruction

Part 5: Type words into new texts | 1 of 4 texts | BLANKS = 14

Crime Prevention Officer's Advice

IF YOU ARE AT HOME:
1. Take all precautions when answering the door. DO NOT allow strangers into your home without proper authority. These DAY$, anyone could be carrying a gun. Let me remind you that criminals look for lonely older people who they think will open the door to them. Don't trust anyone - you could regret it.
2. Make $$$$$$$ that you do not part with any $$$$ for any objects DELIVER$$ to your house without being absolutely $$$$$$$ you are getting what you pay for. Do not sign any papers if you do not know

As in Part 4, when a text has been fully reconstructed, another text is ready if the learner wishes it. This is more word practice than many learners desire or have time for; the principle is that there should be more text and practice available than even the most enthusiastic learner has time for, so the tutor is never the limiting factor.

Figure 8.18 Midsession bail-out

1. Take all precautions when answering the door. DO NOT allow strangers int
proper authority. These DAYS, anyone could be carrying a gun. Let me remind y
look for lonely older people who they think will open the door to them. Don't
could regret it.
2. Make $$$$$$$ th
without being absolut
not know that they a
at your door.
3. Report to the P
Telephone Company.
4. Contact the Pol
$$$$$$$ or cannot $$$
criminal, or even bet
happens.

GOOD-BYE, ZUWEINA AL-AZRI 2A.

TIME ON PROGRAM: 17 minutes
CORRECT ANSWERS: 6

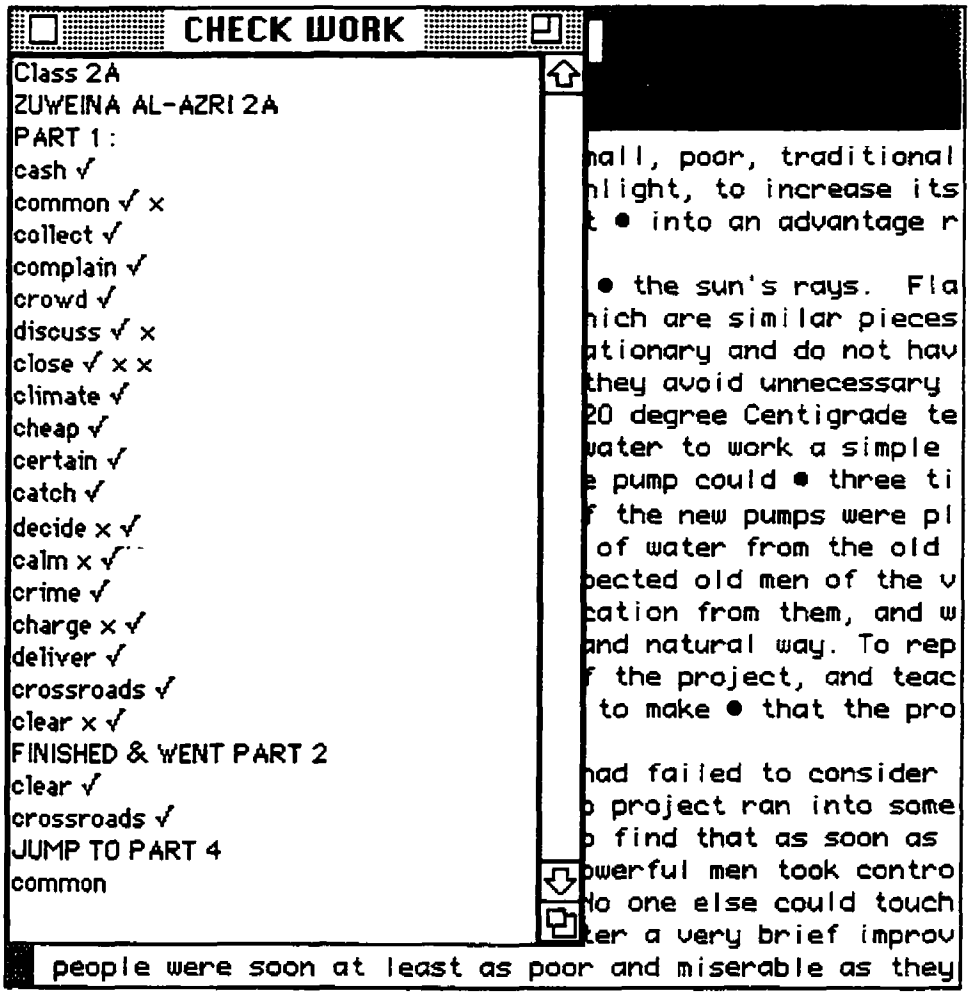
Come and learn more words again soon.

Cancel | OK

Tracking

At any point in the tutorial a student can close the session, as Zuwaina has done in the middle of a Part 5 text reconstruction (Figure 8.18). The tutor reminds her that it has a record of roughly what she has done in the session. In fact, there is an extensive record of her endeavours on the computer's hard disk, which can be viewed during a session if desired as shown in Figure 8.19. The dribble file records which activities Zuwaina chose, how many attempts she put into every correct answer, and whether she completed one activity before moving to another.

Figure 8.19 Tracking moves



When she exits PET•200, her time-on-task is calculated and the whole protocol file sent to her folder on a network server.

Off-line quizzes

The students are free to use or not use PET•200 as they wish, but they are required to take a vocabulary quiz in the classroom once a week, about half of whose items are drawn from the 20 "computer words" (as students call them). The rest are drawn from the vocabulary offering of other courses the students are taking. The reason for including words other than computer words is to allow a comparison between words learned through PET•200 and words learned by other means (to be discussed in Chapter 9). These quizzes all follow the same format: there are six words to spell from dictation, six short definitions to match words to, and a novel passage with eight gaps to fill. Figure 8.20 shows the "C" quiz as an example (see Appendix D for the complete set).

Some points about these quizzes that may not be obvious: First, the meaning-recognition section (Part 2) is the same format as Nation's Levels Test, so that the students are not confused with endlessly switching formats. Second, the deletion passage (Part 3) is a text the students have never seen before. Third, the words surrounding the gaps in the passage are carefully selected to be words the students are likely to know, reducing the chance that an error would involve unknown words in the contexts. Finally, a comparison of results on Parts 1, 2 and 3 of the quizzes should allow some

assessment of different depths of word knowledge, orthographic vs definitional vs transferable word knowledge.

Figure 8.20 Sample in-class quiz

YOCABULARY QUIZ 2

Name.....

Part 1. SPELLING

1. .....

2. .....

3. .....

4. .....

5. .....

6. .....

Part 2. RECOGNITION

Write the number of the word next to the meaning .

1. bracelet
2. leather
3. silk
4. tribe
5. chest
6. underwear

__ group, family
__ you wear it on your wrist
__ shoes are made of it

7. woolen
8. shy
9. stupid
10. common
11. adventurous
12. certain

__ not intelligent
__ happening often
__ made of sheep's hair

Part 3. CLOZE

Write a correct word in each space. Choose from these words:

crowd	cash	charge
clear	catch	protect
crossroads	frightened	try on
changing room	wear	basement

Policeman: So what time did the phone ring at the fire station last night?
Fireman: At exactly eight minutes after eleven.
Policeman: Then what happened?
Fireman: We all jumped out of bed, got into the fire engine, and we drove to t
(1)..... of First Street and Ring Road as fast as we cou
There we saw that the shop opposite the bank was on fire.
Policeman: Right. That's the Hirami brothers' shop. So what did you do nex
Fireman: Well, one fireman held back the (2)..... of people who were watching the fire and told them to stay calm and not be (3)..... The other firemen started to put out the fire.
Policeman: What did you do?
Fireman: I ran into the burning building to see if anyone was inside. First I ra downstairs to the (4)....., and then I went upstairs to th ground floor. That's where I noticed something.
Policeman: What was that?
Fireman: I could smell petrol and then I saw some empty petrol cans.
Policeman: Really? Where exactly?
Fireman: They were in the (5)....., you know, the place where the customers go to (6)..... clothes befo they buy them.
Policeman: Did you see any thing else?
Fireman: Yes, I remember there was a box of matches on the floor.
Policeman: Hmmm. . . . Well, the Hirami brothers have fire insurance worth 500,000 rials on that building. It is (7)..... that they started the fire and hope to collect the insurance money. This is a very seriou crime and the police will do their best to (8)..... the person who did it.

The weekly quizzes were a good motivator for the students. Going to the lab to learn their 20 words quickly became part of their routine—two to a machine the day before the quiz. The quizzes ensured that PET•200 was tightly integrated into the curriculum soon after its introduction.

Does it work?

A large supply of data has been generated by students using PET•200, mainly during the winter of 1994. The students were pre-post tested with both the Levels Test and an in-house test; their dribble files fill several computer disks; and their weekly quizzes track three kinds of word knowledge. Some of this information will be used to answer two questions in the next chapter: Did the students learn words from the tutor, compared to some other ways at their disposal? And did they learn from the concordance feature specifically?

CHAPTER 9

LEARNING EFFECTS OF PET•200

In its decade of existence, the Language Centre at Sultan Qaboos University has seen a good deal of scholarly activity. A sample of publications is Fahmy and Bilton (1989), Griffiths (1989), Cobb (1989), Stevens (1988), Flowerdew (1993), and Arden-Close (1993). A perusal of the titles, however, shows that these studies deal with program development, instructional design, teacher talk, or student strategies, but never with measuring students' learning in relation to the instruction they receive. This omission is now being addressed (Horst, 1995; Stevens, 1995; Cobb, 1995a).

There are some reasons for the omission. One is that the endless re-shuffling of curriculum kept the Language Centre busy producing rather than evaluating instruction. Another is that most language courses at SQU are lockstep courses delivered to several classes at the same time, so that separation of control and treatment groups is impossible. Another is that classes have not been grouped by ability, so that most instruction has been rough not fine tuned. The research to be described here faces these constraints and looks for ways around them.

The PET has made it easier to do research at SQU, in some ways. It has provided a clarity about objectives (such as learning the 2387 words) against which progress can be measured. It has put students into cohesive classes, and generated standardized pre-post information. However, instructors and researchers do not have access to that information in the form of raw scores, but only to pass-fail data, so additional measures must

be devised if smaller learning increments are to be charted. Also, the problem of control groups has not gone away. There is simply no possibility of comparing different ways of getting students through the PET, because all resources must be devoted equally to the success of everyone. Various ways of getting around the control problem are proposed below, none of them 100% watertight but some of them capable of providing useful information.

The learning effects of PET•200 will be examined in three phases. First, did the students use the system to any extent? Second, did they learn any words? And third, can any of the learning can be traced to concordancing?

Volume and kind of use

As with LEXIQUIZ, it seems that students liked learning words with a computer. In the College of Commerce, students are regularly asked to assess the instruction and materials they receive, and Figure 9.1 shows the materials evaluation for an intact class of 11 students after using PET•200 for a term. Points to notice are that PET•200 has beat out the published materials, even the traditionally prized grammar workbook and another vocabulary course called A Way With Words (Redman and Ellis, 1991).

The dribble files show that many students used the program a lot, and used many of its options especially the soundbytes. They tended to work very hard on Parts 1 to 3, less on Part 4, and still less on Part 5. Particular favourites were Part 1 (choosing a definition from examples) and Part 3 (interactive spelling with GUIDESPELL). Some students became so adept

Figure 9.1 Band 2 materials evaluation

BAND 2 - COURSE EVALUATION MAY 1994

Make an "X" under the number which best describes the truth of each statement.
BE HONEST!

1 = Not true
2 = Usually not true
3 = Sometimes true, sometimes not true
4 = Usually true
5 = Always true

MATERIALS	1	2	3	4	5
1. "We Mean Business" helped me a lot.		1	3	3	4
2. "Essential Grammar in Use" helped me a lot.				4	7
3. "A way With Words" (vocab) helped me a lot.			2	3	6
4. Watching the video "Mystery Tour" helped me a lot.	1	2	6	1	1
5. "Task Listening" helped me a lot.	4	1	3	1	2
6. The SRA readers helped me a lot.		1	5	3	2
7. Studying PET words on the computer helped me a lot.			2	1	**8** <
8. Doing the "Edit" lessons on the computer helped me a lot.			3	5	3
9. Writing my journal helped me a lot.				5	6
10. "Keep Writing 2" helped me a lot.		1	2	4	4
11. "Penguin Elementary Reading Skills" helped me a lot.	1	1	5	2	2
12. "Giving and Getting Information" helped me a lot.	3	1	4	2	1

at rapid interactive spelling that the program had to be redesigned to keep up with their speed requirements (this in contrast to the foot-dragging when the same students were made to practice keyboard skills with Typing Tutor!) No student declined to use the program entirely, even though it was entirely optional. Students not wishing to use the program could easily have copied the 20 words and definitions from their friends before the quiz, if they had perceived PET•200's concordances and practice interactions to have no value.

The dribble files show students beginning to develop independent learning

strategies, in line with the faculty members' hopes about how self-access

Figure 9.2 Sample PET•200 protocol file.

```
Abdullah Al Siyabi
CONCORD • A-B
PART 1:
blame x x x x ✓
burglar L L L L R x x ✓
appear L L L R R x x ✓
avoid ✓
bit x x x ✓
available x x ✓
bill ✓
branch x x x ✓
accommodation L R x ✓
advice x ✓
brief x x ✓
amusing x x ✓
assistant x x x ✓
approach x x ✓
annoy ✓
blood ✓
attitude x x x ✓
accident ✓
awful x x ✓
allow ✓
area ✓
JUMP TO PART 2
bill ✓
approach x ✓
awful ✓
branch ✓
amusing ✓
brief ✓
avoid ✓
area x ✓
bit ✓
accommodation ✓
assistant ✓
blame ✓
annoy ✓
attitude ✓
blood ✓
appear ✓
burglar x x x x x ✓
available x ✓
advice ✓
allow ✓
JUMP TO PART 3
blame x x x x x x x x x
x x x x x x x x x x x x
x x x ✓
accommodation x x x x
x x x x x x x x x x x x
x x x x x x x x x x x x
x x x x x x x x x x x x
L R x ✓
brief x ✓
awful ✓
accident x ✓
assistant x x x x x x ✓
bit ✓
avoid ✓
approach x x x x x x x
x x x x x x x x x x x x
x x x x x x x x ✓ R R R
bill ✓
amusing x x x ✓
branch x x x x ✓
attitude x x x ✓
allow x x x x ✓
area x ✓
available x x x x x x x
x x x x x x x x x x x x
x x x x x x x x ✓
advice x ✓
appear x x x x x x x x
x x ✓
burglar x x x x x x x x
x x x x ✓
annoy x ✓
branch
PART 4:
branch ✓
area ✓
accommodation x ✓
available ✓

¶
amusing x x ✓
approached x ✓
attitude x x ✓
bit ✓
bits x x ✓
burglars ✓
bit ✓

¶
brief x ✓
attitude x x x ✓
amusing x ✓

¶
area ✓
attitude ✓
awful ✓
bit
JUMP TO PART 5

¶ $$$=15/5 uniq●●●
JUMP TO PART 1
blame
JUMP TO PART 2
burglar ✓
amusing x ✓
blame ✓
blood ✓
JUMP TO PART 5

¶ $$$=24/6
uniq●●●●●●●●●●
FIN¶ 10 ENTERS

¶ $$$=26/6
uniq●●●●●●
●●●●●●●●●
FIN¶ 15 ENTERS
¶ $$$=20/7 uniq
QUIT
69 minutes
SCORE = 150
```

would feature in the new college. Students always started with Part 1, where they got the definitions (which they invariably wrote down on paper). However, after that there was some variation. They often did Part 3 (spelling) then returned to Part 1 for review. Some repeated the spelling part over and over until they had no errors. Most avoided the larger text activities, but some did nothing but text activities. The main point is that students adapted the tutor to their own uses and fit it into their timetables.

Figure 9.2 shows a sample dribble file from a single session, extracted from the session by methods discussed in Cobb (1993c). This is a long session, 69 minutes, while the average was more like half an hour. However, although students chose different amounts of time to stay on PET•200, amount of use as indicated by number of lines in the dribble files did not decrease over time but increased slightly.

Points to note in the dribble file: First, Abdullah is choosing what to work on. Where the file says PART 4, this means he completed Part 3 and was sent to Part 4; but where it says JUMPED TO PART 3, this means he decided to leave an activity uncompleted and choose another. Second, Abdullah is making lots of mistakes. The large number of X's in the second column represents the interactive GUIDESPELLing discussed above. Third, he is doing a lot of text work. He did the paragraph work in Part 4, reconstructing four of the six paragraphs available. He jumped from Part 4 to Part 5, decided against tackling the dollar-signs, thought again, and went back to complete two texts. In 69 minutes, Abdullah entered 150 correct answers in over 300 interactions.

This student is using the system hard, but is he paying any attention to the concordance or just following a blind generate-and-test strategy? One slight indication that the concordance is getting some attention is the presence of "L" and "R" codes in the file indicating that he has pushed the concordance window to the left or right in order to get more contextual information. Other indications of concordance-attending are discussed later.

Too much data

The amount of information contained within 2000 protocol files is enormous, unexpectedly so, and other than checking a sample for trends it is not simple to know what to do with it. Others have noted this problem, for example Goodfellow (1995b):

> The capacity of the computer to record [the data that is produced when a language learner interacts with a CALL program], tracking keystrokes and mouseclicks, logging information given and received etc, far outstrips our current capacity to analyze this data and decide how best to use it (p. 1).

The PET•200 dribble files are a simple descriptive record of everything the student did, as befits a pilot project. Ideally, however, protocol data collection is focused in advance on the testing of a hypothesis, a point to be kept in mind in the development of the next tutor. In the meantime, one use of these files is to let their size in bytes indicate extent of program use (more revealing than time logs), producing a figure that can enter into statistical analysis. This use of the dribble files will be explored below.

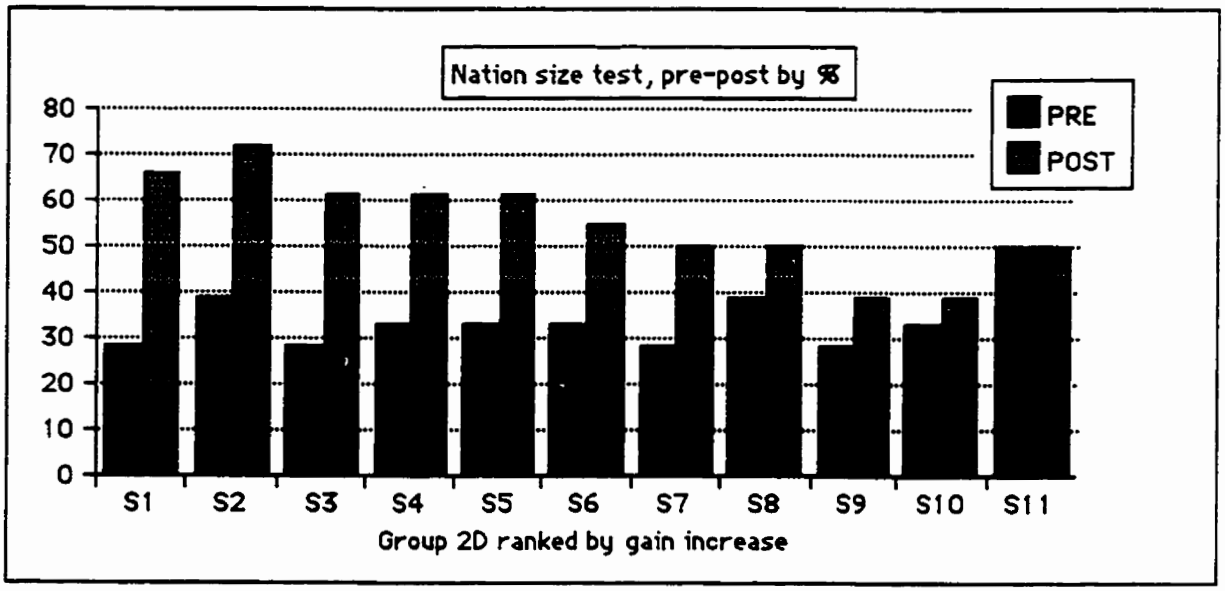
Learning outcomes: Size test

Did the emphasis on vocabulary result in any general increase in students' vocabulary sizes? Nation's Levels Test will be used here as one of two pre-post measures, although it should be noted that PET•200 was not in any way set up to teach the exact words on this test, so the information yielded by this test pertains to general vocabulary growth. The test group is a

remedial group (n=11) chosen because at-risk students are the main ones targeted by this treatment, and because a group stranded between one PET band and another is a maximally cohesive group. This group had just failed to clear PET Band 2, and size testing had classed them an effective Band 1 group in vocabulary by the usual 30-50-70% progression (Table 6.2), with a mean vocabulary size of 33.5% (SD 6.5), or 670 words.

But in less than three months the group mean had grown from 33.5% to 55% (SD 10.5), or 1100 words, exceeding the Band 2 norm. By this measure, these students learned on average (1100-670=) 430 words in one four-month term, which is both in the target range required by the PET and more than double the European norm (275 new words per six-month term as calculated by Milton & Meara, 1995).

Figure 9.3 Individual size gains



Looking at individuals in Figure 9.3, some students seem to have almost doubled their 2000-level word stocks, for example S1 has gained almost 40% of 2000, or 800 words. Seven of the 11 students have made gains of

more than 20%, or more than 400 words. While there is no claim that all these words have been learned by using PET•200 (the program does not even present as many words as some students have learned), there is a modest correlation between the amount of work students did on PET•200 as indicated by the size in bytes of their cumulative dribble files and their gain on the Levels test (Pearson product moment coefficient, r=.35).

Learning outcomes: In-house test

A second, in-house pre-post test was administered along with the Levels Test to gain specific rather than general information. Forty specific to-be-taught words in the 2000 range were also pre and post-tested, 20 by short definitions and 20 by placing words in two novel texts (Appendix B). The mean pre-post differences were even more striking, as might be expected with a test of words actually taught. The mean had risen from 37% (SD=6) to 67% (SD=14), a gain of 30%.

Figure 9.4 Levels v in-house test

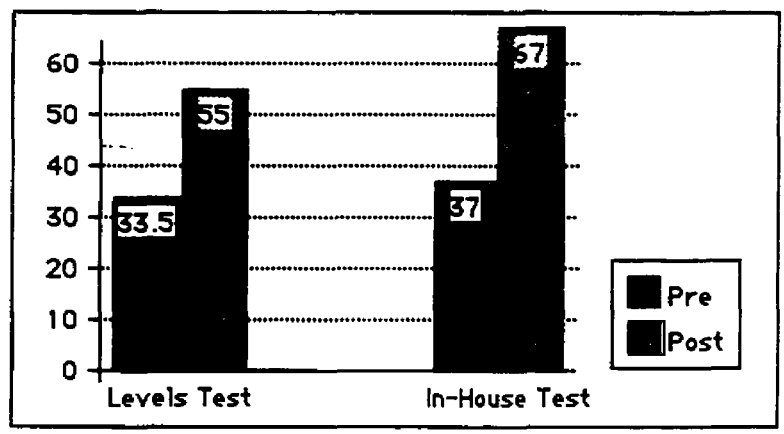
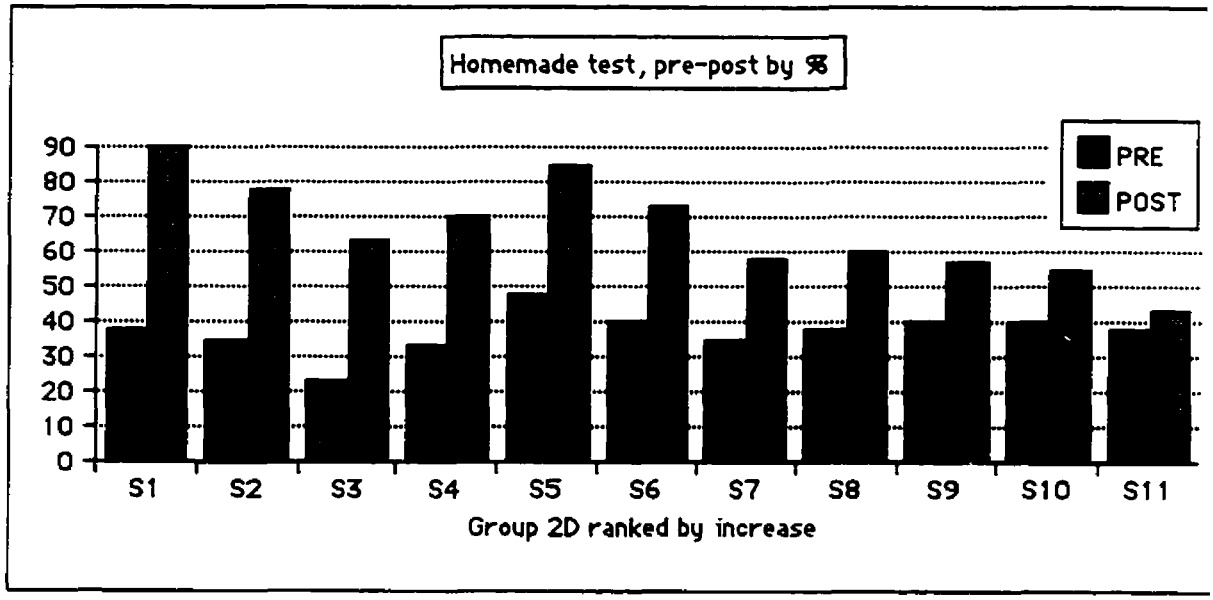


Figure 9.5 is the in-house picture in terms of individuals. The correlation between program use and text score gain is $r = .54$, higher than the correlation between program use and the Levels Test (r=.35).

Figure 9.5 Individual in-house gains



Between media comparisons

But are words being learned better, or at least as well, through PET•200 as in the classroom? In order to get some rough idea of this, the 12 weekly quizzes (Figure 8.2; Appendix C) were written to contain words learned from both the computer and from two courses with vocabulary components that the students were taking at the same time (Way With Words, Redman and Ellis, 1991, and We Mean Business, Norman, 1982). Both these courses present their new words in a list at the end of each chapter, and the students knew that some of these would appear on their weekly quizzes along with PET words. So this allowed a rough comparison between

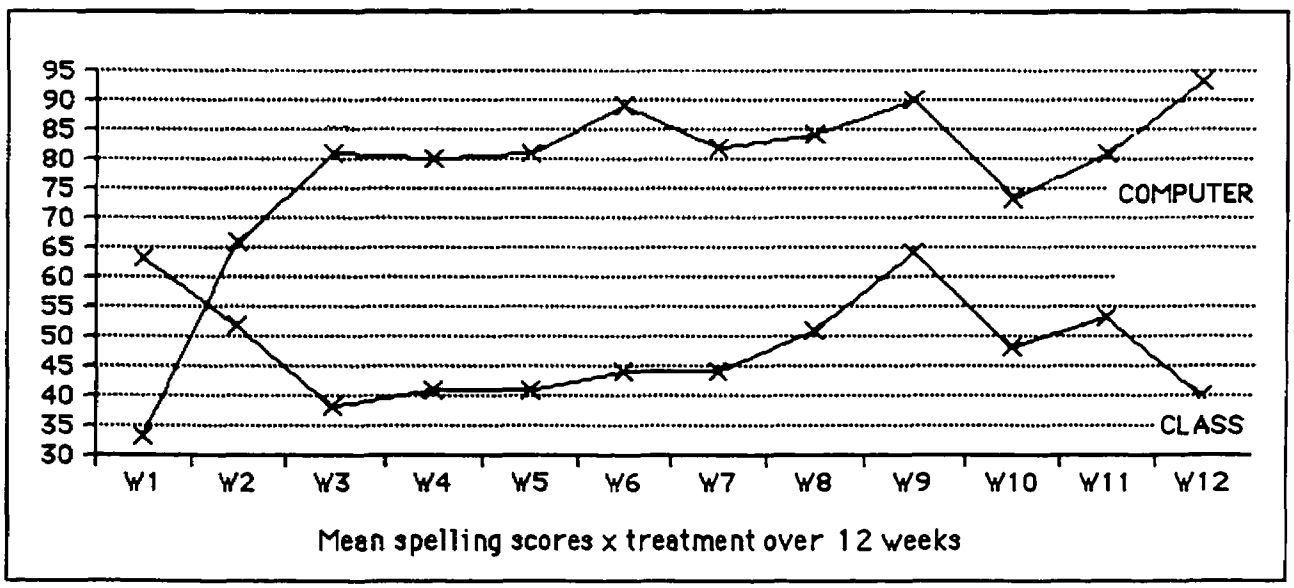
words learned in two different ways.

However, the number of words and the way they were taught in the classroom could not be controlled, so no precise comparison is intended and the data is purely exploratory. In any event, no claim is made here that CALL can teach words better than they are taught in a classroom, only that it can teach them about as well but more efficiently.

The tests track three levels of word knowledge—definitions, spelling, and transfer. The computer tutorial seems to have advantages over the classroom for spelling and transfer, but not for definitions. First definitions: the weekly quizzes contained a total of 792 short-definition questions (six questions per test, 11 students, 12 weeks). Of these, 391 questions pertained to classroom work, and 401 to computer work. The subjects' success with classroom words was 280 correct for 391 gaps, or 71.6%, with PET•200 words 290 correct for 401 gaps, or 72.3%.

Second spelling: as mentioned above, students used PET•200 a good deal to

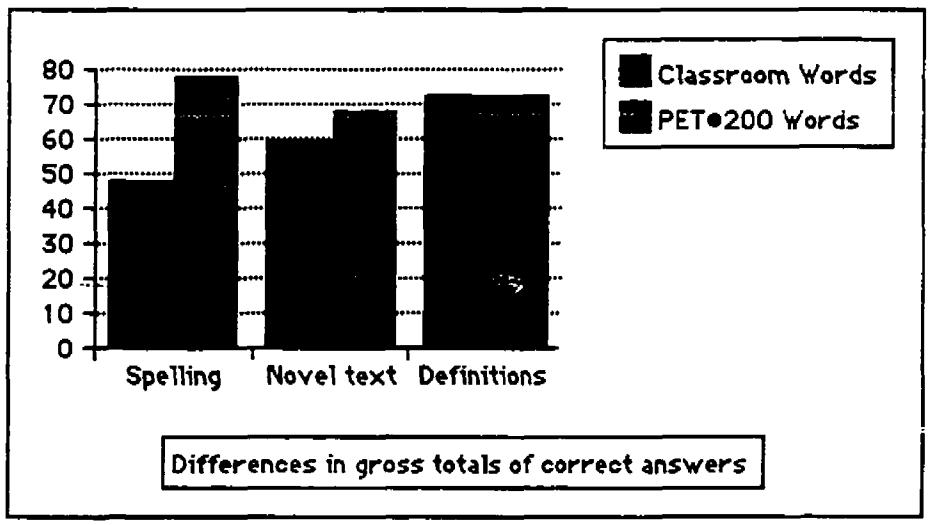
Figure 9.6 Spelling by class v computer



help them learn spellings. When the spelling-words on the quizzes are traced back to their learning sources, the mean spelling score over the term for the 11 students is 48% (SD 8.7) for classroom words, and 78% (SD 15.9) for PET•200 words ($p<.05$). Figure 9.6 shows this difference week by week.

Third, transfer to a novel text: a similar but weaker version of the spelling pattern obtains when the right and wrong answers are traced back to where the words were learned. The weekly quizzes contained a total of 646 gaps requiring classroom words, and 621 requiring computer words. The subjects' success with classroom words was 381 correct for 646 gaps, or 59%, with PET•200 words 422 correct for 621 gaps, or 68%. The two comparisons are depicted in Figure 9.8.

Figure 9.7 Gross media comparisons



It is not worth the trouble to trace this information down to the level of individual testees or even tests, because as stated above the comparison of

class vs PET•200 words could not be controlled for either number of words taught or instructional method in the classroom.

Within media comparison: A concordance effect?

However, it was possible to control for whether concordance was having any role in producing the 68% success rate on the text task. Given the difficulty of separating control from treatment groups in the SQU setting, it was necessary to set up a control comparison within the program itself, through a strategy known as "versioning" (discussed by Malone, 1981). PET•200 was coded so that there were effectively two versions of the program residing together, one giving the students concordances and the other not. The program could be branched to either version by the designer or operator, but not the student.

The control version of PET•200 is as follows. Part 1 gives the student a single complete-sentence example to help him choose the short definition, rather than a concordance, as shown in Figure 9.8. The sentence is merely the first line of concordance for the word, delivered as a complete sentence rather than a chopped-off line. After Part 1, when the correct definition has been chosen, all subsequent activities use the definition as the main information for choosing or constructing answers. Figure 9.9 shows a student trying to spell "burglar" with a definition where the concordance would have been.

Figure 9.8 Part 1, control version

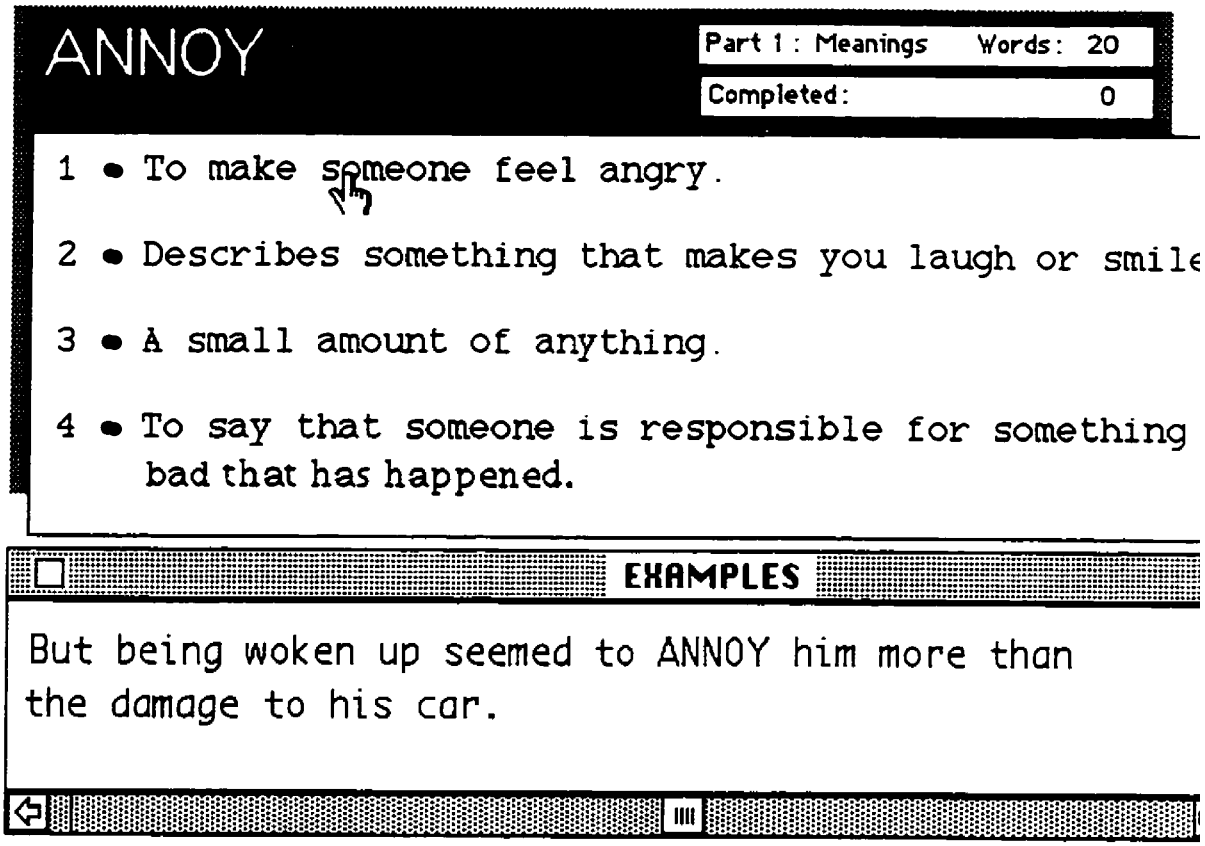
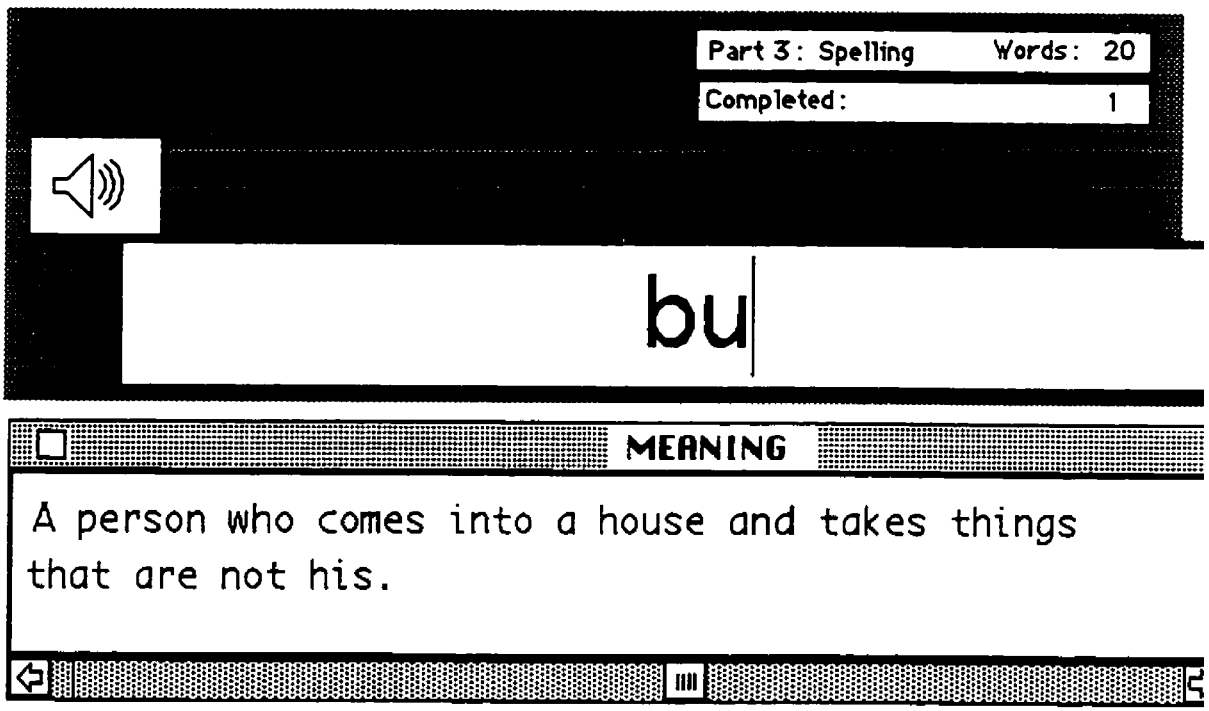
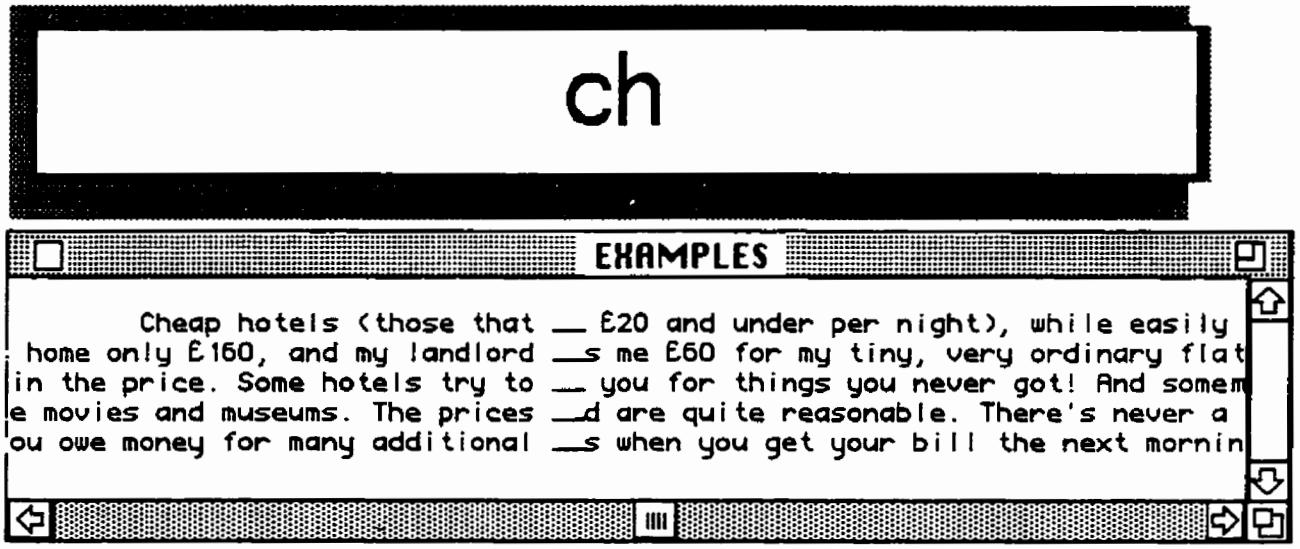


Figure 9.9 Part 3, control version



As a reminder, Figure 9.10 shows the same task for the word "charge" using the experimental concordance version. In the control version, students never see a concordance, just the definition that they see in Part 1 of either version, plus a single example sentence. So the only difference between the versions is concordance yes or no, which of course could entail a further difference in amount of effort expended reading.

Figure 9.10 Part 3, experimental version



In the pilot run of PET•200, the two versions ran on alternate weeks (week 1 definitions, week 2 concordances, and so on). In this arrangement, the same people used both versions of the system. At the end of 12 weeks, six weeks of definitions work could be compared to six weeks of concordancing, and any concordancing effect could be isolated.

Results

On the spelling task, the two versions produced no differences in weekly quiz scores. This can be seen in Figure 9.6 above, where there is no regular

week-on week-off zig-zag in the top line, as there would be if viewing a concordance had any effect on learning the spellings. But the two versions produced significant differences in both scores on the text task of the quizzes and on amount of program use.

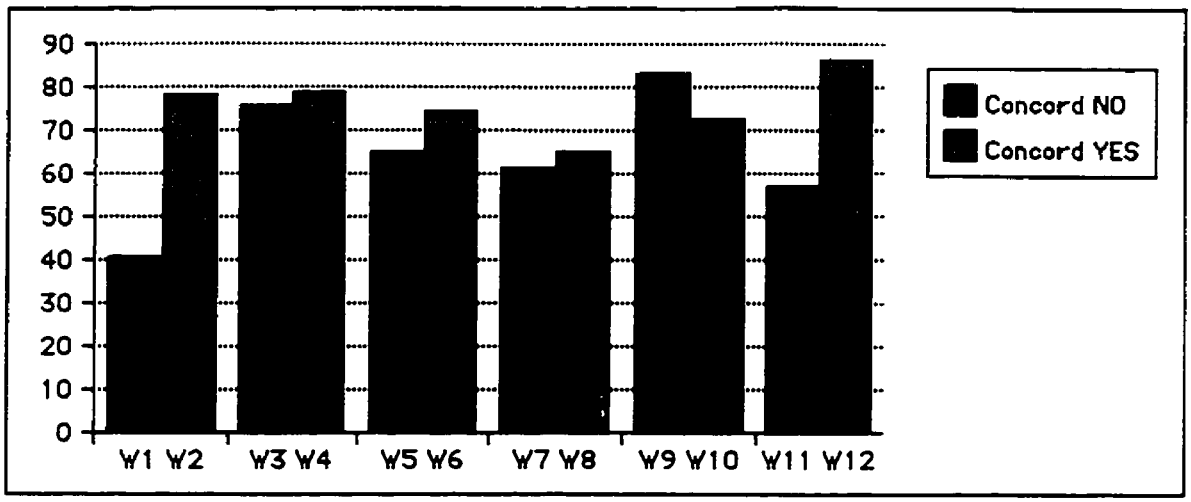
The block of 68% of correct answers on the text task was subdivided according to whether the definitions or concordance version of the program had been used in a particular week. Without concordance, students produced 228 correct out of 357 possible answers, or 63.9%. With concordance, they produced 194 correct out of 264 possible, or 75.9%, a mean concordance effect of 12% as shown in Table 9.1.

Table 9.1 Gross concordance effect

	Concord NO		*Concord YES*	
	Wk1	40.9	Wk2	78.2
	Wk3	75.8	Wk4	78.8
	Wk5	65	Wk6	74.5
	Wk7	61	Wk8	65
	Wk9	83	Wk10	72.7
	Wk11	56.8	Wk12	86.4
Mean	63.9%		75.9%	
Std Dev.	14.8		7.1	

The difference between means was greater than chance ($t = 1.8$, $p<.05$) A graphic representation of the week-by-week data in Figure 9.11 emphasizes the small but persistent concordance effect (although with one reversal).

Figure 9.11 Mean differences over 12 weeks



Viewed in terms of individuals, this information assumes a similar shape. Eight of 11 students in the remedial class averaged higher scores on the text task over 12 weeks when using the concordance version:

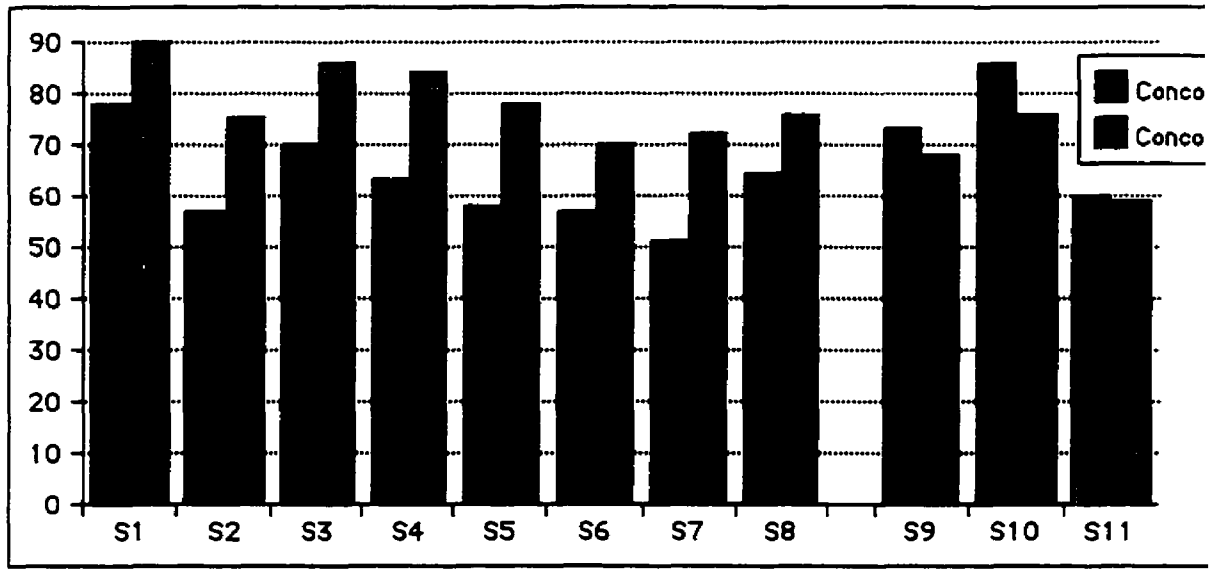
Table 9.2 Concordance effect by individuals

	Concord NO	*YES*
S1	78	90
S2	57	75.5
S3	70	86
S4	63	84
S5	58	78
S6	57	70
S7	51	72
S8	64	76
S9	73	68
S10	86	76
S11	60	59
Mean	65.2	75.9
StDev.	10.5	8.7

The mean scores are 65.2% without concordance, 75.9% with, a significant mean concordance effect of just under 11% (t= 2.59, p<.05). Figure 9.12 shows this information in graphic form. The graph shows that 8 of the 11 students (73%) were substantially aided by the concordance information.

The 3 students out of 11 (27%) who did better without concordance nonetheless did well enough with it.

Figure 9.12 Concordance effect by individuals



Higher scores, less work

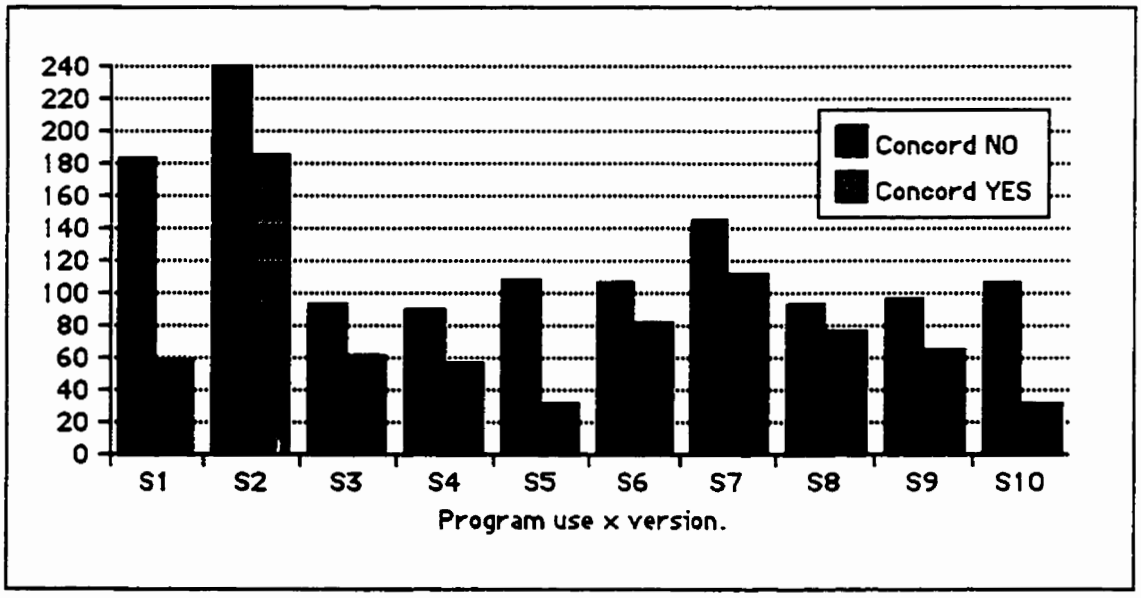
The two versions of PET•200 also produced significant differences in amount of program use. Unexpectedly, when amount of student interaction with PET•200 was plotted against program version, it was revealed that students consistently interacted less with the tutorial (answered fewer questions etc) when concordance was the information source—a lot less, close to half. Table 9.13 shows the kilobyte sizes.

Table 9.13 Byte-size of dribble files by version

	Concord NO	*Concord YES*
S1	184K	59K
S2	240	185
S3	94	62
S4	90	56
S5	109	31
S6	106	82
S7	145	112
S8	93	76
S9	96	65
S10	107	32
Mean	126.4K	76K
St Dev.	49.5	44.9

The difference in means is greater than chance ($t = 2.38$, $p<.05$). Figure 9.13 represents the same information graphically.

Figure 9.13 Paradoxical pattern of use



Putting it all together, with a concordance available students seem to learn words 10% better using the system half as much.

Why? It is tempting to think that fewer clicks and keystrokes means more time spent reading concordances, contemplating multicontextuality, integrating meanings, etc. This might be the case if students were spending equal time on both versions of the program. In fact, this appears to be the case. The dribble file time logs reveal that students spent an average of ten hours using PET•200; the 600 minutes broke down into 309.6 minutes on the no-concordance version and 260.4 minutes on the concordance version, a difference no greater than chance ($t = 1.36$, $p>.05$). So between equal time and unequal activity there seems to be a space for more reading, which in turn ties to better word learning.

Conclusion

Even lower-intermediate learners seem able to pay attention to a concordance and can get useful information from it. Concordance information has no effect on knowledge of a word's spelling, which is non-semantic, but does have an effect on whether the word can be used in a novel context. So it appears that the multi-contextuality offered by several lines of concordance for the same word has the effect of producing transferable word knowledge—in Sternberg's (1987) phrase, multi-contextualization produces decontextualization, or transferability. This is an initial indication that there is a basis for developing a fully fledged corpus-based tutor that would test the concordance effect on a larger task.

The information gleaned from the development and evaluation of PET•200 will be fed into a full-scale corpus-based tutorial, which will increase the learning load from 240 words per term to 2400.

CHAPTER 10

PET•2000: CORPUS, ARCHITECTURE, INTERFACE

Several findings from the study of PET•200 augur well for the development of a larger scale lexical tutor. Students used the tutor a lot, in their own time; they tended to use it fully, not just as a source of cheap definitions; the quality of learning was at least equal to that of the classroom; and the pace of lexical growth was faster than is normally expected. Most interesting, it appears that the concordance information was useful. From this base-camp, an attack on the complete 2400 words and beyond can be mounted.

Novel issues: rising variance

And yet expanding PET•200 into PET•2000 is not straightforward. In the review of lexical tutors in Chapter 5, there is often a problem getting beyond the 1000-word mark, as massive amounts of hand-coding loom up whether in a pregnant contexts or definitions approach. But a further problem for lexical tutors at about this point is the exponential growth of variance in the learning task. In PET•200, it could be assumed that learners (with about 500 words) needed all the words on offer; but now, with about 1000 words in their heads and at least 500 more needed to reach Band 4 range, there will be enormous variation in the 2000-level words known, semi-known, and unknown, even for students who have completed an identical program of instruction.

This variance in vocabulary knowledge was originally documented by Saragi, Nation, and Meister (1978), and confirms the incremental nature of the learning process. The finding was replicated with SQU students graduating from Band 2/PET•200. The method was simply to check variance in students' knowledge of the 18 items used at the 2000 level of the Levels Test. The subjects are the same 11 students whose efforts were followed in the previous chapter, whose Levels Test scores had just risen to more than 1000 words, roughly 9 out of 18 items. Figure 10.1 shows the extent of the variance.

Figure 10.1 Task variance at 1000 words

	Student											Number of Ss from 11		
	1	2	3	4	5	6	7	8	9	10	11	who know each item		
Item 1	√	√	√	√	√						√		6	
2	√	√		√	√								4	
3	√	√			√		√						4	
4	√				√	√	√	√	√				6	
5		√	√	√	√		√						5	
6	√		√	√	√	√	√	√		√			8	
7	√	√		√	√	√		√	√		√		8	
8			√										1	
9	√	√	√	√		√	√	√		√	√		9	
10													0	
11	√	√	√	√		√			√	√			7	
12	√	√					√	√		√			5	
13	√	√	√	√	√	√	√	√	√	√	√		11	
14			√	√	√	√	√	√	√				7	
15	√	√	√								√		4	
16	√	√	√	√	√	√	√	√	√	√	√		11	
17	√	√	√	√	√	√		√	√	√	√		10	
18						√			√				2	
Number	13	12	11	11	11	10	9	9	8	7	7	9.82	6.24	Means
of words from 18												1.99	3.15	S.D.
known to each S														

On average, each student knows 9.8 words out of 18, and each word is known to 6.2 students. In other words, each student knows about half the words, and each word is known to about half the students. By extrapolation, a common core of about a quarter (1/2 x 1/2) of the 2000, or only 500 words, is shared by students who know 1000 words. So as the number of words known increases, the proportion of overlap shrinks, at least in early stages of lexical development.

Of course, the variance in words known is only a fraction of an even greater variance—words yet to learn. Of the 2000 words, 1500 are outside the core of words known, despite the fact that each student knows 1000! In other words, it is no longer possible to say with any confidence which words a learner needs to learn, and select, say, 500 target items for direct instruction. This variance problem appears to be quite universal, and could be a reason that the coursebooks examined in Chapter 6, and the hand-coded lexical tutors examined in Chapter 5, suddenly give up on systematic treatment of new vocabulary shortly after 1000 words. However, the learning need does not end at 1000 words, and there is no real reason for a computer tutor to end there either.

Absorbing variety

One computer solution to the variance problem would be to put the entire 2400 PET list in students' hands, attach it to a sizable corpus at a suitable level, and let students decide for themselves which words they know and don't know. This in fact is what is proposed for PET•2000, and a question to be answered in a later chapter is whether students at this level have

enough awareness of what they know and don't know (lexical metacognition) to justify this way of proceeding.

The instructional design task is to integrate the 2400-word list, a matching corpus, and some text-reconstruction activities within a computer tutorial that students can understand and use. The research design task is to isolate the concordance format as an independent variable to the extent possible, in line with the goal of confirming a definable effect for the experimental treatment. Many of the exploratory studies of concordancing described earlier as inconclusive failed to disentangle the experimental treatment from other variables inherent in the technology. Often three novelties enter into subjects' lives all at the same time—the concordance format, massive authentic texts, and complex entry and interaction modes—with the effects of the separate variables not easily discerned. Fortunately, to some extent the instructional and research design tasks coincide: a level-controlled corpus and a mouse-driven entry will probably make the tutor easy for the students to understand and use, and in addition allow for isolation of the concordance format as experimental treatment.

Novel issues: Large quantities

For either design task, the sheer size of both wordlist and corpus presents some challenges. First, with an offering of 2400 PET words, any hand-coding becomes not just laborious but effectively impossible. Devising a corpus that would contain, say, three hand-coded pregnant contexts for each of 2400 words, would be a labour of many months. The procedure for generating short, corpus-based definitions for PET•200 would no

longer work with the larger numbers either. The beginners' corpus was small enough to be examined for all instances of a word, and then a short definition could be devised to encompass all of them. But now, any corpus large enough to provide even a few examples for each of 2400 words will also be large enough to contain more senses of some of them than can be encompassed by any definition that 1000-level students would have the patience or skill to read.

Second, an access problem emerges as wordlist and corpus grow. To be useful to these students, the tutor must be able to develop many concordances over the course of a half-hour session, which means fast, easy access. Many concordance interfaces such as MicroConcord deliver their information rather slowly on school-sized machines. One reason is their massive corpora, such as MicroConcord's two bundled corpora which are a million words apiece. Speed of access depends on how the corpus is handled by the concordance routine (discussed below), and on how big it is. It is normally thought that only massive, slowly delivered corpora are adequate to guarantee several exemplifications for each word, but the approach here will be to develop a smaller, faster corpus with the aid of text analysis programs.

Computer-assisted corpus development

The corpus developed for PET•200 would be too small for an assault on the remainder of the 2400-word list. With PET•200, because of the limit on the number of words to be taught, almost any 20 texts at the right level would have yielded a suitable list of 240 words unlikely to be known to the

students, each with a few exemplifications. But 2400 words will need a far greater number of texts to ensure a few examples of each word. The corpus initially proposed for PET•2000 was simply all the main texts the students' courses currently exposed them to, about 200 pages. These texts would be thematically familiar to the students, and the lexis presumably controlled.

But is the lexis controlled? Although we have seen that many language materials give up on systematic vocabulary shortly after 1000 words, this does not mean they do not contain vocabulary beyond that level. If they contain large numbers of low-frequency words, this will stand in the way of comprehension and learning new words from contextual inference. Here is a passage from Headway Intermediate (Soars and Soars, 1991), used as PET preparation for commerce students size-tested at just over 1000 words. The words underlined are words identified by a text analysis program as being outside the PET 2400 list (i.e. words that would be opaque to a reader who already knew the 2400 words):

> ... The Observer newspaper recently showed how easy it is, given a suitable story and a smattering of jargon, to obtain information by bluff from police computers. Computer freaks, whose hobby is breaking into official systems, don't even need to use the phone. They can connect their computers directly with any database in the country. Computers do not alter the fundamental issues. But they do multiply the risks. They allow more data to be collected on more aspects of our lives, and increase both its rapid retrievability and the likelihood of its unauthorized transfer from one agency which might have a legitimate interest in it, to another which does not. Modern computer capabilities also raise the issue of what is known in the jargon as 'total data linkage' the ability, by pressing a few buttons and waiting as little as a minute, to collate all the information about us held on

> all the major government and business computers into an instant dossier on any aspect of our lives (p. 74).

Out of 167 words, 30 are beyond the basic 2400, let alone beyond the basic 1000 words. This is a density of 1 difficult word in 5, absurdly out of touch with Laufer's (1992) finding that 1 in 20 is where contextual inference becomes feasible. Such absurdities in fact abound in commercial textbooks. This type of text is unlikely to teach very many words to our subjects, so no straightforward adoption of scanned course texts was possible.

Admittedly, few texts will be found that present new words in the ideal ratio of 1 unknown in 20. Even the best-designed texts in the world will still leave learners with 1000 words in the paradox of trying to learn many words from contexts that themselves contain words that are unknown or semi-known. Yet, this paradox is one that every child somehow breaks out of over the decade of first-language acquisition.

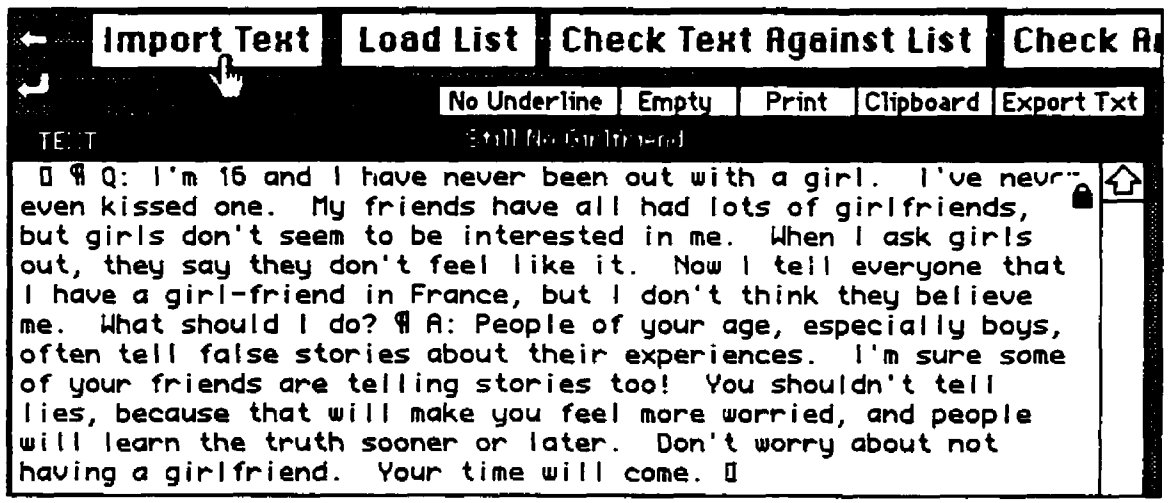
A couple of things can be done to resolve the paradox in a more restricted time-frame for second-language learners. First, as discussed above, a concordance allows learners to negotiate input, by searching through several contexts and finding one that makes sense to them (has a high proportion of the 1000 words they happen to know). Second, texts from the students' course can be constrained without too enormous a labour to the 2400 PET words themselves. Then, as expansion takes place beyond the 1000 level, the words that have been learned will feed into the contexts for learning yet others, initiating positive feedback.

These two measures might provide an escape-hatch. Whether they do is a question to be answered in a later chapter.

What is needed, then, is a corpus built from the students' course texts, but with its lexis restricted to the PET wordlist. One would think that the computer could help in this, and indeed a program called EspritDeCorpus (Cobb, 1994b) has been developed to do so. Once the entire corpus of course books was recoded in electronic form, EspritDeCorpus checked every word against the PET list, tagging any that were off-list. Of course, such word-matching programs are simple to write, but notoriously inaccurate when dealing with word families ("look" is in the list, but the program tags "looking," and so on). The usual solution, and the one adopted here, is to automate the tagging process as much as possible but leave a space for a human flagman at the choice points.

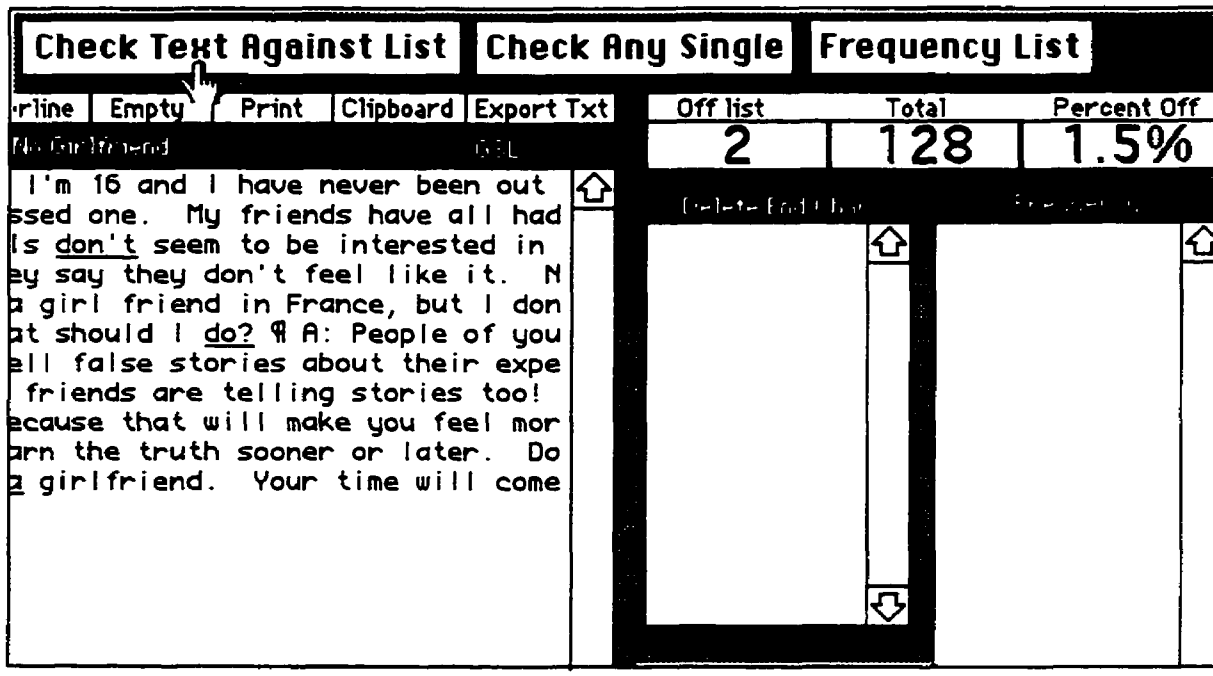
EspritDeCorpus brings in a candidate text from a hard disk or network:

Figure 10.2 Computer-assisted corpus building



Then a wordlist is loaded into memory, in this case the PET 2400 list, and the text is checked against the list:

Figure 10.3 Interactive vocabulary control



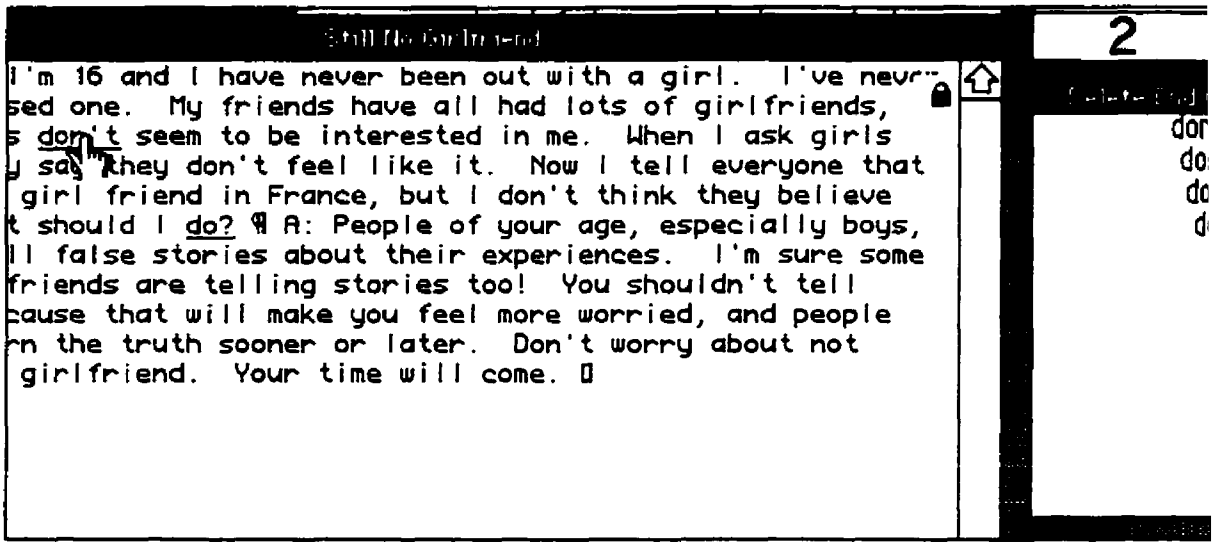
Here EspritDeCorpus has found two words from 128 that are off-list, 1.5% of tokens in the text, so the text looks suitable as a source of contextual learning for the subjects.

However, the program makes some mistakes. In the illustration above, "don't" and "do?" are erroneously tagged as off-list merely because of some bits of punctuation attached to them, and are easily dismissed. But the program could make some more serious errors that would cause part of a text to be rejected needlessly. The program might tag "running" as off-list, although "run" was on-list; but since "+ing" is a morphological change these students could be expected to know (Bauer and Nation, 1993), then it is not necessary to reject "running." Some simple morphologies are built

into EspritDeCorpus (it counts any listed word "+s" as a listed word), but for complex cases it is cheaper to bring in a human than to precode every acceptable variant.

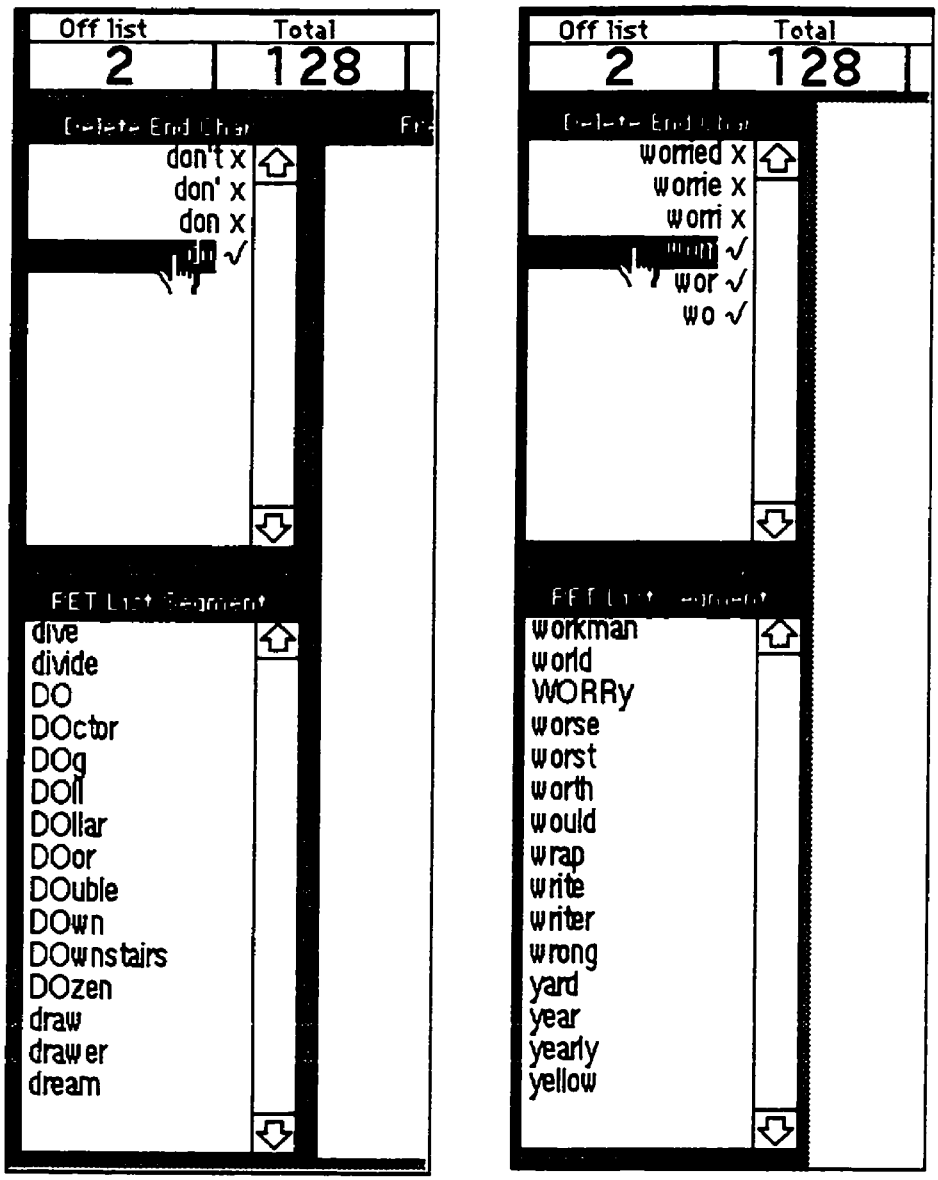
Man and machine decide on tough cases interactively. If there is some doubt about whether a word or some form of it is a PET word, then the operator clicks on it with the mouse, and in another window the string is trimmed back through end-character deletion until either a stem is found that appears in the PET list (and it gets a "√"), or else the word disappears:

Figure 10.4 Man-machine decisions



"Do" is clearly on the PET list, so "don't" can be assumed to be also, although literally it is not. In cases of ambiguity, clicking on a string in the checklist itself allows the operator to make a match with the relevant segment of the PET list. The "do" example is banal, but in the case of a word like "worried," this method allows an operator to find out quickly whether or not "worry" is a PET word (Figure 10.5).

Figure 10.5 Volume list comparisons



With the operator satisfied that an underlined word is merely a variant of an on-list word, he can click on the word again, removing the underlining and updating the percent-off-list figure.

By this method, a sizable text can be checked in less than a minute. The goal is to reduce the percentage of off-list words to one or two. If there is a

particular paragraph that contains a large number of infrequent words, the operator may decide to delete the section (since these texts will not be read continuously anyway). Or, he can decide whether the text can survive with a few words deleted, perhaps with a small amount of re-writing. This method of corpus control has proven very efficient, and a corpus of about a megabyte can be checked and adapted in about a day.

The coverage issue

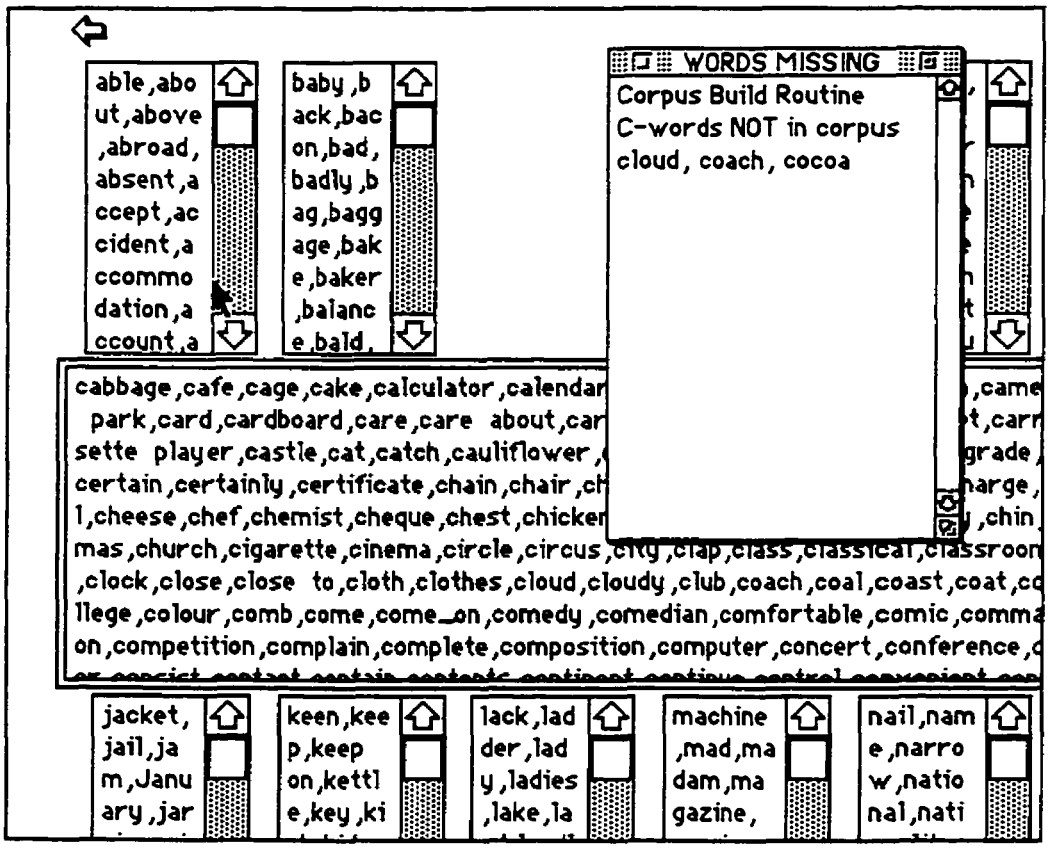
Getting the wrong words out of the corpus is one challenge, getting the right ones in is another, and in enough times is yet another. As discussed above, each PET word should be met in at least three or four contexts. Of course more would be better.

In fact, is three or four enough? In a study of English speakers learning the "nadsat" vocabulary of the novel A Clockwork Orange (Burgess, 1962), Saragi, Nation and Meister (1978) measured word learning against number of occurrences of each word in the text, finding about 16 occurrences needed for high quality learning and a cut-off at 5, below which little learning took place. However, these subjects did not know they would be tested on the words, so their learning was entirely incidental, as would not be the case with users of a lexical tutor. Also, they were meeting the words spaced throughout several hours or days of reading, not in several contexts together. So it is not certain that two or three occurrences are not useful when time-collapsed in an intentional learning activity. The corpus built for this experiment is clearly in the nature of a trial.

Given that many commercial coursebooks abandon systematic vocabulary instruction after 1000 words, yet at the same time contain large numbers of low-frequency words, it is perhaps not surprising that in one final area they are also deficient. Even a year's worth of readings does not necessarily yield even one example, let alone three, for many of the 2400 most frequent words. So these words must be found and worked into the corpus. Once again, however, the computer's matching power can reduce the task-size. The program required for this task is EspritDeCorpus running backwards, which checks the corpus for missing PET words.

The illustration below shows PET•2000's lexical database, with EspritDeCorpus finding "C" words missing from the corpus:

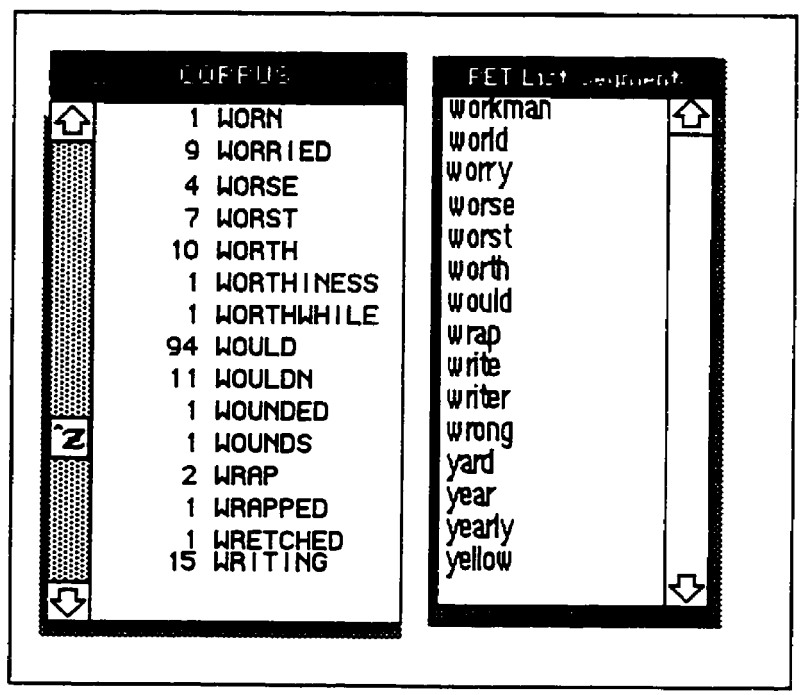
Figure 10.6 Coverage check



The solution to a missing word is usually to hand-code a few items into the corpus, and once again the computer can help. For example, if PET-word "cocoa" is missing, it is a simple matter for EspritDeCorpus to run a search of the corpus for "drink" or "tea" and find a place where the missing beverage would fit without sounding contrived. For example, "We went home after a cold day and warmed up drinking tea..." can easily bear the addition of "and cocoa."

Once again, there is the problem knowing whether a word is missing or merely present in another morphology (say, "worry" is absent but "worries" is present). A way of checking for this information is simply to run a concordance on the corpus, matching its frequency list against the relevant segment of the PET list. Below, for example, it becomes clear that although the corpus does not actually contain PET-word "worry," the word actually appears nine times as "worried."

Figure 10.7 Family search



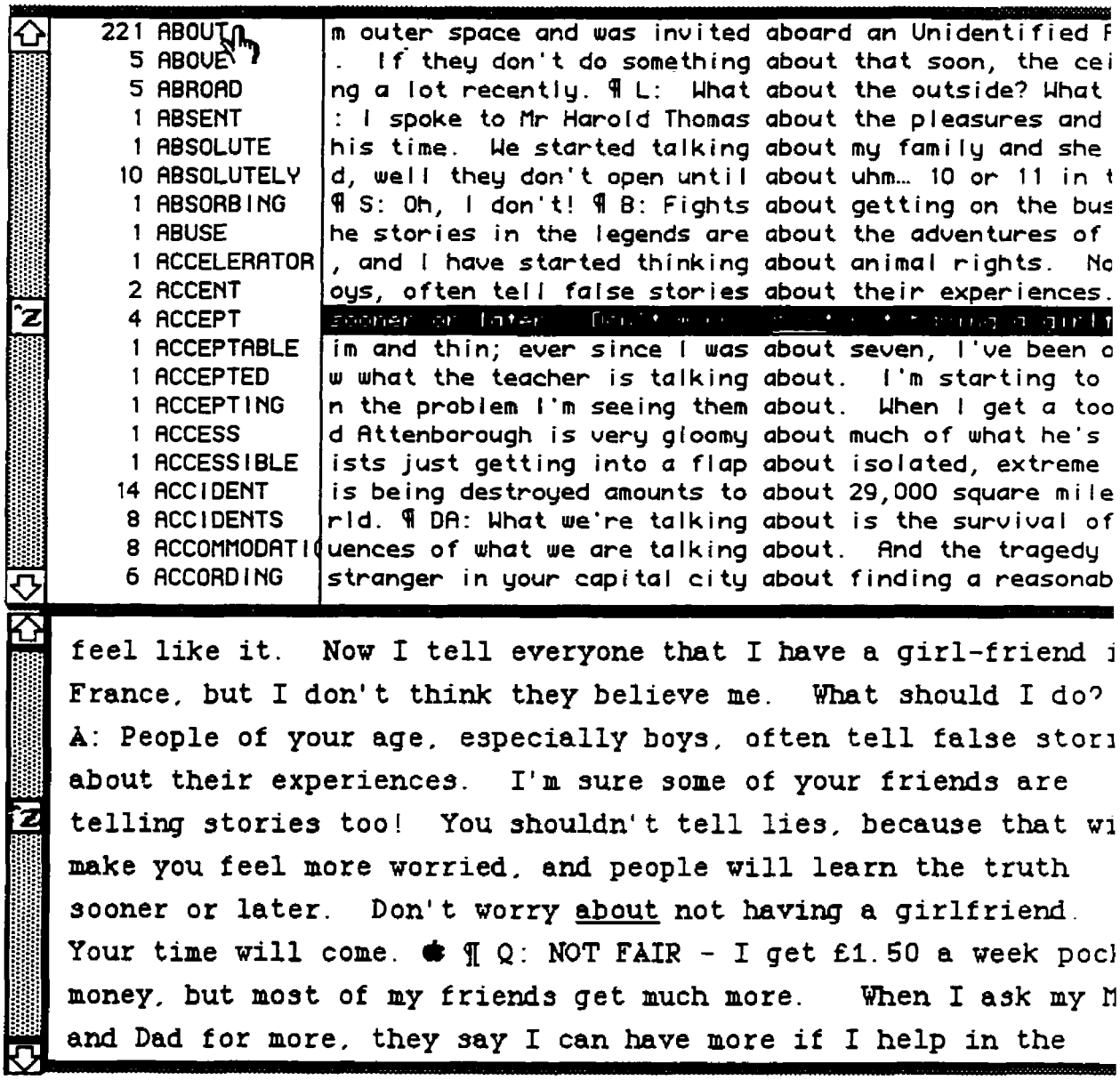
With these technical aids, it becomes manageable to build a relatively small corpus with 99% of tokens within the 2400 range and each PET word exemplified at least three times. It is a task of a working week, compared to the enormous labour to grow LEXIQUIZ from 500 to 2000 words (an additional 1500 short definitions and matching example sentences required), or Coady's tutor from 1000 to 2000 words (an additional 1000 dedicated definitions required) or Beheydt's tutor from 1000 to 2000 (an additional 4000 dedicated pregnant contexts required).

The access-speed issue

Sophisticated concordancers like MicroConcord allow numerous coding options; one can find all the instances of "come" that have "back" in the environment, and so on. While this is undoubtedly useful for a linguist, course designer, or certain type of learner, it is expensive in access speed. The flexibility is purchased by generating concordance listings from scratch, which takes a relatively long time. The idea of PET•2000, however, is to allow students to search through a corpus rapidly, for example checking briefly to see whether a particular word is already known, not necessarily pondering each and every concordance listing. For this, high-speed processing is necessary, and speed can be increased greatly if the program does not have to generate its concordances from scratch. A fixed-line concordancer pre-codes all its concordances for a specific corpus in advance and then displays them rapidly on command.

Such a high-speed concordancer is Texas (Zimmerman, 1988), which can generate a concordance for a high frequency item like "the" in less than a second, as compared to MicroConcord's ten seconds for the same item and the same corpus. TEXAS has been adapted as the program infrastructure

Figure 10.8 TEXAS, home of PET•2000



of PET•2000, and its main user interface appears in Figure 10.8. Top left is the frequency list for the entire corpus, to the right are concordance lines generated by clicking words in the frequency list, and below are source texts generated by clicking concordance lines. TEXAS solves the access-speed problem, and is entirely mouse-driven for ease of use.

Texas also has a number of convenient features for assembling texts into corpora and adding new texts to existing corpora. The pre-coding of concordance lines for a text of two megabytes takes under a minute. Zimmerman (1992) describes some of the progamming advantages of TEXAS that make it particularly suitable for exploring a variety of concordancing configurations and corpora. He highlights the advantages of TEXAS by indicating the disadvantages of other concordancers:

> All conventional database systems (that I know of) fall short in one or more ways:
>
> •they require "clean" input data, in highly structured formats;
>
> •they break down if applied to files larger than a few megabytes;
>
> •they are intolerably slow in answering simple queries;
>
> •they do not allow easy, interactive free-association and browsing;
>
> •they are not integrated with writing or programming tools;
>
> •they demand too much work to get data into the system;
>
> •they lack a user interface fit for an intelligent being;
>
> •they cost too much, or only run on expensive/exotic hardware (p. 46).

In other words, TEXAS is more flexible and easier to use for both developer and end-user. Ease of getting data into the system is particularly important for exploring the learning properties of the medium and of different kinds of corpora.

Interface design

While hugely easier to use and understand than MicroConcord, for tutorial purposes there are still several problems with the TEXAS interface. TEXAS presents the full frequency list for the corpus, but this would not be useful to give to students. It is easily seen that more words are represented in the frequency list than are actually on the PET list—since it includes the 1 to 2% of off-list words tolerated in corpus building ("abuse," "absorbing," and "access" in Figure 10.8). Over even a medium-size corpus, these stray words end up as quite a large number of single items, normally buried in the corpus but here given equal billing with PET words like "absent," "above," and "abroad." What the students need is the relevant sub-set of this list, not the whole thing. Also, the TEXAS corpus lines are probably numerous enough to confuse students, yet too short to tell them whether the word is familiar or not.

The biggest problem is that the source text is unfriendly, starting not merely in media res but also verging midway into a different text. In fact, it is not much friendlier than a MicroConcord source text (Figure 10.9). Learners' needs for "white space" in screen designs may not be as great as was once thought (Morrison, Ross, and O'Dell, 1991), but TEXAS and MicroConcord source texts can both be predicted to overload most language learners. The problem is not so much the number of words on display as the lack of differentiation of different categories of words and kinds of attention asked for.

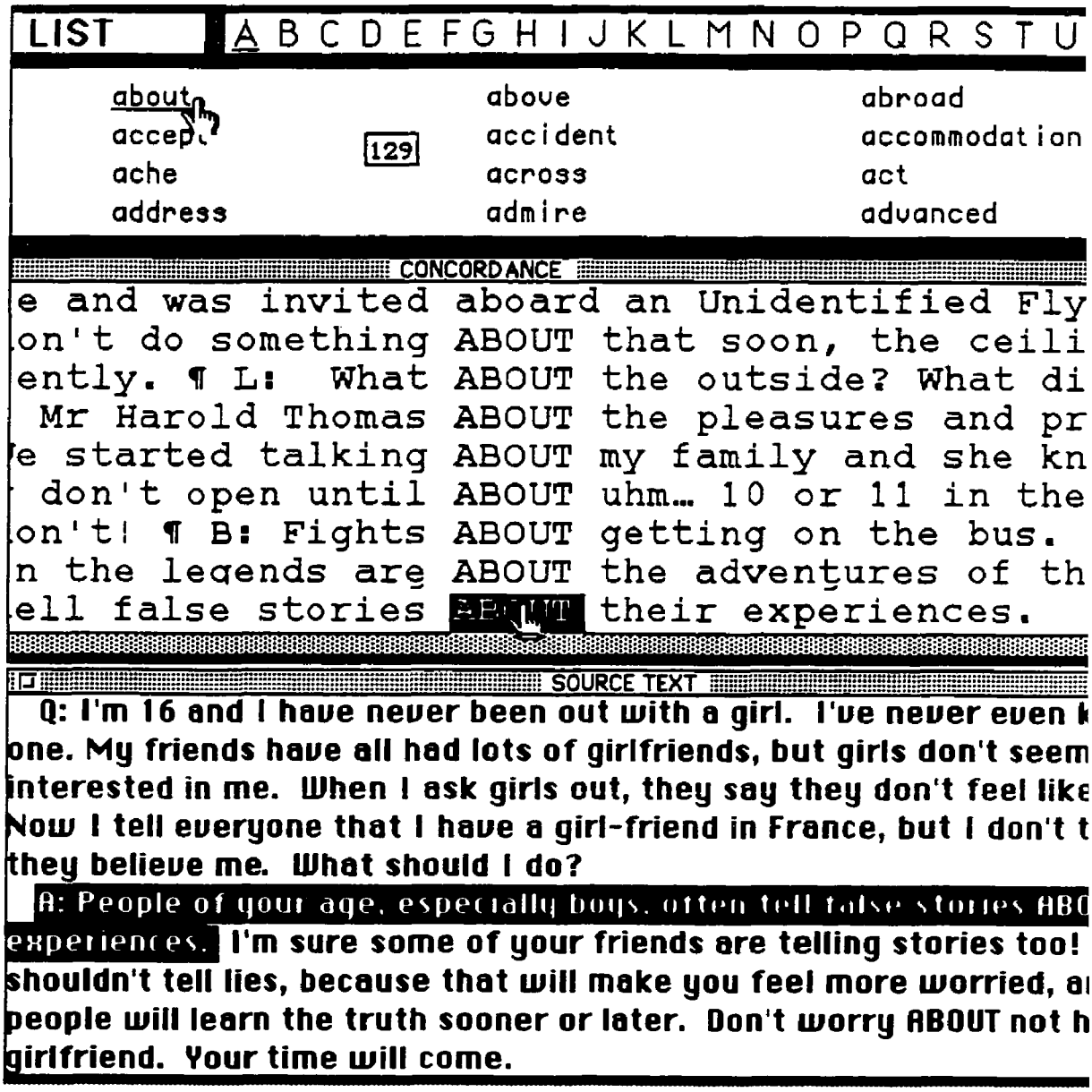
Figure 10.9 Find the hidden word

```
Esc back ═══════════ MicroConcord ═══════════ Press F1 for Help
50/1201 max.        SW: abstract              SORT first 1R then SW
1 MCB_APAR.ART                                case ignored
[■]
<ersonal discussions of literature, abstract and remote from my new interests>
D:\MCONCORD\TEXTS\MCB_APAR.ART byte 47,244
given up our apartment on Church Street and the old life it represented:
shopping at the coop, weekend bicycle trips to the youth hostels, Sunday
walks to the Riverdale and Rosedale ravines, and the passionate literary
meetings and debates that for five long years had enlivened our tiny gabled
living room.
<p> After my graduation I came back to Toronto to pack our furniture, sort
our books and destroy old letters and papers. Among the letters I destroyed
were those from John Sutherland and Raymond Souster. Their letters seemed
to me nothing but impersonal discussions of literature, abstract and remote
from my new interests in personality growth and change. Looking back, I can
understand my wish to be free of the clutter of unresolved debate and
mundane detail, but I regret the loss of these early exchanges for whatever
they might have yielded to fall out historical fact and recreate the
atmosphere of a unique period in Canadian literary history which has still
not been fully chronicled.
<chp>
Esc: back — Home: Top of File — End: Bottom — w: abstract
```

The PET•2000 interface (Figure 10.10) displays all the same information as TEXAS and most of the information of MicroConcord, but in a form calculated to be more congenial to the learner. The wordlist here is not simply all the words in the corpus, just those on the PET list. The corpus lines are fewer but wider (about 40% more than is visible here). The source text is a cohesive piece of text, beginning with a capital letter and ending with a full stop, with the target word and immediate context clearly identified. The overall amount of text on the screen is de-emphasized through the use of three colours and three fonts corresponding to three

types of information. It is never necessary to "go" to another screen. This interface is the first draft of a corpus tutor for lower intermediate students.

Figure 10.10 PET•2000 interface



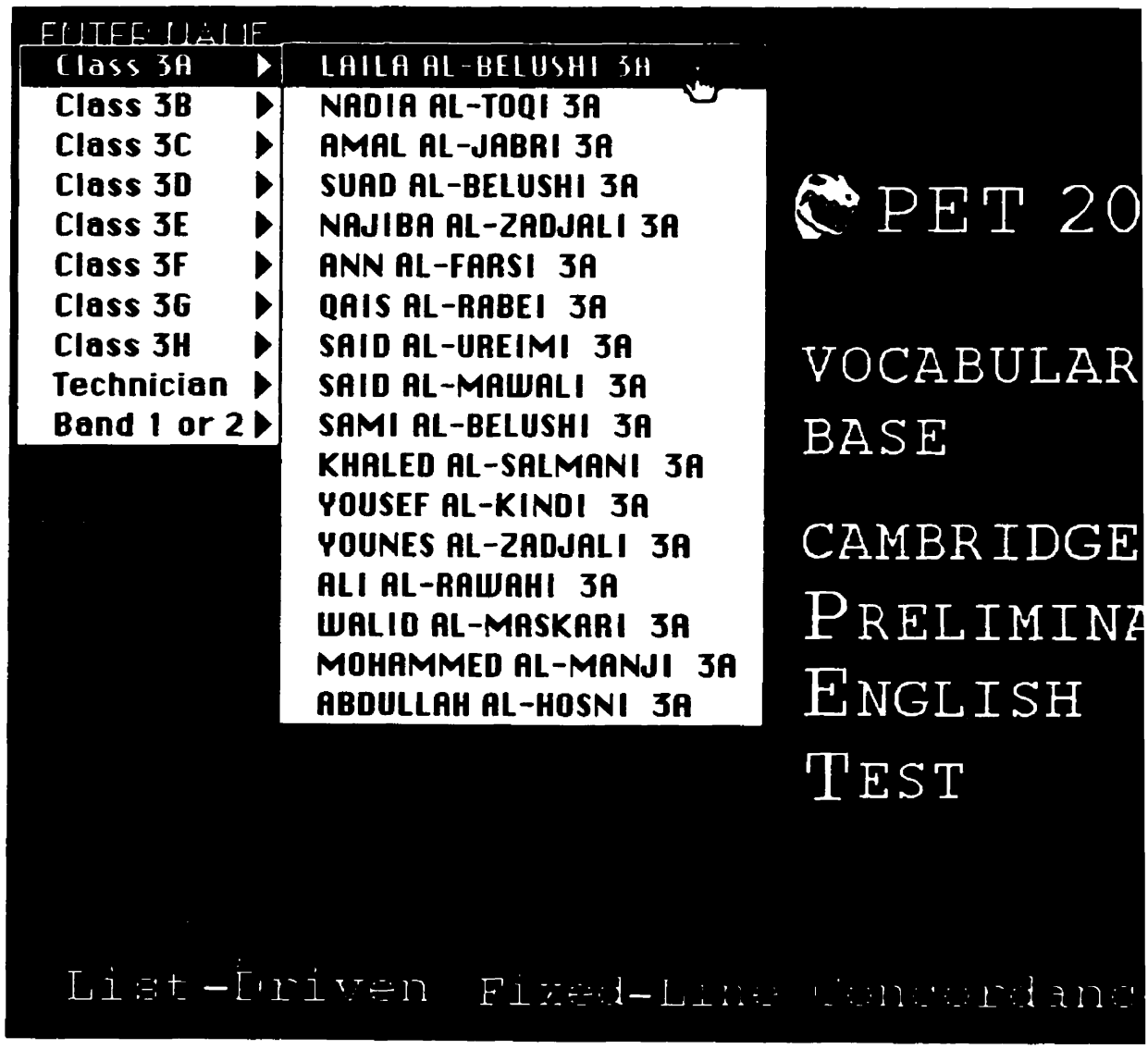
But technology and interface are less than half the job in any CALL project; it is in implementation that projects succeed or fail, and strategies for implementation are discussed in the next chapter.

CHAPTER 11

PET•2000: IMPLEMENTATION

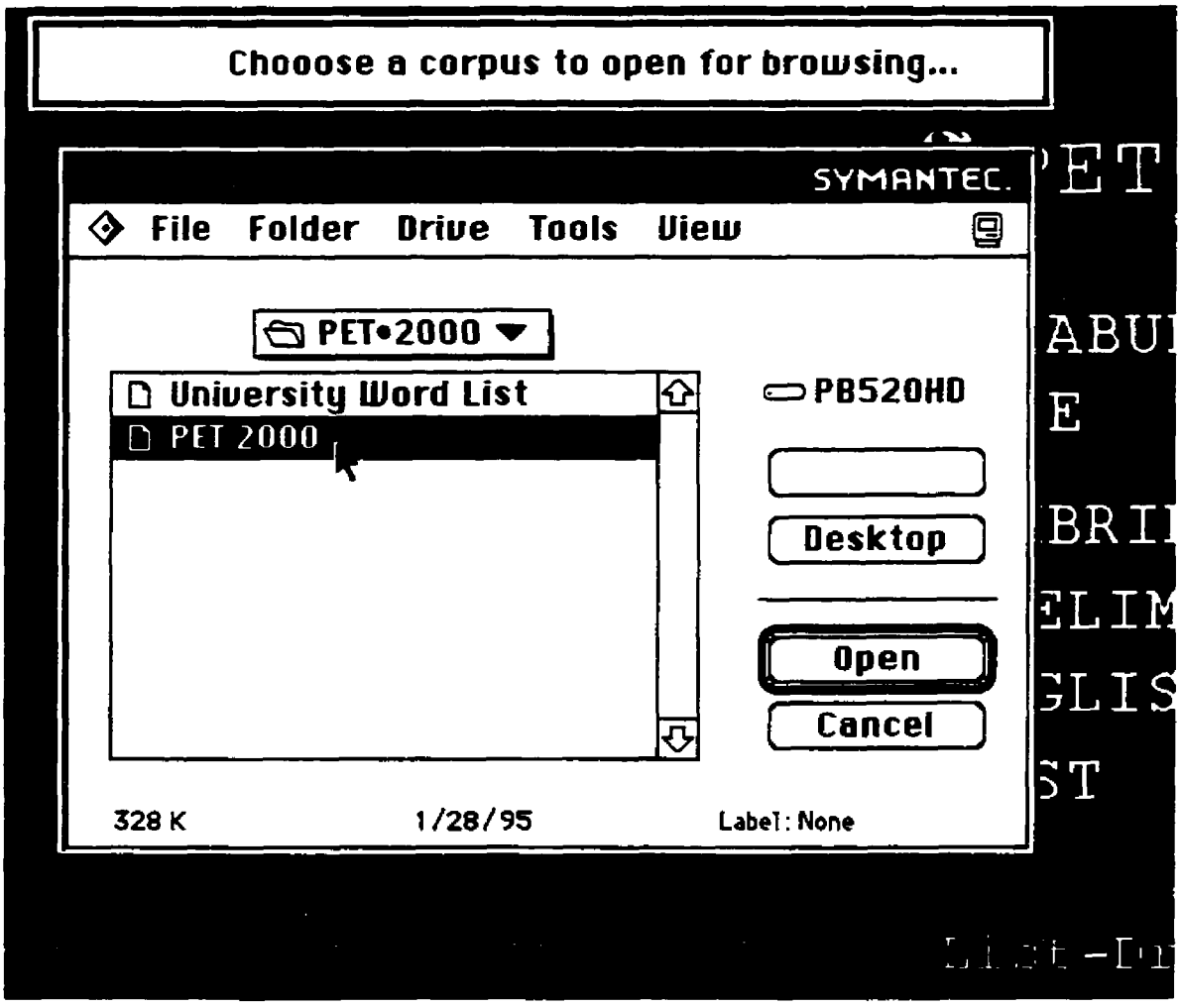
As in the discussion of PET•200, going through a run is the best way to pick up the design features of PET•2000 relevant to its implementation. On start-up, the learner enters her name and behind the scenes the program launches a protocol file:

Figure 11.1 PET•2000 - class and name entry



Then Laila is asked which corpus the program should access:

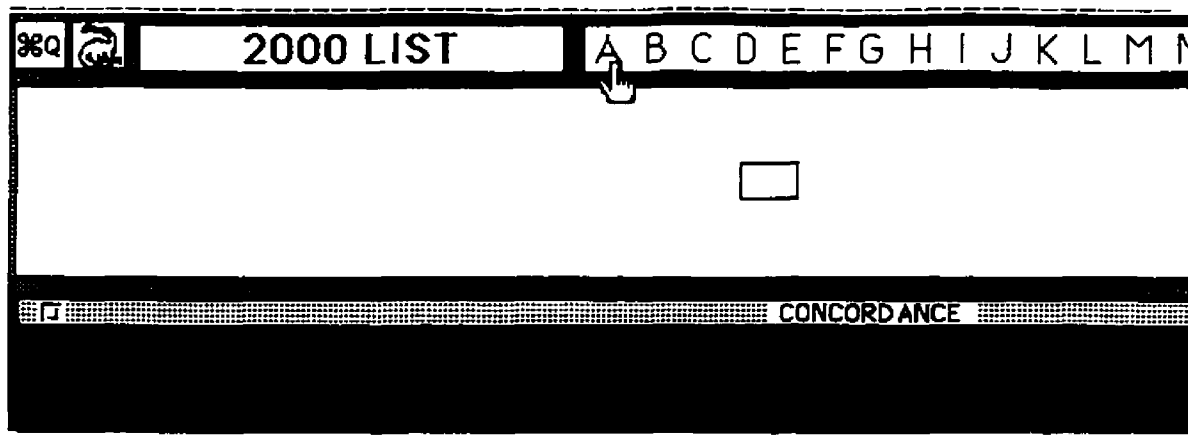
Figure 11.2 Choose a corpus



The choices are a 328-K corpus specially dedicated to the PET word list and a 1.5 MB corpus dedicated to another academic wordlist (for graduates of PET•2000). Other corpora could be offered at this point (1000-word corpus, medical corpus, business corpus, and so on).

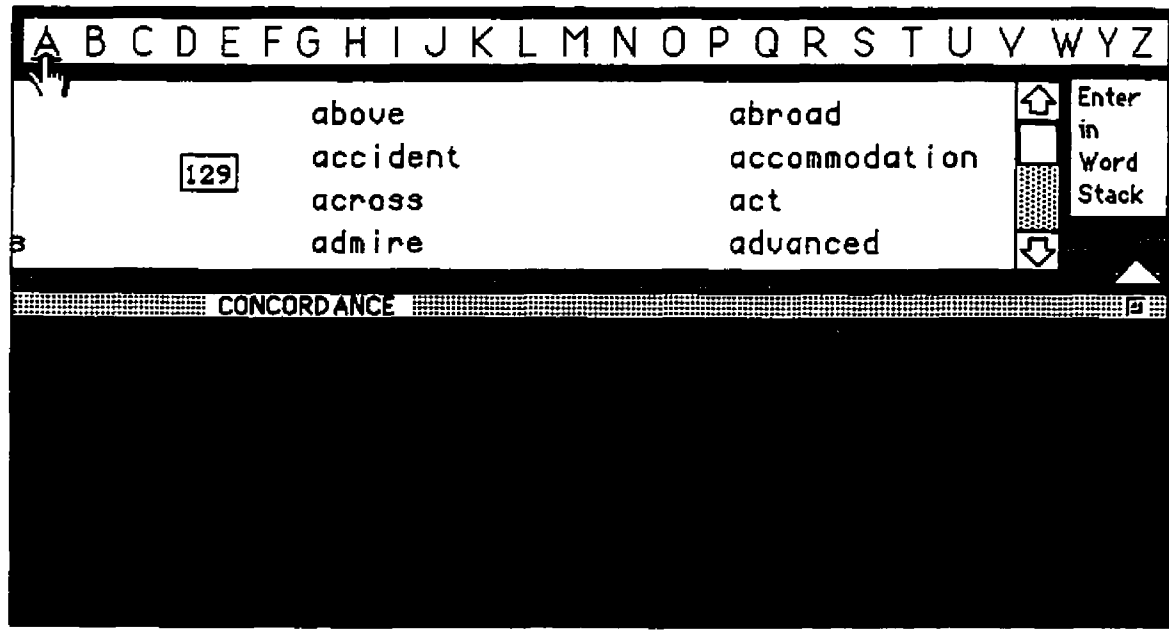
With a corpus chosen, the main interface appears, and Laila chooses an alphabetical range of the list:

Figure 11.3 Choose a letter



Clicking on any letter brings in the relevant list segment in a scrolling field, with the number of words in that letter indicated in the middle (129 words for "A"):

Figure 11.4 Choose a word



Clicking on any word underlines it, so the learner can keep track of what she has done, and then returns a concordance for the word:

Figure 11.5 Concordance for "accept"

```
2000 LIST   A B C D E F G H I J K L M N O P Q

        about                    above                abr
        accept      [129]        accident             acc
        ack                      across               act
        address                  admire               adv

                    CONCORDANCE
They spoke in a funny accent.  It sounded
e tennis schools which ACCEPT children fro
ll.  The students just ACCEPT what he says
he theatre, and didn't ACCEPT another film
ployer doesn't have to ACCEPT his responsi
inion is the situation ACCEPTable as it is
has to find one of the ACCEPTed labels to
It showed two Scotsmen ACCEPTing the offer
the people do not have access to safe wate
hnological times, more accessible than eve

                    ACCEPT
                    SOURCE TEXT
```

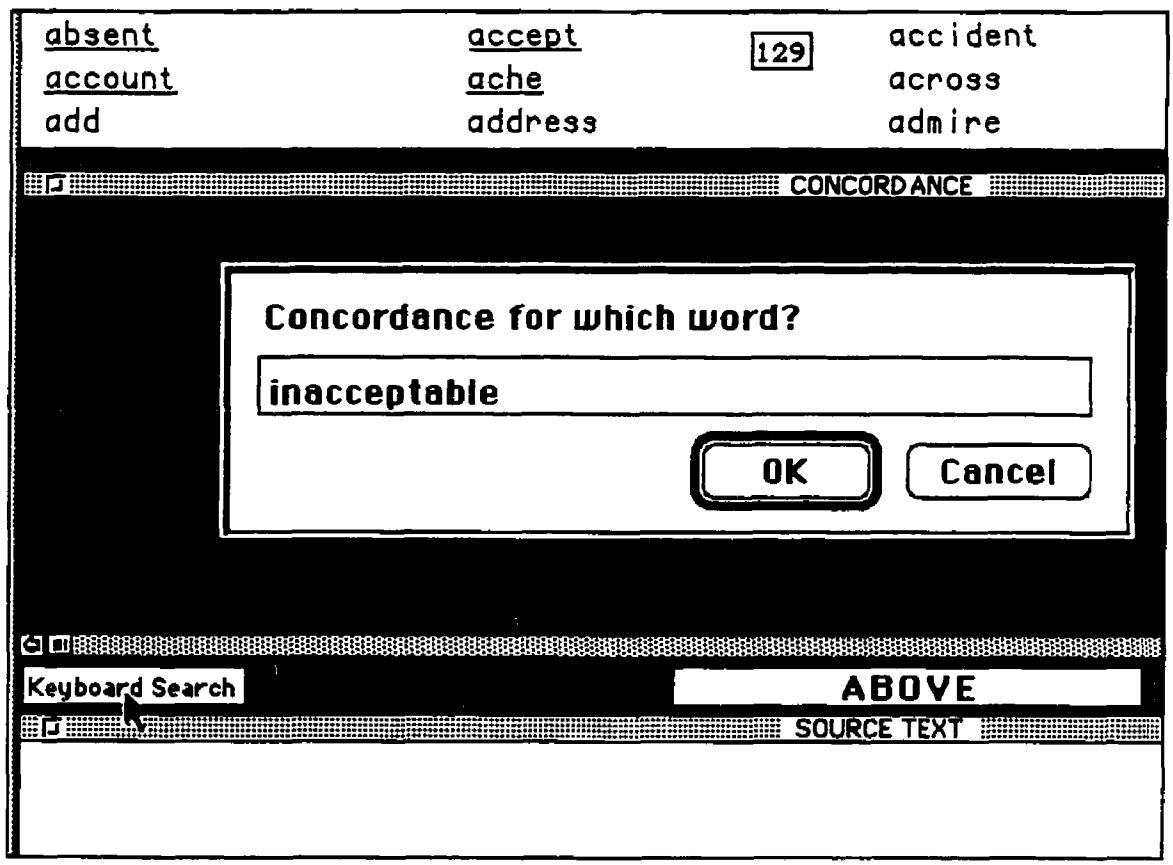
The concordances produced by TEXAS are not real-time generated, but windows on a pre-coded concordance for the entire corpus. The fixed-line architecture is fast, but means that students cannot request sophisticated searches. MicroConcord for example offers "wildcards," so that entering "accept*" will pull in "accepted," "acceptable," and so on. However, TEXAS often delivers such related-word information unsolicited, as in Figure 11.5. By contrast, if a MicroConcord user does not specifically ask for related-word information, the program returns a concordance for the exact string requested only. Students at this level are unlikely to request

related-word information, but they might make some connections if it is put in front of them.

Entry and navigation

The learner is not limited to concordances generated by the PET wordlist. There are two other options. One is keyboard entry for any word learners may be curious about, say about whether "inacceptable" or "unacceptable" was the way to negate "acceptable":

Figure 11.6 Keyboard search



Second, from within the black concordance window, any context word can itself be clicked to produce its own concordance, giving the concordancer a hypertext dimension. Students can browse through the corpus, random-associating their way through a cyber-lexicon of whatever words catch their interest. Looking at "about," Laila spots a curious use of "right" in the vicinity:

Figure 11.7 Lateral thinking

```
CONCORDANCE
ace and was invited aboard an Unidentified Flying
 don't do something ABOUT that soon, the ceiling
ecently. ¶ L:  What ABOUT the outside? What did y
to Mr Harold Thomas ABOUT the pleasures and probl
 We started talking ABOUT my family and she knew
ey don't open until ABOUT uhm… 10 or 11 in the mo
 don't! ¶ B: Fights ABOUT getting on the bus.  No
 in the legends are ABOUT the adventures of the k
ve started thinking ABOUT animal [redacted].  Now I h
 tell false stories ABOUT their experiences.  I'm
```

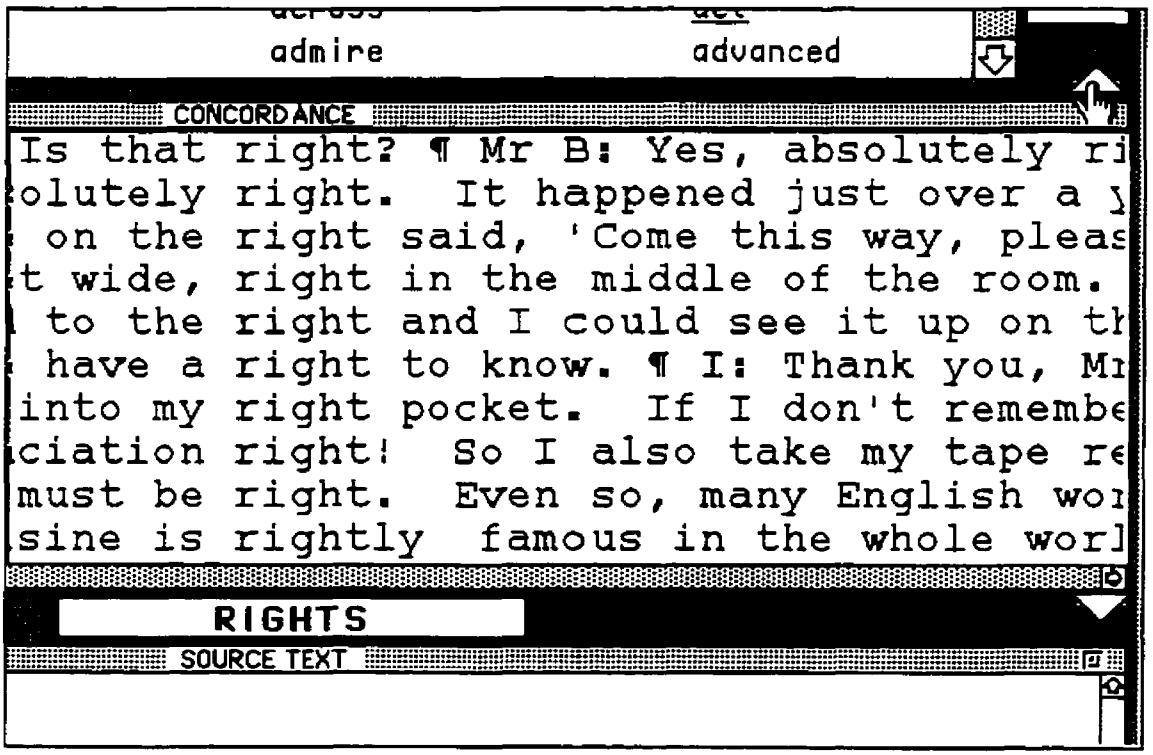
Clicking on "rights" in the concordance window returns Figure 11.8:

Figure 11.8 New-found sense

```
CONCORDANCE
  Well, Chinese cuisine is rightly  famous in the
rted thinking about animal RIGHTS.  Now I have be
d the United Nations Human RIGHTS Prize in 1978.
olitics, literature, human RIGHTS, things like th
opean Commission for Human RIGHTS that jokes abou
e Scottish Group for Civil RIGHTS in Sweden, an
opean Commission for Human RIGHTS, the Scots in
rd Search                RIGHTS
```

Then, if the student is curious about how "human rights" relates to the various senses of "right" she already knows, the arrow-up button (top right) leads to 86 instances of the word in this particular corpus, divided into strips of ten:

Figure 11.9 Common sense



For a really curious learner, the final step in browsing is to power up to the University Word List (a two-click operation) and check "rights" in its dedicated corpus, the 1.5 megabytes of Independent newspaper articles bundled with MicroConcord:

Figure 11.10 Corpus switch

```
CONCORDANCE
 less convinced of its rightness.  Julian Bickne
It is anticipated that RIGHTS to the device will
rently holding unused "RIGHTS" to North American
proached Willy for the RIGHTS to the play, but "
use we found to obtain RIGHTS to certain tracks
 the form of the Civil RIGHTS brigade.  The rest
 the subject of animal RIGHTS is raised; so high
 the other hand, a pro-RIGHTS clergyman suggeste
ts committed by animal RIGHTS terrorists -the Br
bate came from the pro-RIGHTS organiser who sugg
 raise £150m through a RIGHTS issue or by attract
ontrols the publishing RIGHTS to a catalogue of
nt of its one-for-four RIGHTS issue was taken up,
ave to be a £300m-350m RIGHTS issue.  ¶ The criti
320m convertible bonds RIGHTS issue.  With Americ
le to take part in the RIGHTS, the stock, around
 up to £350m through a RIGHTS issue in return fo
since been a stream of RIGHTS issues, particular
man for the Charter 77 RIGHTS group and co-ordina
d any lessons in human RIGHTS and socialist demo
```

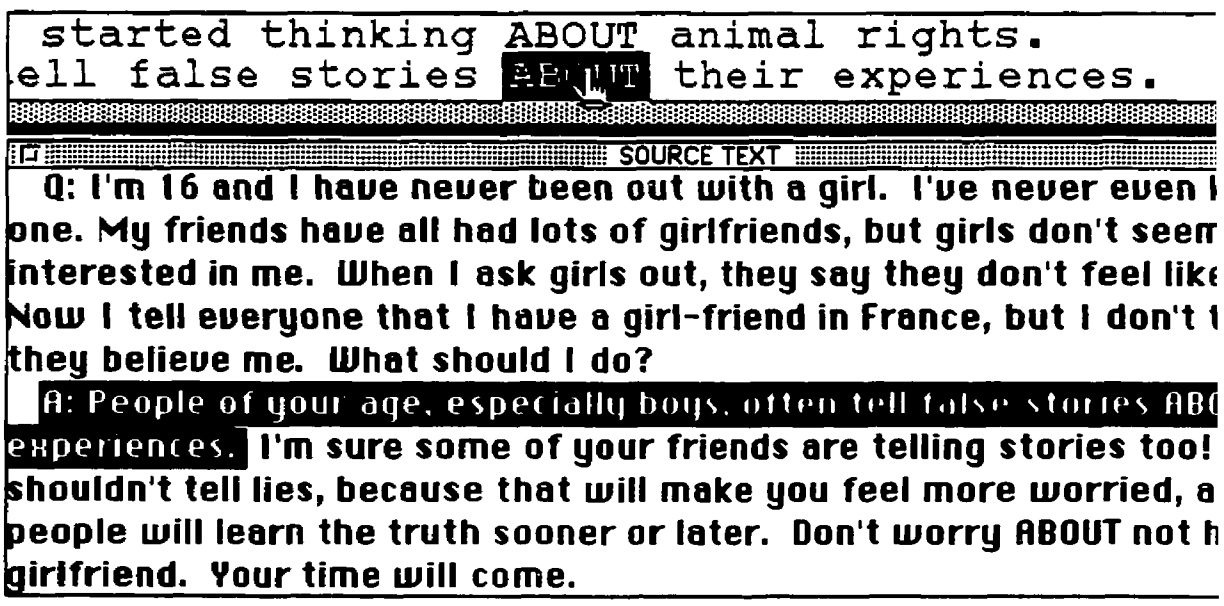
Here are some of the 57 instances of "rights" offered in that corpus. The concordance window can be expanded up to 20 lines using the standard Macintosh "grow" button.

While few students may stretch the system this far, the design principle is that there should be more things to think about and do than any student will ever get around to, so that the tutor is never the limiting factor in learning. In fact, only a handful of the hundreds of students who have used PET•2000 have ever jumped back and forth between concordances and corpora, but the point is that some have.

Normal use

The system has to cater to all types of users, mainly ones needing more guidance than the aggressive browser dramatized above. For most users, the sequence is to search through the PET words, thinking about which ones they know, sort of know, and do not know. Choices and metacognition are forced by the large number of words to be learned every week. For example the Week 1 assignment is 287 A+B words, more than the students can handle without prioritizing. When they find a word they want to know more about, they search through concordance lines (meeting words multicontextually) until they find an example that makes sense (negotiating comprehensible input). When a reasonable candidate has been found, they can click for an expanded context for the word. This is presented in a format designed to be as clear and legible as possible. Here a learner expands the context for "about":

Figure 11.11 Highlighting and legibility



Students often search for at least two examples that are clear to them. Here a learner has noticed a second sense of "about" and is considering a second source-text:

Figure 11.12 Second guessing

time. We started talking ABOUT my family and
well they don't open until ABOUT uhm... 10 or 11
: Oh, I don't! ¶ B: Fights ABOUT getting on the
stories in the legends are ABOUT the adventures
nd I have started thinking ABOUT animal rights.
, often tell false stories ABOUT their experien

ard Search ABOUT

SOURCE TEXT

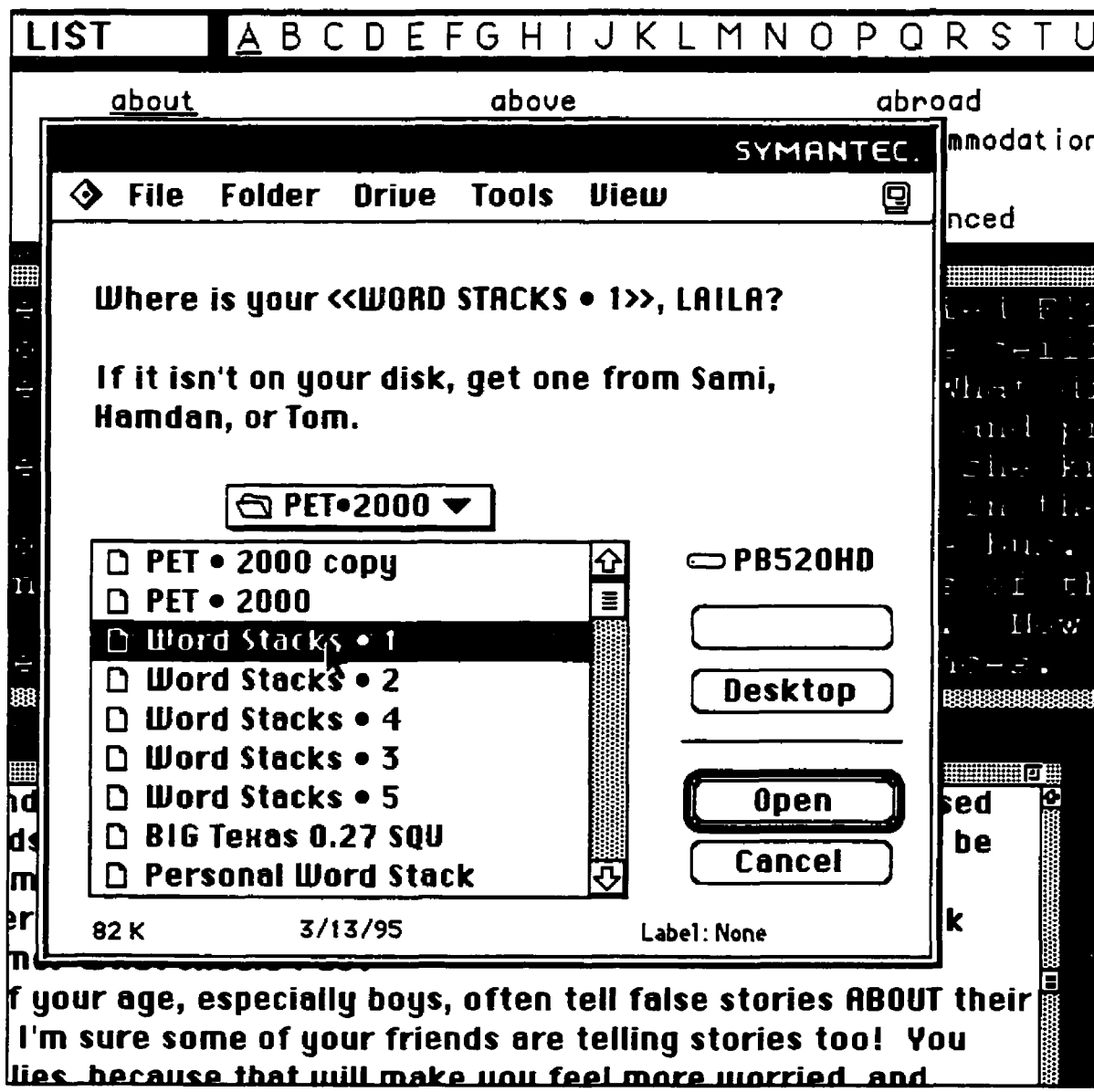
I mean, the shops are open till 10 o'clock.
I: All shops?
Sheila: Yes, everything, food shops, chemists....
B: There's a huge department store called Gambles on 86th Street tha
was open till 9:00.
S: And some supermarkets are open twenty-four hours a day. Most
shops don't open as early as in England, well they don't open until ABOU
uhm... 10 or 11 in the morning.
B: Yes, that's right.
S: Because they all work much later. And everything's open on Sunda

Something to do: lexicography

A complaint about concordancing often made by teachers is that once some information has been produced on the computer screen, there is nothing further for students to "do" with it. In PET•2000, the search for clear examples is just the first of several possible steps. Not all users go through all the steps, but few skip the first one, which is to send the words they

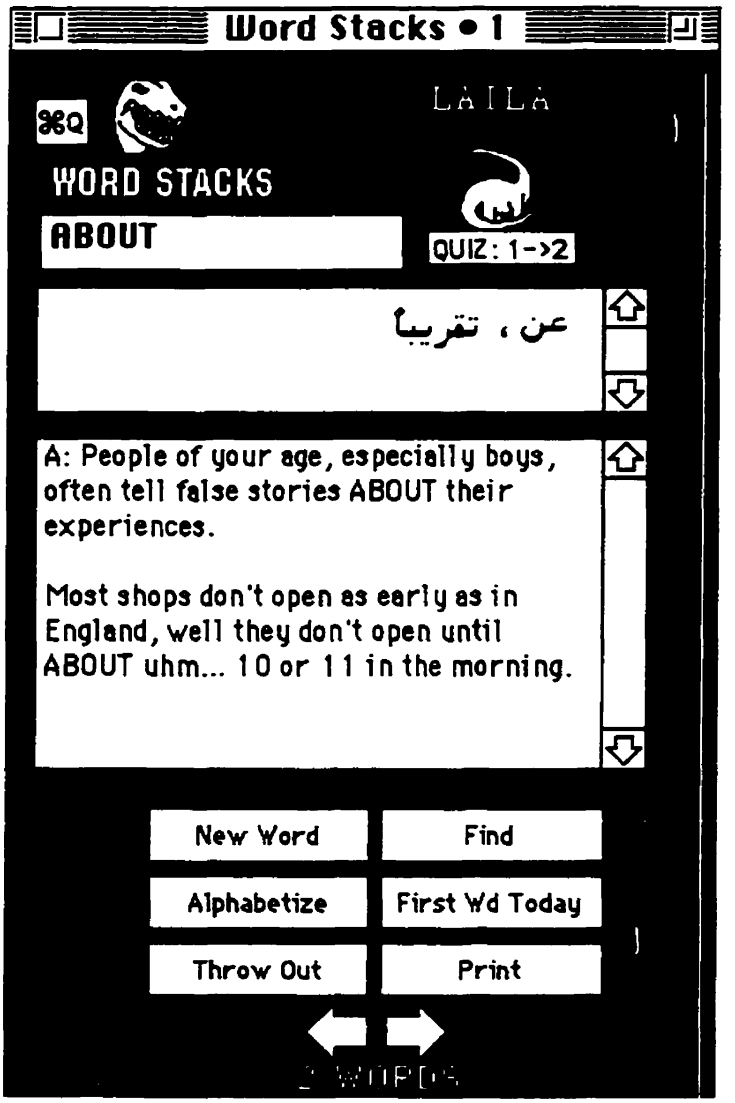
have found to a database where they can be printed up as a personalized glossary. Here Laila has found a good example for a word she wants to remember, and decides to send it to the database ("Word Stack 1") on her floppy disk. For the first entry, this involves telling the program where the disk is:

Figure 11.13 Data capture



Each new word sent to the database opens a new file, and any number of examples up to 30k can then be added to the file. Here are the two "abouts" from the source texts in Figures 11.11 and 11.12:

Figure 11.14 Personal word stack



The accompanying examples are the default full-sentence selections from the source text, but if they wish students can use the mouse to expand, shrink, or alter the context they send with a word.

Once a collection of words has been assembled in the database, a number of things can be done with it. Arabic script is accessible in a "definitions" field, so that students can enter a gloss in their native language. They can also add notes with the examples, or type in other examples from another source. The option of interest to most learners-as-lexicographers at this point is "Print," and a report form has been

Figure 11.15 Lexicography

PERSONAL WORD STACK • LAILA • 21/3/95 / 12:56 PM 10

employ يستخدم

They EMPLOY a consultant engineer to design it and prepare all the plans.

employee مستخدم ، اجير

Surely the person is still an EMPLOYEE?

encouraged شجّع ، دعى ، حث ، ساعد

They ENCOURAGED women to break the law.

enemy عدو ، خصم

His main ENEMY was the Sheriff of Nottingham, who was always trying to capture Robin but never managed to do it.

engaged خاطب ، مخطوبة،

Then the monster attacks and kills not only Frankenstein's friend but also his brother and the woman his brother is ENGAGED to, his brother's fiance Elizabeth.

engaged مشغول ، متورط

If you want to phone someone, it's often impossible because they're ENGAGED all the time.

engines محرك ، قاطرة ، عامل ، آلة حرب

The ENGINES started to roar, and suddenly we were up in the air over the water.

envelopes يغلّف ، يحجب ، يطوّق

But the rest of the time, unfortunately, it's common secretarial work instead, like filing invoices, stuffing ENVELOPES, fetching somebody a cup of tea, answering the phone and trying to be polite while I take a message.

escape يفلت من ، يفرّ

The thieves managed to get in and ESCAPE without setting off the security alarm by cutting off the electricity supply.

pre-coded into the stack to assemble the students' words, examples, definitions, or notes into professional-looking, two-column documents. To say that this feature has been used hard is an understatement. Figure 11.5 is a typical page that a student has produced, a substantial document considering it represents only a few clicks and a little typing.

Some points about Laila's glossary: First, related-word information has been noticed and included ("employ" and "employee.") Second, two senses of "engaged" have been noticed. Third, several possible Arabic translations have been entered for some of the words, suggesting that more than a one-to-one translation strategy or "naive lexical hypothesis" is being used. Fourth, most of the context sentences chosen are fairly clear illustrations of an important meaning of the word in question, with the possible exception of the sentences chosen for "employee" and "encourage."

To ensure that students do not print their entire list every time they add a few new words, "First Word Today" and "Alphabetize" allow the student to tell the report generator where to begin printing the current document.

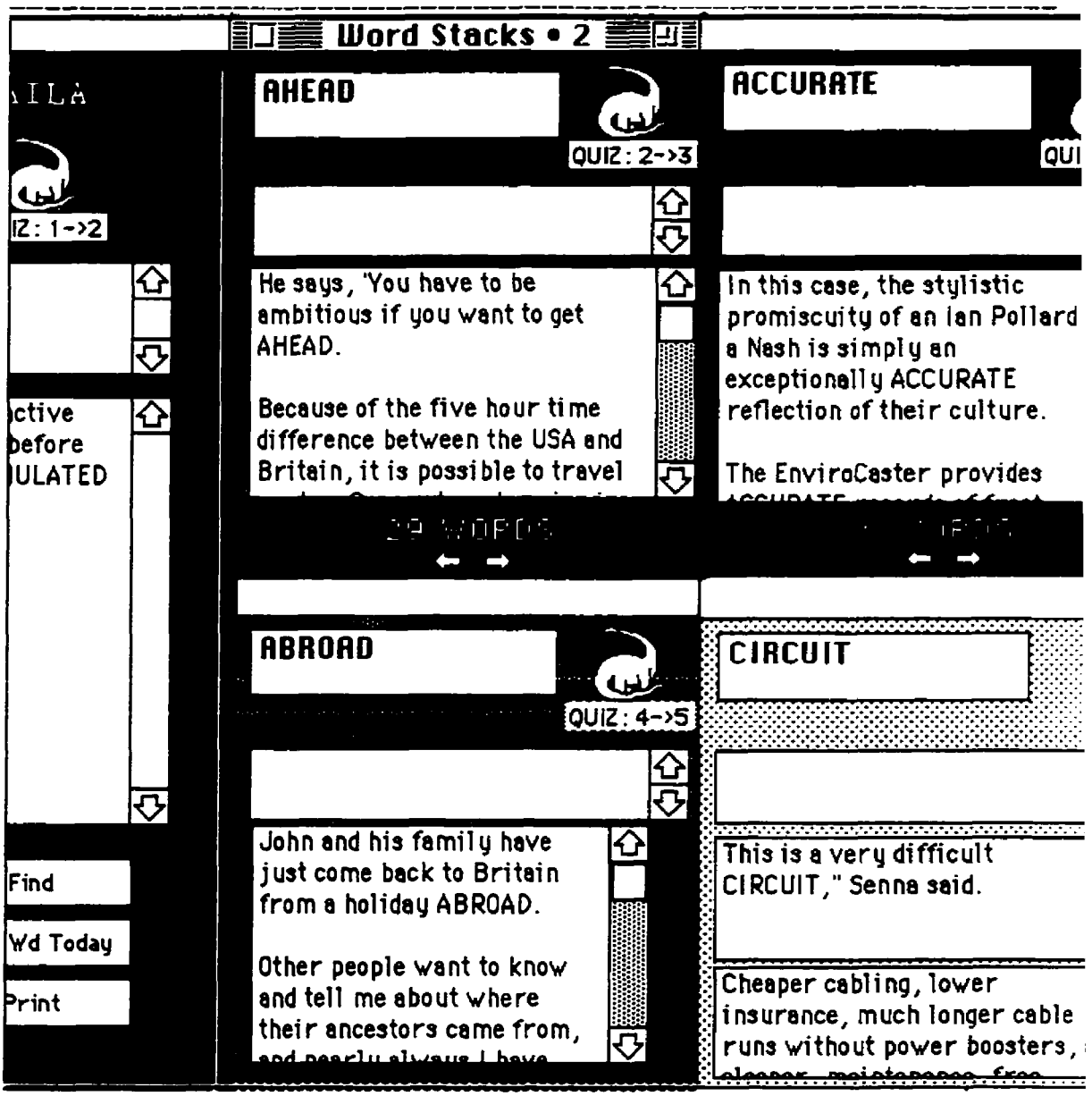
Something to do: Text reconstruction

Amateur lexicography is not the only option. A set of further activities can be launched from the Word Stack that will give learners practice in recovering and recognizing their words, activities borrowed from PET•200 but now individualized for personally chosen words. Four further word stacks reside on the learners' disks, and can be accessed by clicking on the "Quiz" buttons. The object is to move the words from

Stack One to Stack Five through activities of increasing challenge, in a computerized version of an idea proposed by Mondria (1993).

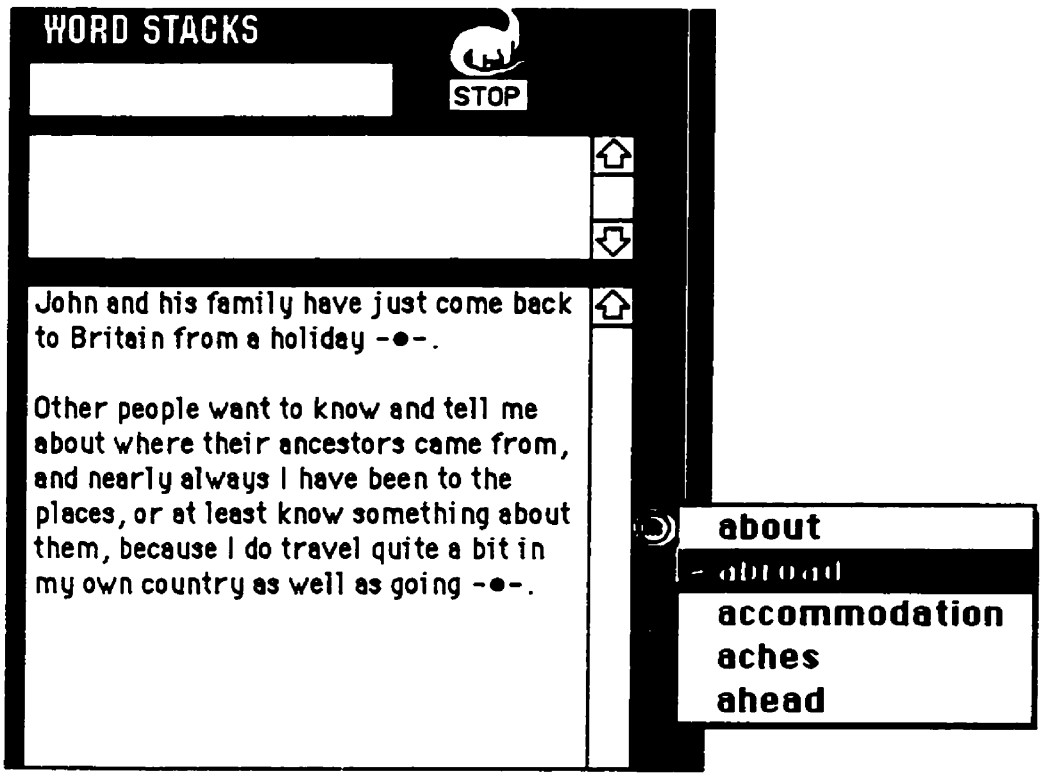
Here is the right side of the student's screen with the five word stacks opened:

Figure 11.16 Traveling through the stacks



The activity for moving words from Stack 1 to Stack 2 is a simple reconstruction of a gapped sentence. The headword and definition disappear, the entries are put in random order, and a menu-entry button appears. The headword is removed from each sentence the student has sent to the stack, replaced by the symbol "-•-". Holding down the entry button brings up a menu of choices:

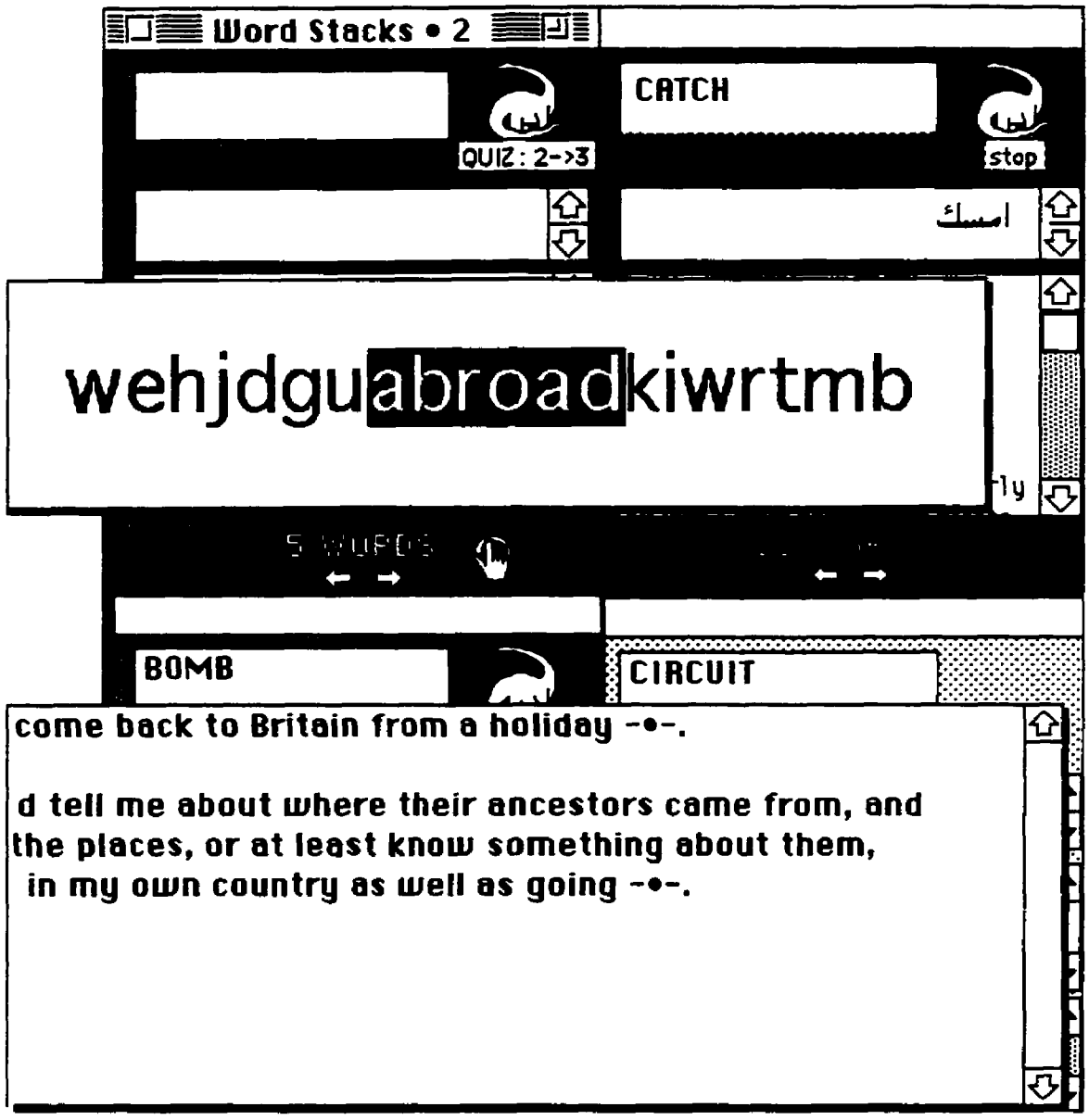
Figure 11.17 Stack 1 to stack 2



A correct entry sends the entire data structure (word, Arabic gloss, examples) up to the next stack; an incorrect entry sends it down to the previous stack. The idea, well laid out by Mondria, is that the word in need of more practice gets it.

The move from Stack 2 to 3 is made through another PET•200 activity, distinguishing the word out of a jumble of letters:

Figure 11.18 Stack 2 to stack 3



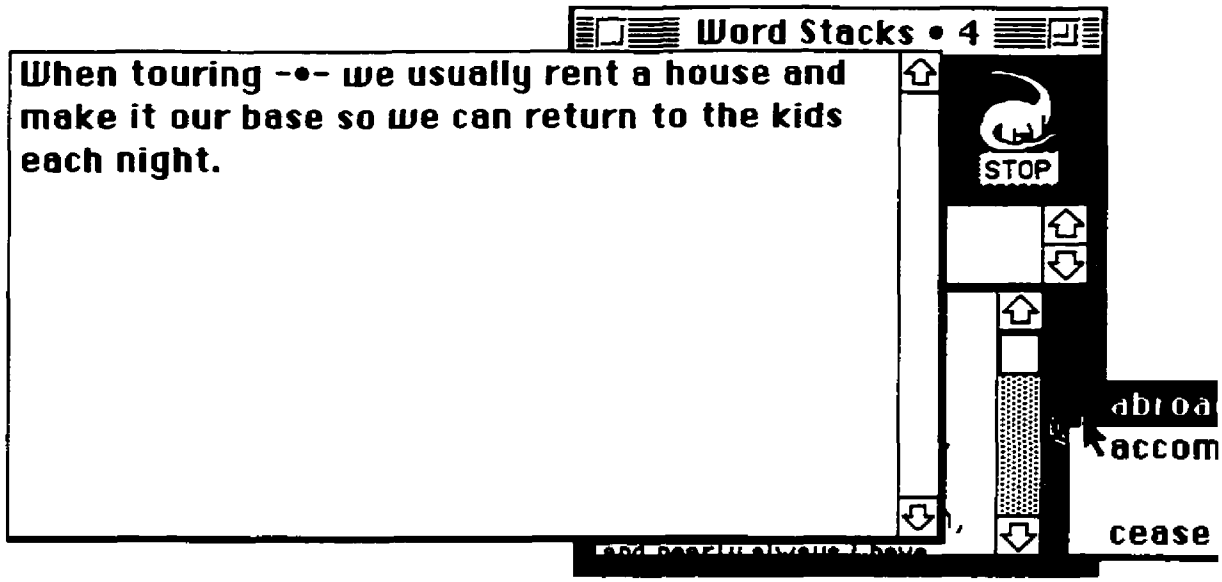
The move from 3 to 4 is via spelling the word correctly, and once again the GUIDESPELL feature encourages the interactive reconstruction that was so popular in PET•200. In all these activities the learner will soon see that recovering the word is easier if more than one example has been sent to the database, so once again multicontextual learning is encouraged.

Stack 4 to 5: Computing novel contexts

Unfortunately, the adaptation of PET•200 activities in PET•2000 does not extend to working with large texts. The loss cannot be avoided. Unlike the PET•200 user, the PET•2000 user is free to choose which words to work on from any number of source texts in the corpus, so it is highly unlikely that any single text could be found bringing together enough of these particular words to build a text activity on. Even if such a text existed, where PET•200 could search for usable texts from a total of 20, the PET•2000 corpus contains more like 250 making search time prohibitive.

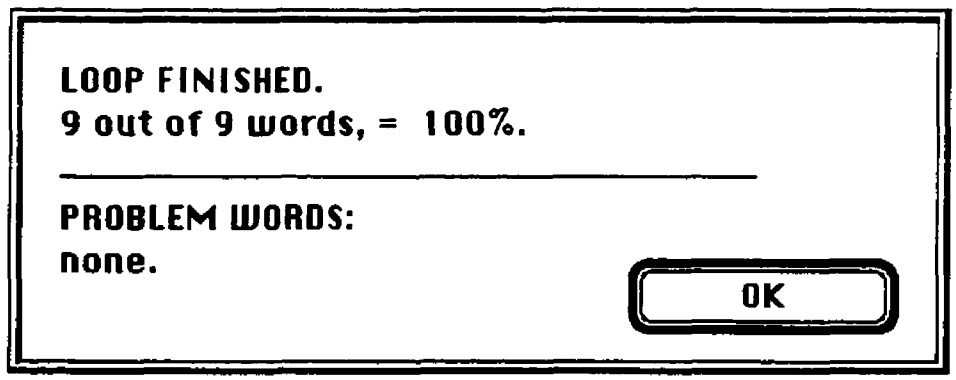
However, the Stack 4 to Stack 5 activity makes up for some of the loss. Unbeknownst to the user, when a word and example were originally sent to Stack 1, another randomly chosen example of the word was also sent with it, to wait in a hidden field until needed. This ghost sentence rides with its data-set through the stacks. Then, on the move from Stack 4 to Stack 5 it appears, giving the student a novel context to transfer the word to. Here Laila is faced with a sentence requiring "abroad" that she has almost certainly never seen before (cf. Figure 11.18 above):

Figure 11.19 Transferring "abroad"



At the end of each stack, students get a score and are reminded of problem words:

Figure 11.20 Stack feedback



They can go back and forth between PET•2000 and their Personal Stacks as often as they like, and they can quit Stack activities without completing them. They can send 20 words from the concordance and then quiz themselves, or pile up 100 words from several sessions and practice them all later.

On quitting PET•2000 learners are given summary information about their session:

Figure 11.21 Session feedback

```
GOOD-BYE, LAILA.

TIME ON PROGRAM: 24 minutes
CONCORDANCES REQUESTED: 20
ORIGINAL TEXTS REQUESTED: 26
DATABASE ENTRIES: 18

Come and learn more words again soon.

                                  [ OK ]
```

This information is, of course, just a drop from the dribble file. The next chapter examines dribble files in more detail.

Off-line quizzes

The immediate motivation to use PET•2000 regularly is the weekly quiz, on the same format as the PET•200 quizzes except that items are sampled from a far greater number of words (the "C" quiz below samples 25 from 217 words); the spelling section has been removed (given the number of words involved); and the number of short-definition questions has been increased. The 12 weekly quizzes all have 15 short-definition questions and 10 novel-text questions (Figure 11.22). As in the PET•200 study, these

quizzes have been designed to allow a comparison of two kinds of words knowledge.

A point to notice about this and all the other quizzes (in Appendix E) is that while only 25 "C" words are directly tested, many more appear in the text task ("credit," "change," "complain," "criminal," and so on.) Students who have learned their "C" words will have no trouble comprehending these ideas,

> ... it wasn't easy to (7)..... these criminals because no one expected the thieves to be children
>
> Computer criminals have also (9)..... problems for credit card companies ...

or supplying words for the gaps. The effect of this recycling is to test more words, as well as guarantee comprehensible contexts for the test items. The lexis of the all the texts has been 95% constrained to the 240 list plus the 2400 list as covered to date, with the aid of EspritDeCorpus.

Conclusion

PET•2000 provides motivation to use concordance software extensively. It is driven by a list of words the students know they need to learn; the tutor can be operated entirely by clicking the mouse; it allows for total individuality of instruction; the words of the corpus are 99% within the target zone; most of the texts are thematically familiar; the concordance information comes in a format minimizing mystification; there is plenty to do with the information gathered, from assembling a glossary to a wide range of practice activities. There is guidance for the weak, freedom for

the strong. So, if concordance has any ability to simulate the rich lexical acquisition of natural reading, it should show itself here.

Figure 11.22 Sample weekly quiz

992 YOCABULARY QUIZ 2 (C)

Part A. Recognition (1 each = 15 points)
Write the number of each word beside the correct definition.

1. candle
2. cabbage
3. candy
4. capital
5. chalk
6. chat

__conversation
__green vegetable
__teachers use it
__important city

1. centre
2. chapter
3. chimney
4. church
5. clinic
6. couple

__two people or two things
__part of a book
__doctors work there
__Christian building

1. cry
2. control
3. charge
4. cover
5. contact
6. clap

__make unhappy sounds
__make noise with hands
__ask to pay; cost
__have power over

1. curious
2. cruel
3. crazy
4. cloudy
5. confident
6. convenient

__causing pain, hurt
__not sunny
__always asking questions

Part B. Cloze (1 each = 10 points)
Choose from these words to complete the passage.

continued	customers	catch
century	court	congratulations
cheat	clever	caused
connected	curly	contained

Young Computer Criminals

Computers have changed our lives in many ways and made so many things easier to do. Most of us would probably agree that the computer is the most important invention of the 20th (1)..... By now most of us know how to use a computer and these days children learn how to use them at school. This sounds like a great idea. Computer games are good entertainment and educational programs are clearly very useful. But some children are able to do surprising things with computers. For example, in the United States some young computer users found a way to rob banks! These very (2)..... boys made a computer program that wrote thousands and thousands of different telephone numbers. When they (3)..... their program to the bank's telephone, the computer started dialing the numbers. The computer (4)..... dialing the phone numbers, day after day, until the bank's secret telephone number was finally found. Then the boys were able to open the files which (5)..... bank account information, and they started changing things. As you can imagine, you could easily make yourself very rich just by opening a new file and typing some numbers! Of course, bank (6)..... soon noticed that there were problems with their accounts and they started complaining to the bank manager. The police were brought in but it wasn't easy to (7)..... these criminals because no one expected the thieves to be children. In the end the police weren't sure what to do with the boys. They were too young to be sent to a (8)..... of law, and they were certainly too young to go to prison. The bank just had to find a better way to protect its files. Computer criminals have also (9)..... problems for credit card companies in the same way, and these companies have lost a lot of money. Finally, you may be interested to know that students who are good with computers have found a new way to (10)..... Again, by trying thousands of different numbers, they find their way into the computer network of their school and simply change their marks!

CHAPTER 12

LEARNING EFFECTS OF PET•2000

It might be expected that PET•2000 would appeal less to students than PET•200. The screen is more cluttered, there is less step-by-step guidance, there are no free definitions, and there is no control on the proliferation of word senses. Still, PET•2000 was about as popular as PET•200. Here is how 113 Band 3 students rated their course materials in May 1995:

Figure 12.1 Band 3 materials evaluation

BAND 3 - COURSE EVALUATION MAY 1995

Make an "X" under the number which best describes the truth of each statement.
BE HONEST!
1 = Not true
2 = Usually not true
3 = Sometimes true, sometimes not true
4 = Usually true
5 = Always true

MATERIALS	1	2	3	4	5	ME
1. Headway Student Book helped me a lot.	14	22	37	25	15	
2. Headway Workbook helped me a lot.	6	14	38	35	20	3
3. The Headway Books were very interesting.	13	27	46	14	13	2
4. English in Use Grammar Book helped me a lot.		5	16	49	43	4
5. The SRA Reading helped me a lot.	16	19	24	28	26	3
6. The Practice PET Tests helped me a lot.		3	14	32	64	4
7. The Vocabulary on the Mac helped me a lot.	**4**	**7**	**15**	**34**	**53**	**4**
8. The materials helped me prepare for the PET test.	8	19	40	34	12	3
9. The materials were at the right level for me.	4	27	35	32	15	3

Clearly PET•2000, the grammar book, and the PET practice tests (also in the Mac lab) were a cut above the other materials, as far as the students were concerned.

This popularity was achieved even without the supplementary text reconstruction activities described in the previous chapter, because these activities were not part of PET•2000 when the data discussed in this chapter was obtained. The data discussed below looks only at students' use of PET•2000 and the Word Stack without quiz options.

Found control groups

The PET•2000 idea was popular with students, but not necessarily with their instructors, some of whom had doubts about the underlying inductive learning theory. They argued against making students collect examples of word use, since the words could be better learned from a bilingual dictionary. The dictionary work could be facilitated, of course, if the students were given a computer-generated list of the 2400 words with spaces to jot down translation equivalents. Why not let students use PET•2000 to generate a simple wordlist, no complicated examples, if they wished? This would be the high-tech version of standard area practice and a perfect example of the "study skills" faculty deplore.

In fact, in the midst of the low-control scenario described in Chapter 9, these instructors' reluctance about learning from examples was the unwitting offer of a control group. If some learners or ideally complete groups went for the wordlist-only option, then they would be learning from dictionaries while the others would be learning from corpus and

concordance (and dictionaries too, no doubt). This rough division would allow further testing for a concordance effect, and would replace the versioning methodology of the PET•200 study which was no longer possible. So the system was reconfigured to allow students to send words to their Word Stacks without examples to be printed as a wordlist.

The two groups thus created are admittedly self-selected. However, the dribble files reveal whole intact classes heading for one mode of use or another, suggesting a large role for instructor influence. And since PET groups are otherwise equal and randomly selected, there is at least some case for seeing these self-selected groups as useful groups for comparison.

Dribble files: Type A users

The dribble files tend to be of two types. Figure 12.2 shows a "good learner" way of going about concordancing. "WD" indicates that a concordance has been requested for a word on the PET list; "¶" means that a source text has been requested for a concordance line; and "dB" means that an entry has been sent to the Word Stack. In 52 minutes, Sumaya has looked at 79 concordances, requested 77 source texts, made 91 database entries, and printed a report of her work.

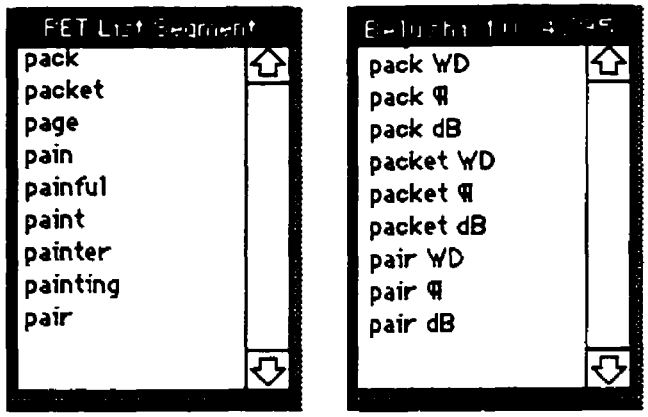
Figure 12.2 Correct protocol

Sumaya AL-	peace dB	plain dB	polite ¶	prepare dB	pure dB	prize WD
Belushi 3H	peace ¶	plane WD	polite dB	press WD	purple WD	prize ¶
10/4/95	peace dB	plane ¶	political WD	press ¶	purple ¶	prize dB
10:18 AM	pen WD	plane dB	political ¶	press dB	purple dB	porter WD
pack WD	pence WD	plane WD	political dB	press ¶	purse WD	porter dB
pack ¶	pence ¶	plane ¶	politics WD	press dB	purse ¶	pink WD
pack dB	pence dB	plane dB	politics ¶	prevent WD	purse dB	pile WD
packet WD	penknife WD	plenty WD	politics dB	prevent ¶	push WD	pile dB
packet ¶	penknife ¶	plenty ¶	politics ¶	prevent dB	push ¶	piece WD
packet dB	pepper WD	plenty dB	politics dB	priest WD	push dB	piece dB
pair WD	pepper ¶	plenty ¶	pork WD	priest ¶	push ¶	pick WD
pair ¶	pepper dB	plenty dB	pork ¶	priest dB	push dB	pick dB
pair dB	per WD	plug WD	pork dB	principal WD	away WD	pet WD
round WD	pig WD	plug ¶	pot WD	principal ¶	away dB	pet dB
round ¶	pigs ¶	plug dB	pot ¶	principal dB	down WD	perfect WD
round dB	pigs dB	plug ¶	pot dB	progress WD	down dB	perfect dB
pattern WD	pill WD	plug dB	practice WD	progress ¶	put WD	particulr WD
pattern ¶	pills ¶	pocket WD	practice ¶	progress dB	put dB	particulr dB
pattern ¶	pills dB	pocket ¶	practice dB	proper WD	put WD	parent WD
pause WD	pity WD	pocket dB	practise WD	proper ¶	put ¶	parents ¶
PAUSE ¶	pity ¶	poem WD	practise ¶	proper dB	put dB	parents dB
pause ¶	pity dB	poem ¶	practise dB	pull WD	put ¶	pale WD
pause dB	pin WD	poem dB	pray WD	pull ¶	put dB	pale dB
WENT dB /	pin ¶	poet WD	pray ¶	pull dB	put WD	pants WD
10:26 AM	pin dB	poet ¶	pray dB	pull WD	put dB	pants dB
WENT 2000	pillow WD	poet dB	pray ¶	pull ¶	put WD	parcel WD
/ 10:26 AM	pillow ¶	poetry WD	pray dB	pull dB	put ¶	parcel dB
pattern WD	pillow dB	poetry ¶	prayer WD	pullover WD	put dB	WENT dB /
pattern ¶	pint WD	poetry dB	prayer ¶	pullover ¶	pyjamas WD	11:10 AM
pattern dB	pint ¶	poetry ¶	prayer dB	pullover dB	pyjamas ¶	Print report
pea WD	pint dB	poetry dB	prefer WD	pupil WD	pyjamas dB	WENT 2000
pea ¶	plan WD	point WD	prefer ¶	pupils ¶	prove WD	/ 11:14 AM
pea dB	Plan ¶	point ¶	prefer dB	pupils dB	prove dB	52 minutes
peace WD	Plan dB	point dB	prefer ¶	pupils ¶	proud WD	Words = 79
peace ¶	plain WD	point ¶	prefer dB	pupils dB	proud dB	Paras = 77
peace dB	plain ¶	point dB	prepare WD	pure WD	pronounce WD	dBs = 91
peace ¶	plain ¶	polite WD	prepare ¶	pure ¶	pronounce dB	QUIT 11:14

Several points about the file may not strike the eye. First, Sumaya is not simply investigating every single word on the list. There are 179 "P" words, but she has selected only 79 for attention. A comparison between words available and words collected shows her passing by "page," "pain,"

"painful," and "paint," displaying some metacognition about what she knows and needs:

Figure 12.3 Exercising choice



Second, although Sumaya goes through the list alphabetically for the most part, toward the end she goes back and reconsiders some words from the beginning (such as "particular"). Third, not every word sent to the database gets an example, for instance "prove." Fourth, she often sends several different examples for the same word, such as "point" "put" and "poetry," indicating that she is making use of the multicontextuality offered by the concordance medium. Fifth, not every word that gets concordanced is taken on to the source text stage; "per" is concordanced, then dropped, presumably because it was recognized when seen in context ("per cent"). Sixth, Sumaya notices the difference between "plane" and "plain" and "practice" and "practise," sending examples of each to her Word Stack.

Viewing examples?

The dribble file suggests that Sumaya is searching through the examples of each word before sending one to her database, at least where she sends several. In other words, she is not simply sending the first example mechanically, she is using the concordance to "negotiate input." To find out how much students generally were searching through examples, five of their glossary printouts were compared against the concordances that were available to them over a random stretch of the word list. Figure 12.4

Figure 12.4 Negotiating input

	S1	S2	S3	S4	S5	Number of Ss who sent each word to database
shame			✓ 1		✓ 1	2
shape					✓ 4	1
share			✓ 1	✓ 1	✓ 2	3
sharp			✓ 2		✓ 2	2
shave	✓ 2		✓ 1		✓ 2	3
she						0
sheep	✓ 0				✓ 1	2
shelf	✓ 2		✓ 2		✓ 1	3
shine					✓ 3	1
ship					✓ 1	1
shirt					✓ 1	1
shock	✓ 2	✓ 0	✓ 3		✓ 1	4
shoe	✓ 1					1
shoot	✓ 2		✓ 1	✓ 2	✓ 1	4
shop						0
shop assistant					✓ 1	1
shopkeeper					✓ 2	1
shopping						0
shore	✓ 2	✓ 1	✓ 2	✓ 1	✓ 1	5
short						0
shorts	✓ 1		✓ 1	✓ 1	✓ 2	4
Words/20 chosen by each S	8	2	9	4	16	40

shows that there was a good deal of variation in how selective students were, which precise words they attended to, and which of the three or four examples they sent to their Word Stacks. In the table, "√" means a word was sent to the database, and the number after it ("√ 2") refers to whether the accompanying example was line 1, line 2, etc of the concordance. Twenty of the 40 examples selected were the first concordance line, 14 were line 2, two were line 3, and one was line 4; three words had no example. Almost half the examples (17 out of 40) were other than line 1, suggesting a certain amount of discrimination in the choice of a clear example.

Type B users

However, not all students spent time sifting through examples, such as Nabil whose work is shown in Figure 12.5. The pattern here is clicking on words in the PET list and sending them to the database for printout, as a wordlist without examples. Chances are good that Nabil is taking part in a "cooperative learning" project in which a group of male students take turns generating the week's wordlist which they will then photocopy, ready for annotation with Arabic synonyms. However, Nabil is not using PET•2000 entirely mindlessly; he is exercising at least some metacognition in selecting a listing of only 127 "P" words, when 179 are on offer.

Figure 12.5 Breach of protocol

NABIL AL-	partner dB	pepper dB	pink WD	politics WD	prefer WD	progress WD
RIYAMI 3C	pasenger WD	perform WD	pink dB	politics dB	prefer dB	progress dB
12/4/95	pasenger dB	perform dB	pillow WD	pool WD	press WD	proper WD
7:44 AM	party WD	per WD	pillow dB	pool dB	press dB	proper dB
pack WD	party dB	per dB	pint WD	position WD	priest WD	proud WD
pack dB	passport WD	perfume WD	pint dB	position dB	priest dB	proud dB
painful WD	passport dB	perfume dB	plain WD	pork WD	pretty WD	pull WD
painful dB	partly WD	persuad WD	plain dB	pork dB	pretty dB	pull dB
pair WD	partly dB	persuade dB	pipe WD	pop WD	present WD	purpose WD
pair dB	pass WD	perhaps WD	pipe dB	pop dB	present dB	purpose dB
pants WD	pass dB	perhaps dB	plan WD	port WD	prevent WD	prove WD
pants dB	past WD	pet WD	plan dB	port dB	prevent dB	prove dB
packet WD	past dB	pet dB	plane WD	post WD	princess WD	pullover WD
packet dB	path WD	piano WD	plane dB	post dB	princess dB	pullover dB
palace WD	path dB	piano dB	platform WD	popular WD	prison WD	pupil WD
palace dB	pence WD	pick WD	platform dB	popular dB	prison dB	pupil dB
painter WD	pence dB	pick dB	plant WD	porter WD	principal WD	purse WD
painter dB	pea WD	piece WD	plant dB	porter dB	principal dB	purse dB
pale WD	pea dB	piece dB	plenty WD	poster WD	prisoner WD	pull WD
pale dB	pattern WD	pick WD	plenty dB	poster dB	prisoner dB	pull dB
parcel WD	pattern dB	pick dB	plug WD	pound WD	private WD	punctual WD
parcel dB	peace WD	pig WD	plug dB	pound dB	private dB	punctual dB
pain WD	peace dB	pig dB	plate WD	pour WD	prize WD	purple WD
pain dB	penfrend WD	picnic WD	plate dB	pour dB	prize dB	purple dB
pardon WD	penfriend dB	picnic dB	pleasant WD	practice WD	probable WD	put WD
pardon dB	pause WD	picnic dB	pleasant dB	practice dB	probable dB	put dB
pardon WD	pause dB	photo WD	pocket WD	pot WD	p'fession wd	pyjamas WD
pan WD	penknife WD	photo dB	pocket dB	pot dB	p'fession dB	pyjamas dB
pan dB	penknife dB	pile WD	poetry WD	practise WD	promise WD	WENT dB /
parent WD	patient WD	pile dB	poetry dB	practise dB	promise dB	Print report
parent dB	patient dB	pin WD	poem WD	pray WD	probably WD	8:19 AM
part'lar WD	perfect WD	pin dB	poem dB	pray dB	probably dB	32 minutes
part'lar dB	perfect dB	pity WD	political WD	prayer WD	p'fessor WD	Words=127
park WD	period WD	pity dB	political dB	prayer dB	p'fessor dB	Paras = 0
park dB	period dB	pill WD	poet WD	presidnt WD	prnounce WD	dBs = 127
partner WD	pepper WD	pill dB	poet dB	president dB	pronounc dB	QUIT 8:19

(Some long words like "particular" have been edited to save space.)

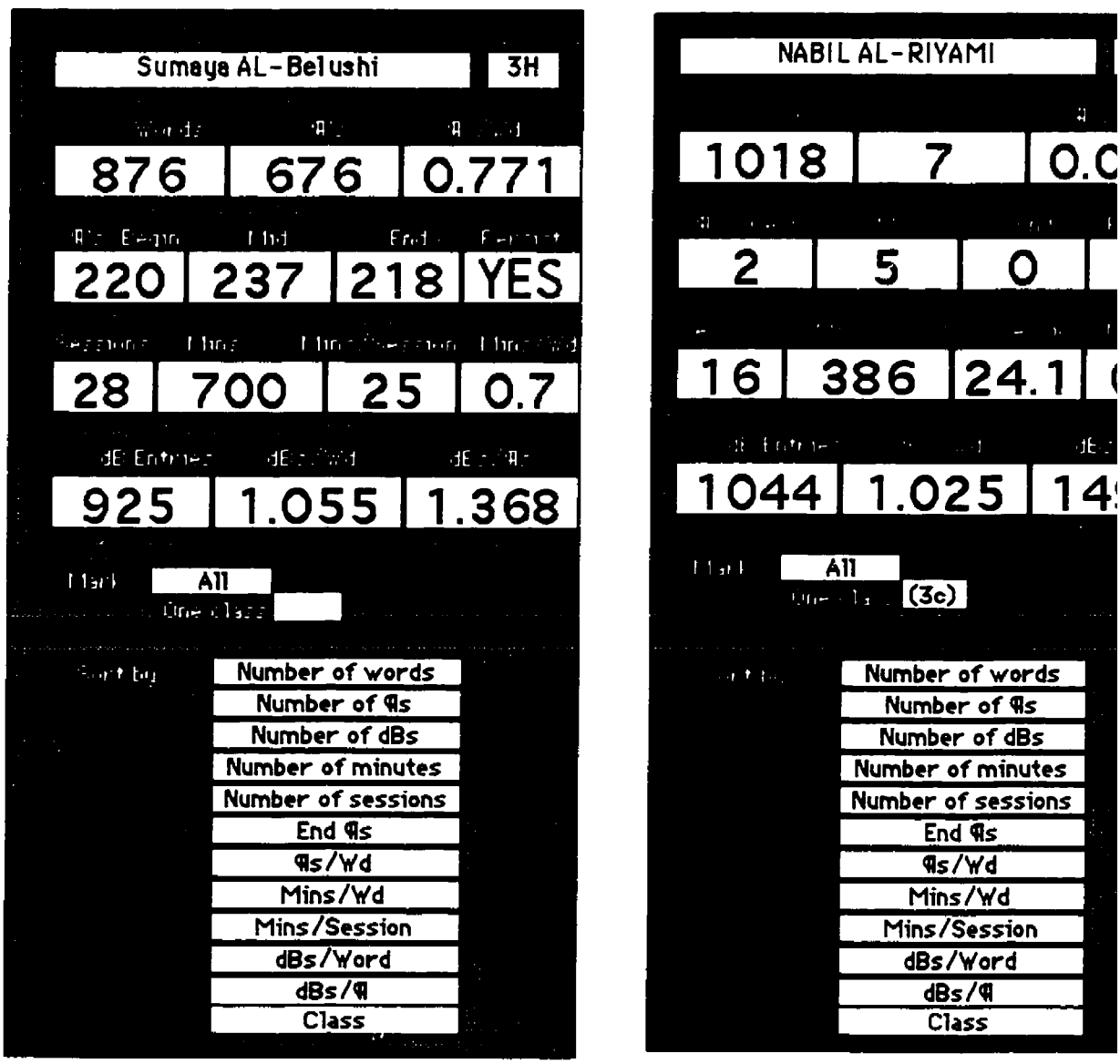
Exploring protocol files

Pulling the important patterns out of 1356 dribble files (113 students x 12 weeks) would be a monumental labour by hand, so once again a computer program was written to aid with data analysis. SHRINK (Cobb, 1995b) assembles the students' dribble files, sorts them into order, extracts

summary information, and searches for specific patterns. Figure 12.6 shows SHRINK summaries of Sumaya and Nabil's PET•2000 work for the entire term.

The top horizontal line is the number of words selected for any sort of treatment, then the number of source texts requested ("¶" because about a

Figure 12.6 Computer-assisted protocol analysis



paragraph in size), and then the ratio of source requests to words. The second line records how many source texts were requested in the first, second and final months of the term, to check for persistence and trends. The third line records the number of sessions, time on task, and calculates averages. The fourth line records the number of database entries the student has made, and calculates the ratios of both database entries to words examined (Is the student sending every word examined to the database?) and database entries to source texts requested (Is the student sending examples to the database or just words?)

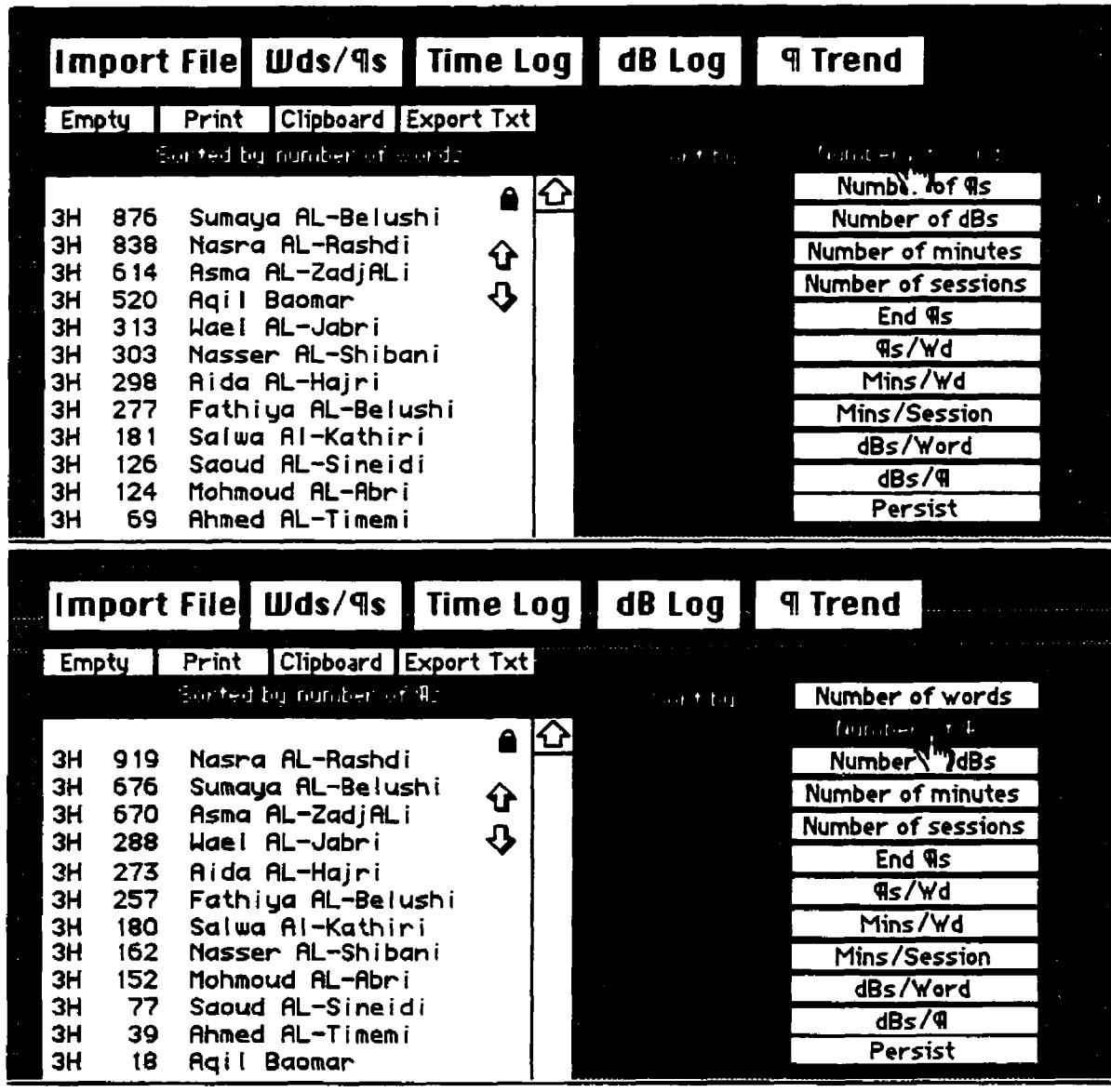
A wealth of information lies within the 113 such analyses collected, only a small portion of which can be examined in detail in the present study. One piece of information that may not be obvious is that since Sumaya has read 676 source texts of roughly 150 words each, then she has read more than 100,000 words (150 x 676 = 101,400) in the term, almost certainly more than she has read in all her other courses put together. This can be informally confirmed by looking at typical SRA (Parker, 1985) reading lab records: few students can force their way through more than 10 stories of about 1000 words each over the length of a term, just 10,000 words total. So even if concordance is shown in the end to have no special way of making vocabulary learning efficient, it may still be an aid to learning in the old inefficient way where massive reading was the key ingredient.

How many students read a lot on PET•2000? SHRINK shows that about one-third of the students (49 of 130) used the program hard as a source of reading, 100 or more paragraphs, although there is no control on how much reading took place when students worked two to a computer (as they

often did, working out the meanings of words in lively Arabic discussions), and when they looked over each other's example print-outs before the weekly quizzes.

SHRINK can group the records of intact classes, and then sort the individuals in the class by any of the fields in the database. In Figure 12.7,

Figure 12.7 Sorting clicks



a good-user class is sorted below first by the number of words selected for attention (i.e. concordance and/or sending a word to the database for printout), and then by the number of source texts requested. The main revelation of this class-by-class analysis is that most members of intact classes tended to use PET•2000 in the same way, suggesting as discussed above a strong role for teacher enthusiasm in selling the concordance idea.

Table 12.1 shows the total number of source texts requested by each

Table 12.1 Source text requests by group

	3A	3B	3C	3D	3E	3F	3G	3H
	216	991	74	432	587	815	77	919
	198	452	41	274	542	754	77	676
	163	447	37	173	486	661	61	670
	125	444	35	88	476	481	38	288
	96	284	34	84	152	369	32	273
	77	217	24	54	113	259	30	257
	67	214	20	52	109	257	12	180
	41	162	20	46	94	237	10	162
	36	111	9	42	79	188	6	152
	35	110	4	36	58	176		77
	34	84	3	19	49	145		39
	30	75	2	8	43	114		18
	26	75	2	7	36	112		
	21	65	1	2	24	78		
	18	57	1	2	20	78		
	17	9	1	1	7	71		
	16	5	1	1	1	23		
				0		21		
SUM	1216	3802	309	1321	2876	4839	343	3711
MEAN	**71.53**	**223.65**	**18.18**	**73.39**	**169.18**	**268.83**	**38.11**	**309.25**
SD	65.65	247.88	20.59	113.96	207.26	249.31	27.74	288.55

student, each request presumably reflecting a desire to clarify the meaning of a word contextually (since a word can be sent for list-printing without it).

Although of course there is variance within classes, the huge between-class variance (significantly greater than chance) clearly reflects the way PET•2000 was being promoted in the classrooms. Classes "C" and "G" were not encouraged to use the program, other than to generate easy wordlists, while "B," "F" and "H" clearly were. Table 12.1 is almost a textbook illustration of the role of teacher support in the implementation of a new technology.

"C" and "G" will be used as control groups in two studies below and "F" and "H" as experimental groups. Two studies are needed because in this data there are two levels of students. Groups "A" to "F" were composed of students fresh from Band 2, while "G" and "H" were remedial students who had already been through Band 3 once and narrowly failed to reach Band 4. The main difference was that the remedial groups "G" and "H" were higher in terms of starting vocabulary size. Looking at two levels will allow a check on whether PET•2000 is more suitable for a particular stage of learning, and check for a convergent finding.

Did all this searching for examples, say in the case of classes "F" and "H", produce any benefits? According to the hypothesis, students who take the trouble to examine a word in several contexts should do better on a large-text task than those who merely learn words through short definitions, although not necessarily on a definition-based task.

Experiment 1

All Band 3 students were pretested for vocabulary in March 1995 and posttested in May, two months later. Two months is not a complete term, but in 1995 the winter term began in February, during the Muslim month of Ramadhan, a time when students fast and stay up late, possibly compromising the reliability of pre-test data. So although students had used PET•2000 during February, pre-testing was delayed until March, so that scores were probably a little higher than they would have been otherwise, and learning gains were produced over only a two-month period. The pre-post test once again had two parts, intended to measure two kinds of word knowledge, the Word Levels test for short definitions, and a task fitting words to a novel text (in Appendix D).

Subjects and treatment

Normal (non-remedial) groups "C" and "F" were found in pre-testing to be statistically equal on two measures, overall Levels Test mean 65.2% (SD 14.8), and novel-text task mean 60.1% (SD 19.2). With a mean score of 65.2% on the Levels Test, or about 1300 words, both of these Band 3 classes had members at risk in terms of the 30-50-70% success baseline.

Control Group "C" mainly used PET•2000 to generate wordlists and annotate them with Arabic translations. Table 12.2 shows the number of words and then source texts requested by individuals in the control and experimental groups.

Table 12.2 Two ways of using PET•2000

	C		F	
	Words	¶s	Words	¶s
	1018	74	1292	815
	400	41	962	754
	383	37	831	661
	229	35	807	481
	143	34	802	369
	120	24	705	259
	104	20	642	257
	65	20	567	237
	58	9	439	188
	52	7	420	176
	42	4	382	145
	42	3	338	114
	41	2	310	112
	39	2	289	78
	18	1	201	78
	16	1	172	71
	12	1	29	23
				21
SUM	1364.00	309.00	6934.00	4839.00
MEAN	90.93	18.18	462.27	268.83

These are clearly two distinct groups in terms of how they used the tutor: the control group "C" requested fewer than one-tenth of the source texts requested by the treatment group "F."

Results

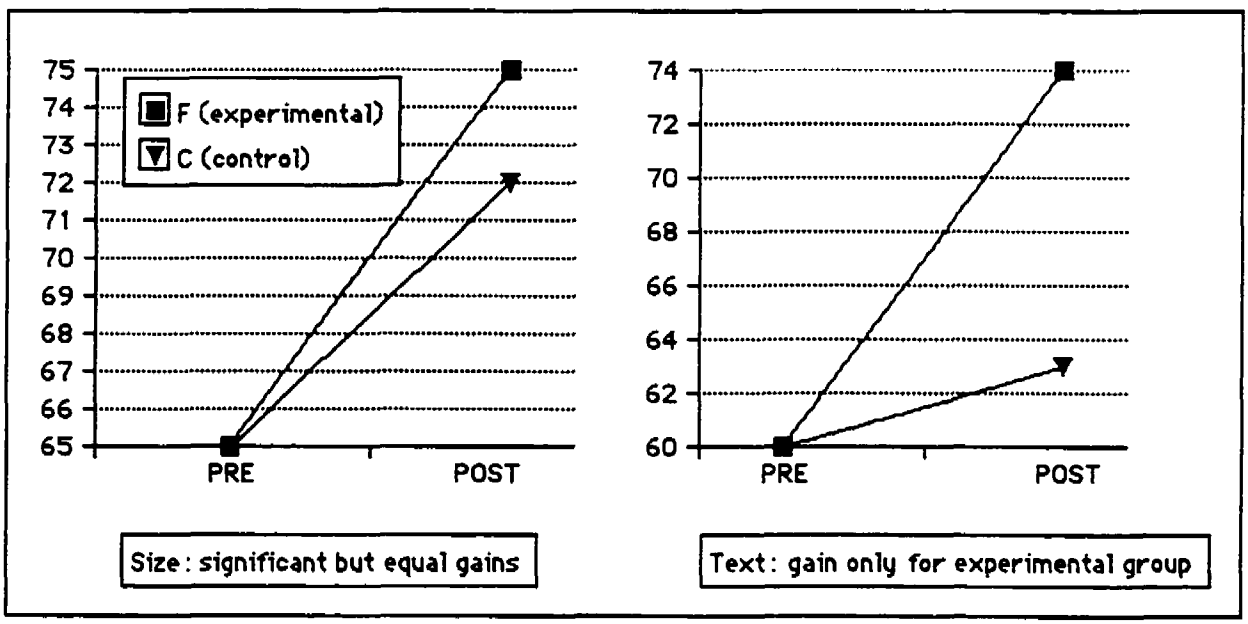
Here are post-test mean scores for the two tasks (the Levels pre-test mean was 65.2%, and the text-task mean was 60.1%):

Table 12.3 Post test, experiment 1

	LEVELS TEST		TEXT TASK	
	F (Expt)	C (Cntl)	F (Expt)	C (Cntl)
MEAN	74.47	71.94	74.12	62.76
ST DEV	13.81	13.41	15.00	17.08
GAIN	9.27%	6.74%	14.02%	2.66%
	S.diffs. pre-post, n.s.d. between gps.		s.d	n.s.d

On the Levels Test, both groups made significant gains over their pre-tests, about 7% gain for control group "C" (representing about 140 new words) and 9% gain for experimental group "F" (180 words), but not significantly different from each other. But in terms of the ability to use the words they learned in novel contexts, "C" made no significant progress (from 60.1% to 62.76%, n.s.d.) while "F" rose from 60.1% to 74.1%, a difference greater than chance compared to both their former selves and the control group (F=3.46, p<.05). Figure 12.8 presents this information graphically.

Figure 12.8 Static vs transferable knowledge



Discussion

This is the predicted outcome, and the exact finding reported in Mezynski (1983), that learning words by definitions has little effect on comprehending the words in novel texts. So it appears that some of the benefits of natural word learning are taking place for students who use PET•2000 as directed, but in hours rather than years. Students in the experimental group learned almost 200 words to a fairly high level of comprehension in just two months, with an average time-on-system of 6 hours (SD 2.18 hours). As a very rough yardstick of comparison, Beck and colleagues' (1982) training program needed five months of classtime to teach 104 words up to comprehension level.

Experiment 2

Subjects

The groups in this experiment are control group "G" (a group making almost no use of PET•2000's corpus) and experimental group "H" (a group using it a great deal). These are both remedial groups, who have already spent a term in Band 3 and whose year for clearing the English requirement is nearly over. It is primarily such high-risk students whom the lexical tutor has been designed to help, yet at the same time they provide quite a stiff test for it.

These subjects are already at a relatively high level of vocabulary, testing 76% on the Levels Test (compared to 65% for the non-remedial groups in Experiment 1). Also, they are more concerned than other Band 3 students

about academic courses (commerce, accounting, information systems, etc) , since they are moving ahead with their cohort in spite of their PET problem. They almost certainly feel that learning general English is no longer a priority. On the plus side, however, these students are in a serious time squeeze and might see self-access options as attractive.

"G" and "H" were found in pre-testing to be statistically equal on both measures of word knowledge, Levels Test mean 75.7% (SD 10.8), and text task 71.0% (SD 12.2). "G" was one of the groups who used PET•2000 as a wordlist generator. Table 12.4 reviews the numbers of PET•2000 source texts requested by individuals in these two groups.

Table 12.4 Two higher-level ways of using PET•2000

	3G		3H	
	WORDS	¶s	WORDS	¶s
	453	77	876	919
	131	77	838	676
	87	61	614	670
	44	38	520	288
	37	32	313	273
	36	30	303	257
	30	12	298	180
	15	10	277	162
	9	6	181	152
			126	77
			124	39
			69	18
SUM	842.00	343.00	4539.00	3711.00
MEAN	93.56	38.11	378.25	309.25

In fact, group "G" did not even use PET•2000 much as a list generator, but their instructor reports that somehow the students all had well-annotated lists on quiz day.

Results

The result after two months is similar to the result in Experiment 1. Here are post-test mean scores for the two tasks (the Levels pre-test mean was 75.7%, and the text-task mean was 71.0%):

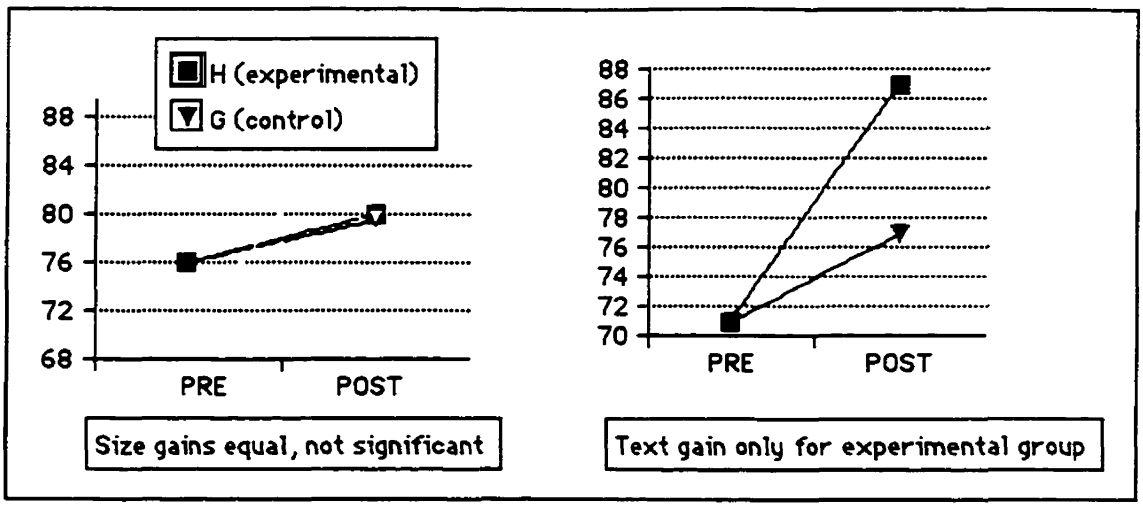
Table 12.5 Post test, experiment 2

	LEVELS TEST		TEXT TASK	
	H (Expt)	G (Cntl)	H (Expt)	G (Cntl)
MEAN	79.90	79.64	86.80	77.00
ST DEV	13.30	12.80	8.90	10.70
GAIN	4.20%	3.94%	15.80%	5.00%
			s.d.	

The pattern is remarkably similar to Table 12.3 in Experiment 1, except a level higher: no between-group differences in the Levels Test, but significant differences on the text task.

On the Levels Test, experimental group "H" has progressed from 75.7% to 79.9% (SD 13.3), and control group "G" from 75.7% to an almost identical 79.6% (SD 12.8), a between-group difference no greater than chance. But on the text task, the experimental group mean has risen from 71.0% to 86.8% (S.D. 8.9), the control group mean only from 71.0% to 77.0% (SD 10.7), a significant between-group difference (t=2.4, p<.05). Figure 12.9 represents this pre-post information graphically.

Figure 12.9 Static vs transferable replicated

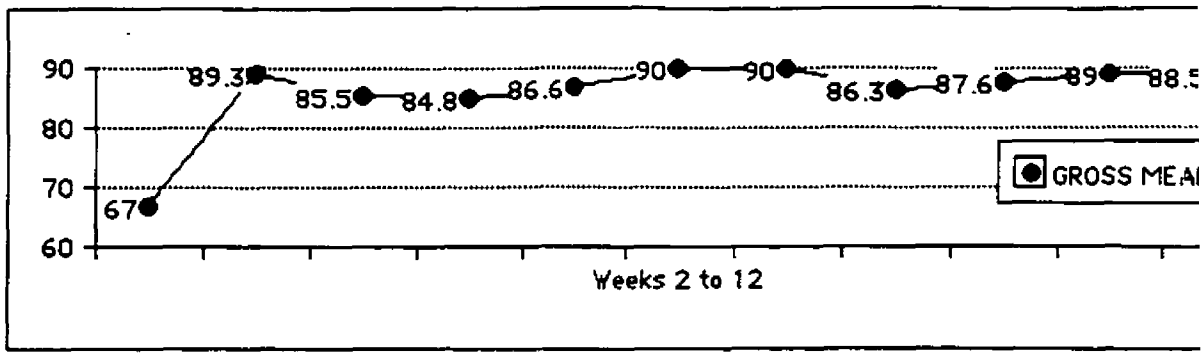


Experiment 2 replicates the main findings of Experiment 1. The only difference is that in Experiment 2, the pre-post differences on the Levels Test are not greater than chance for either group (F=0.22, p>.05, for the common pre-test mean and two post-test means).

Discussion

The lack of a gain on the Levels Test could be due to a ceiling at the 2000 level for these "advanced" students, four of whom in each group had pre-test scores in the 80s. Still, with a null gain it is hard not to wonder whether they might not have been wasting their time on PET•2000. This impression of time-waste is strengthened when one looks at the weekly quiz means for the experimental group, which are consistently high and suggests a task too simple for these students (who perhaps should have been working on vocabulary beyond the 2000 level):

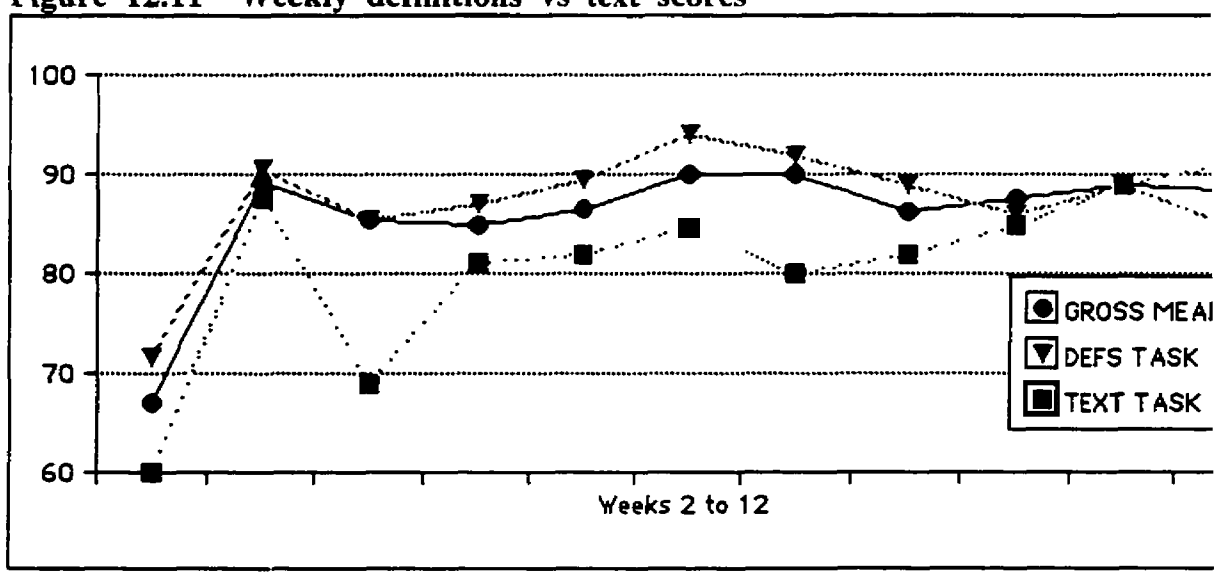
Figure 12.10 Experimental group weekly quiz means



There are no significant differences in this data (except between weeks 1 and 2, when the students were deciding whether to take the activity seriously). However, when the data is carved up by different measures and individuals, the picture gets more interesting.

First, looking at measures, when the weekly quiz gross means for the experimental group are split into definitional and text components, a trend emerges:

Figure 12.11 Weekly definitions vs text scores



After the class has settled to the weekly quiz idea, there appears to be a gradual crossover from skill with definitions to skill with novel texts. It is tempting to see in this a shifting emphasis from memorizing static meanings to seeking out dynamic conditions of word use. The idea is interesting, but few of the distinctions in this data are significant.

However, looking at individuals and sub-groups within the data, as disclosed by the dribble-files we find some distinctions that are both interesting and significant. Here are the individual scores behind the no-gain finding on the Levels Test for the experimental group, ranked by the number of source texts (¶'s) requested on PET•2000:

Table 12.6 Levels outcome by subgroups

	¶s	Levels Test Pre	Post	Diff
3H Nasra	919	55	72	17
3H Sumaya	676	83	94	11
3H Asma	670	83	93	10
3H Wael	288	78	89	11
3H Aida	273	83	94	11
3H Fathiya	257	80	100	20
3H Salwa	180	89	78	-9
3H Nasser	162	78	72	-6
3H Mohmoud	152	72	61	-11
3H Saoud	77	61	72	11
3H Ahmed	39	89	67	-22
3H Aqil	18	72	67	-5
	Mean	76.92	79.92	
	S.D.	10.43	13.27	

The experimental group in fact contains two distinct groups, in terms of both program use and vocabulary gain, divided fortuitously into sub-groups of six each, and interestingly also by gender (although with one exception in each direction, Wa'el and Salwa).

These two groups form another almost perfect comparison set. The Levels pre-test scores are virtually identical (female mean 77.0%, male 76.8 %), as are the text-task pre-test scores (female 70.0%, male 71.0%), while the number of source text requests is five times higher for the females (t = 3.45, p<.05), as shown in Table 12.7.

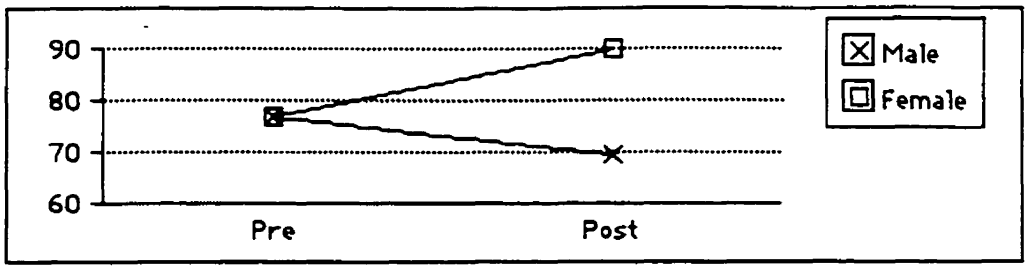
Table 12.7 Genders same and different

	Levels Pre		Program Use (¶s)	
	Female	Male	Female	Male
	55	89	919	180
	83	78	676	162
	83	72	670	152
	78	61	288	77
	83	89	273	39
	80	72	257	18
Mean	77.0	76.8	513.8	104.7
S.D.	10.97	10.91	279.2	69.0
		n.s.d.		s.d.

For these two groups, divided only by mode of use of PET•2000, the Levels Test pre-post difference is significant: From a common mean of 77% (S.D. 10.9), the female group has advanced to 90% (S.D. 9.64), while the male group has declined to 69.5% (S.D. 5.82), a terminal difference of over 20% on the Levels Test, representing in real terms a difference of 400 words (significant at p<.05, F=4.94).

The male students appear actually to have lost definitional knowledge they once possessed. The irony is that if the males were not using the corpus they were almost certainly using a purely definitional strategy for acquisition, as is also suggested by their dribble files.

Figure 12.12 Levels Test pre-post



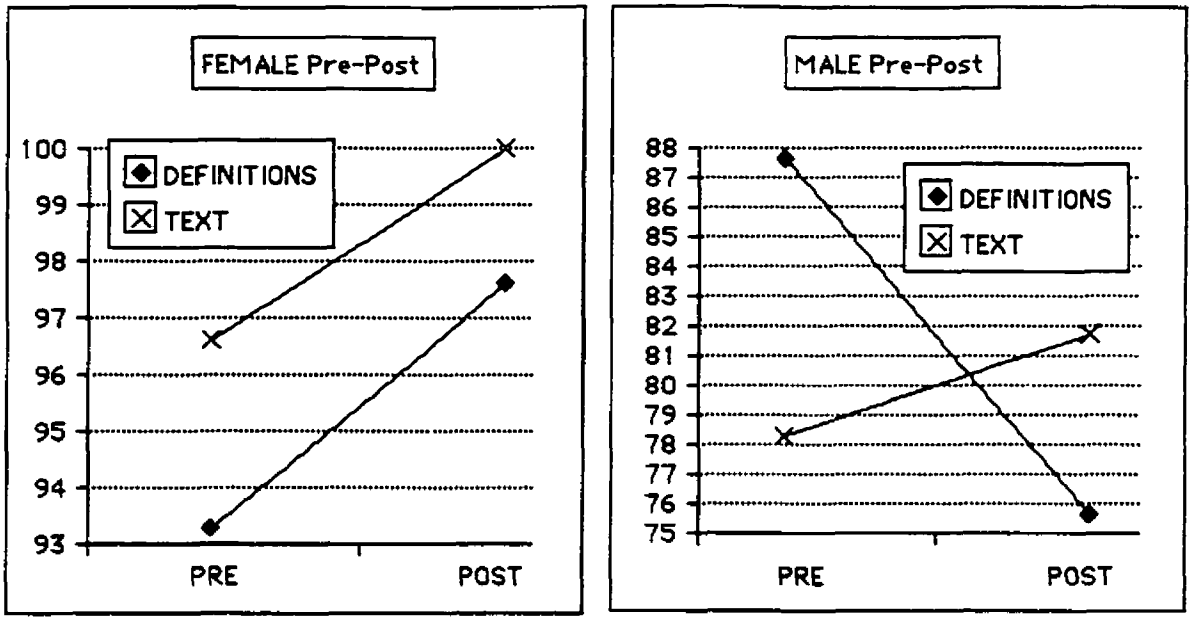
The loss pattern appears to be real, since it survived a replication. In a surprise retention test, a random weekly quiz was re-administered in April 1995 six weeks after it was originally administered in February, and the same effect was found:

Table 12.8 Stick test

	DEFINITIONS		TEXT	
	MALE	FEMALE	MALE	FEMALE
FEB	87.6	93.3	78.3	96.6
APRIL	75.6	97.6	81.7	100.0
	-12.0 s.d.	+4.3	+3.4	+3.4

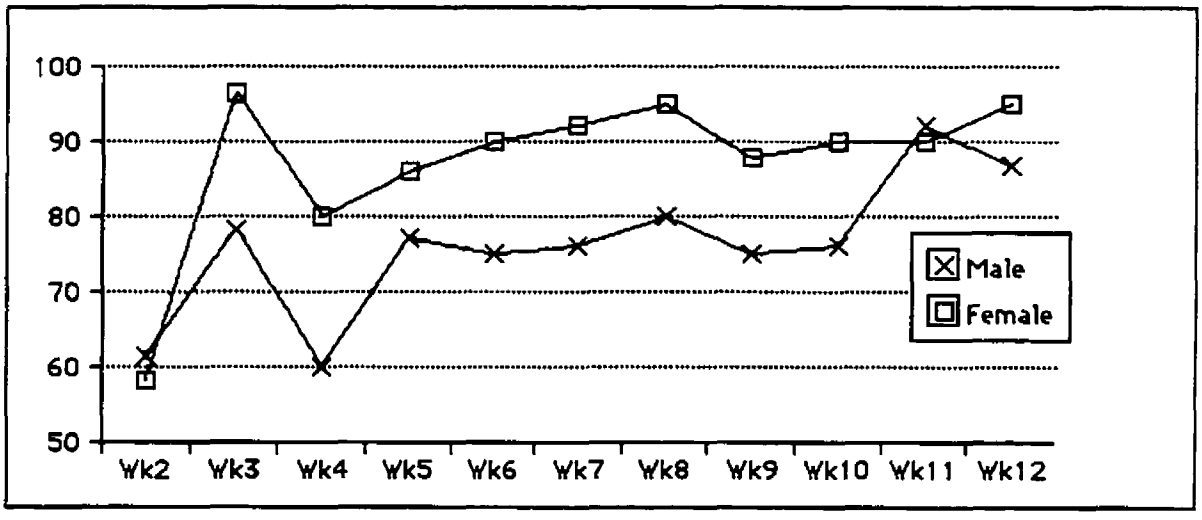
For males, definitional knowledge of words they knew six weeks ago has declined, from 87.6 to 75.6 (s.d.), while their contextual knowledge has stayed the same (78.3 to 81.7, n.s.d.) For females, there are no losses, and although gains are not statistically significant this seems an artifact of a ceiling effect. Figure 12.13 presents this information graphically.

Figure 12.13 Plunging defs-line



These differences are interesting, but the main difference between the male and female groups lies in scores on the text task in the weekly quizzes. In Figure 12.11 the in-class quizzes were divided for definitional vs novel-text tasks; and now the text task is further divided for male and female contributions:

Figure 12.14 Text-task by gender



All differences are significant except weeks 2, 5, and 11 (75% of the time).

The finding seems clear: learning words from texts enables students to comprehend them in novel texts; learning words from definitions does not aid comprehension, and the definitions will probably be forgotten as well. Students still have a lot to learn about words after they have learned to match them to short definitions, and corpus work for these students was almost certainly not a waste of their time.

Conclusion

It seems clear that meeting a word in several contexts, whether slowly in natural reading or quickly in a corpus, enables a language learner to comprehend the word in novel contexts. These female students (and one male classmate) are acquiring word knowledge of a quantity and quality normally the result of years of reading or months of intensive instruction, but with an average time expenditure of less than 10 hours—give or take an hour and a half:

Table 12.9 Measure of efficiency

	MINUTES	HOURS
Sumaya	700	11.66
Asma	653	10.88
Nasra	583	9.71
Aida	519	8.65
Fathiya	517	8.61
Wael	441	7.35
SUM	3413	56.86
MEAN	**568.83**	**9.48**
S.D.	95.92	1.60

CHAPTER 13

ONGOING WORK AND PROSPECTIVE

With PET•2000 shown to be a useful resource when taken as directed, the next step is to expand the system. As noted above several times, with 2000 words the process of lexical acquisition has hardly begun. The PET•2000 interface can be easily extended to additional word lists and corpora that can take learners on to higher levels of lexical acquisition. What word lists, and which corpora?

A preliminary adjustment at the 2000 level is to replace the PET (Hindmarsh, 1980) word list of 2387 words with West's (1953) more widely used General Service List (GSL) of 2000 words. The two lists are largely coextensive, except that the Hindmarsh list contains some surplus Anglicisms ("byro" and "duvet") and a quirky selection of phrasal verbs ("put up" but not "put up with"). Also, Nation's program of research uses West's list, so replacing the PET list with the GSL will bring PET•2000 into line with that agenda. Both lists antedate computing, of course, and are likely to be modified in the near future (the COBUILD list?), but as Nation (1994, p. 284) writes, the GSL "for all its imperfections has not yet been improved upon."

Whither to extend?

It was once thought that when a learner knew 2000 words, 80% of tokens in an English text, direct instruction in vocabulary should end; the rest

could be acquired by inference. I myself expressed such a view in a recent conference paper (Cobb, 1995a, p. 5):

> The advantages seem obvious of having control over 80% of the words of a text you might be trying to read in a foreign language. One is that if 80% of its words are familiar, you can probably work out the meaning of the rest for yourself.

I now disagree with this position, possibly as a result of working with students who more or less know 2000 words and watching them struggle with thick economics textbooks. When 2000 words was an impossible dream, it seemed adequate; once attained, it seems a bare beginning.

Knowing 80% of the words in a text still leaves 2 in 10 words unknown, a density probably too great for many successful inferences to take place. Here is a sentence about forestry in New Zealand with unknown words represented by gaps (the reader's skill in supplying the missing word will predict roughly a learner's success in inferring a meaning):

> If _____ planting rates are _____ with planting _____ satisfied in each _____ and the forests milled at the earliest opportunity, the _____ wood supplies could further increase to about 36 million _____ meters _____ in the period 2001-2015. (Nation, 1990, p. 242.)

With seven words unknown in 40 (roughly 20%), it would appear that little successful inferencing can take place. Admittedly the sentence is out of context, but in any case researchers now believe that inference is unlikely to be successful with only 80% of word tokens known, and becomes consistently practical at levels more like 95%, or one unknown word in 20.

Laufer (1989, 1992) and Hirsh and Nation (1992) converge in his view, and it can be experienced directly if the reader repeats the exercise above with two words unknown in 40 (or 5%):

> If current planting rates are maintained with planting targets satisfied in each _____ and the forests milled at the earliest opportunity, the available wood supplies could further increase to about 36 million _____ meters annually in the period 2001-2015.

Therefore, a suitable goal for academic second-language readers is to learn enough words to transform texts in their area of specialisation from texts of the first type into texts of the second. Then, true independent lexical acquisition would actually be possible; words would be either completely inferable from context, or else narrowed sufficiently for a dictionary to be of substantial use. However, the distance from 80% to 95% is larger than it looks.

This can be seen in the following well-replicated corpus finding (Carroll, Davies, and Richman, 1971, cited in Nation, 1990, p.17):

Table 13.1 Word frequencies

Different words	Percent of average text
86,741	100 %
43,831	99
5,000	**89.4**
3,000	85.2
2,000	81.3
1,000	49
10	23.7

From this information, it appears that for learners to know even 18 words in 20 (90% of an average text), direct vocabulary instruction would have to proceed from 2000 words to 5000. The problem, of course, is that the size of this task leads straight back to the impossible time frame lexical tutoring was supposed to avoid in the first place. Learning 3000 more words would be a task of at least three terms, even at the accelerated rate of PET•2000's best users. So direct teaching of 90% of the words of English is not a very feasible goal, and 95% is out of the question. In other words, a major portion of building a native-size lexicon must apparently be left to the winds of fate, as it has always been. However, a pessimistic conclusion could be premature.

The University Word List

In Chapter 1, the work of Nation and colleagues was offered as a good example of the benefits of the statistical analysis of language to course design. These researchers believed that for specific genres of text there might be high-frequency lexical islands beyond the 2000 level, which if identified could provide shortcuts to reaching the 95% mark within these genres. The genres of interest are academic discourse in general and then the discourse of specific subjects.

First, academic discourse in general. The search for a zone of academic discourse has been going on since the early 1970s, well before the era of corpus and concordance. Most of this work was undertaken in places where large numbers of students were suddenly destined for academic studies in English. One of these was the American University of Beirut,

effectively the main university for the Arabian Gulf in the early days of oil. Jean Praninskas worked in Beirut in this period and found her students in desperate need of vocabulary, much like their Omani brothers and sisters more than two decades later. She found, moreover, that this need unexpectedly persisted even after the 2000 level had been attained.

In a pre-computational corpus analysis, Praninskas copied out every tenth page of ten of her students' first-year academic texts producing a corpus of 272,466 running words. She submitted this corpus to a frequency analysis with a computer program, producing a list of word families in order of frequency. Then she subtracted out West's (1953) 2000 list, and was left with a high-frequency residue of 507 headwords occurring across all ten texts. Interestingly, most of these words were Latin based. Arabic, of course, provides no easy cognate route into this lexical zone, while most European languages do (as shown by Ard and Homburg, 1983). So Arabs and others with non-Indo-European first languages have special needs in this lexical range. Praninskas' 507 words were published as the American University Word List (1972) and became the focus of a successful introductory vocabulary course in Beirut (which was probably followed by many present-day Gulf state ministers and business leaders).

Xue and Nation's (1984) contribution was to gather together four academic vocabulary lists developed in the 1970s by methods similar to Praninskas' and combine them to produce an integrated list of just over 800 words which they called the University Word List (UWL). This list has been widely used in developing countries in the last decade, particularly in countries where the first language is unrelated to Latin. Ironically, it is not used in any Gulf university that I know of at present.

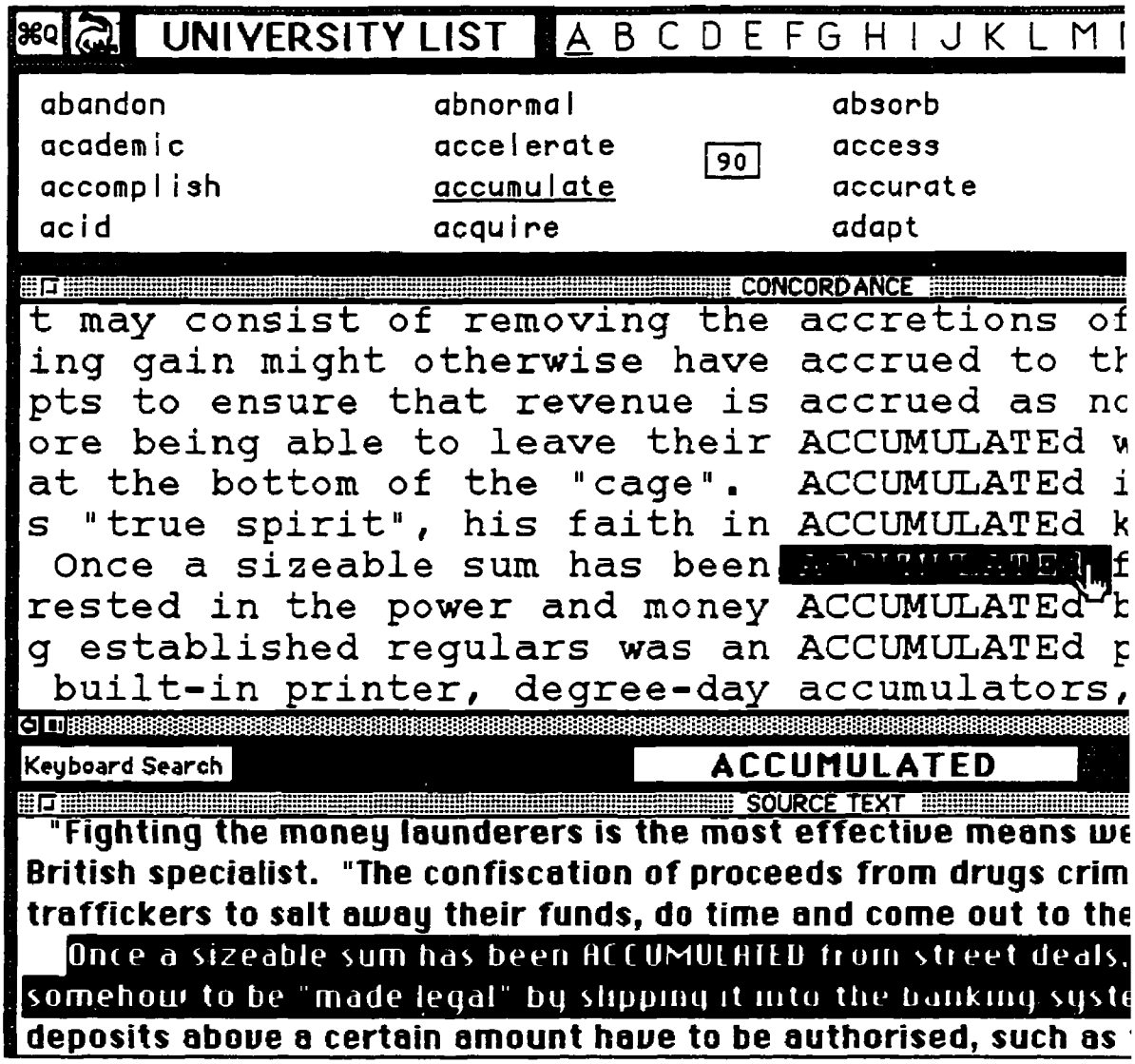
When eventually tested against computer corpora, the UWL has shown itself to be in some need of revision (Hayden, 1995), but in the main its existence has been confirmed and its importance even better specified. Sutarsyah, Nation and Kennedy (1994) assembled a computer corpus of more than 300,000 words from 160 subject areas and found that, as expected, 2000 word families accounted for roughly 80% of the individual words across this corpus, as they would across any, and that the UWL accounted for an additional 10% of the individual words in this particular corpus. Thus a student who knew the 2000 list plus the UWL would know 90% of the words in his or her academic texts. Learning 850 words may seem a lot of work merely to move from 80% to 90%, but seen in terms of the progress toward independent learning, it cuts the proportion of unknowns to knowns in half—from 2 unknown in 10, to 1 in 10.

So the logical extension of PET•2000 is to expand it to include the UWL and of course a second corpus to exemplify it. Extensibility, as discussed in Chapters 5 and 10, is among the desiderata for a lexical tutor and one of the strengths of the concordance approach.

Pilot study of UWL-extended PET•2000

An extended version of PET•2000 was developed in January 1996 and trialed with 46 Band 4 students in the College of Commerce at SQU, February-May 1996, as shown in Figure 13.1.

Figure 13.1 PET•2800 with UWL and MicroConcord corpus



The UWL was built in as a start-up option, and attached to it was Oxford's million-word MicroConcord Corpus "A" (five genres of writing from The Independent newspaper). The UWL was broken into weekly chunks of about 70 words each, and a further set of weekly quizzes was prepared. The computer interface and procedures were all exactly the same as before, and the users of the extended tutor were mainly veterans. The only difference was the difficulty of the words and especially the corpus.

The Latin orientation of the wordlist is clear in Figure 13.1 above and Figure 13.2 below.

The 12 weekly quizzes follow the usual format:

Figure 13.2 Sample weekly quiz

UWL Quiz 4: Range crystal-dynamic
Name: .....

A. Write the number of the word next to its definition:

1. diagram
2. drama
3. debate
4. denominator
5. doctrine
6. dimension

__length, width, or height
__controversy, argument
__picture, chart

1. deny
2. diverge
3. distribute
4. demonstrate
5. distort
6. define

__separate, go a different way
__show
__give the meaning

1. digestion
2. deprivation
3. domination
4. depression
5. deficiency
6. dictation

__low place; sadness
__writing spoken language
__power, control

1. deficient
2. dynamic
3. distinct
4. divine
5. deliberate
6. distorted

__lacking, poor
__false; stretched out of shape
__active, energetic

B. Choose words to complete the passage:

diverse	detriment	drastic
decades	culture	dense
cumbersome	detect	devote

The Price of Development

An Amazonian Indian is walking down the streets of Washington in the middle of rush hour traffic. His shoulders are broad and his hair is long and black. He walks as if he isn't used to wearing shoes, as if he finds his clothes heavy and (1)..... . He doesn't seem to notice the traffic but he is constantly watching the trees where his hunter's eyes can (2)..... the smallest movement of a bird or animal. What is this stranger from the jungles of the Amazon doing in Washington? He has come to make a complaint to the Inter-American Commission on Human Rights. He has come to say that his people and their (3)..... are being destroyed by development. Development should bring benefits to a country but in the case of the Huaorani Indians of the Amazon, it has brought little but (4)..... . How did this happen? First, about three (5)..... ago, oil was discovered in the part of the jungle where the Huaoranis live. Since the coming of the oil companies, the pipes have burst 27 times, poisoning the drinking water over a huge area and killing plant and animal life. Secondly, the (6)..... forests of the Huaorani homeland are being destroyed, tree by tree, and the valuable wood is being exported all over the world. This may be good business but it means the destruction of a natural environment. The wildlife of the Amazon jungle is extremely rare and (7)..... . Many of the thousands of different kinds of plants and animals that live there are found nowhere else on earth. Scientists predict that if the present rate of development continues, the Huaorani lands will be completely bare of trees in about twenty years. And their oil resources will be used up too, having satisfied the oil demands of the United States for about 13 days!

And what is happening to the Huaorani Indians? Many of them are leaving the Amazon jungle to go and live in cities. But few of them have the job skills or education that they need to succeed there. Most are unable to adjust to the (8)..... change in their lives and rapidly sink to the bottom levels of society. Proud Indian hunters degenerate into people without hope.

Will there be a happy ending to this story? Perhaps, but so far it looks like we may pay a high price for development – the destruction of life on this planet.

–from the Toronto Globe & Mail, March 1996

As before, the lexis of the texts other than the to-be-placed words themselves is constrained, here to the 2000 list plus the UWL list as covered to date, with the aid of the EspritDeCorpus software. Unfortunately, a similar degree of lexical control on the corpus itself was impractical to exercise. The MicroConcord corpus was not passed through the EspritDeCorpus filter, since for a million words this would be a labour of many months even computer-aided. In other words, it was possible that this corpus would be too difficult for some of the students.

Evaluation of extended PET•2000

The students felt that they benefited from exposure to the UWL words, as might be predicted from Praninskas' work with Arabic speakers and academic English. A survey of students' attitudes to learning the UWL (Appendix H) shows that 61% thought learning these words was "very useful," and 61% thought 70 academic words a week was "difficult" while only 4% thought it was "impossible."

As for learning the words from the corpus tutor, the finding is less positive. Language instructors reported that the students found the MicroConcord corpus too difficult to use as a word-learning tool, and in their survey the students made it clear this was true. The ratio of unknown to known words was apparently too high to facilitate inferential learning, even with concordance facilitating the negotiation of input. In light of the discussion above, and well after the fact, it was indeed predictable that students with 2000 words would not have the necessary base for making useful inferences. But at time of development, the decision to use this

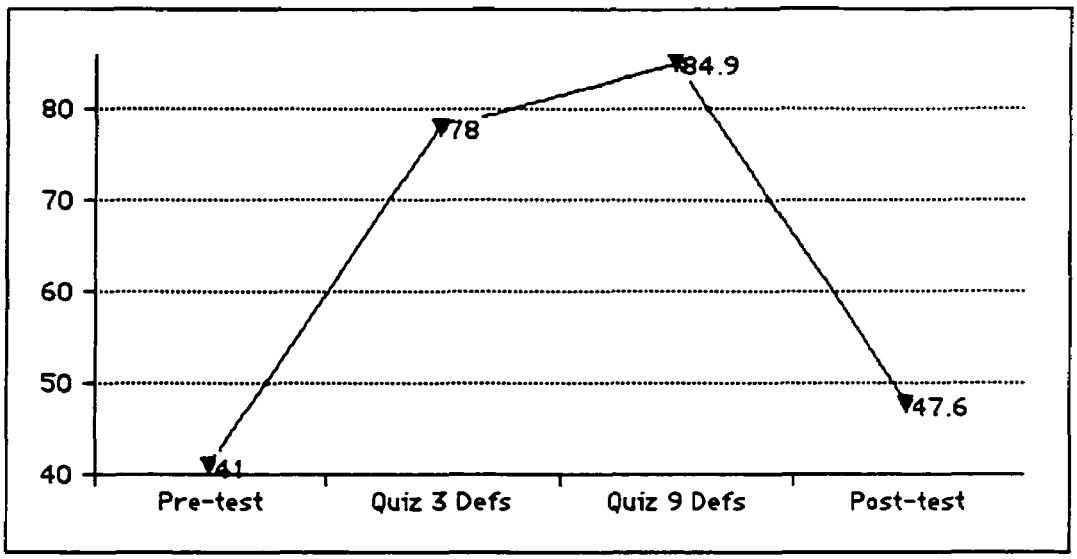
corpus for this purpose was an honest mistake. So most students adopted a dictionary-based learning strategy, by-passing the corpus.

User feedback

This turn of events was a setback, as often occurs in computer work in real-life settings. Nonetheless it opened up some opportunities for learning more about corpus tutoring. The same measures used in the PET•200 and PET•2000 studies were applied to the UWL students, the Levels Test pre-post (but at the UWL level) and the weekly quizzes divided for definition and text tasks. These measures should enable the testing of some predictions about word learning related to non-use of the corpus: First, the students will adopt a definitional learning strategy. Second, definitional gains will be small between pre and post, although not necessarily week to week, because without text work the definitional learning will not be retained. Third, on the weekly quizzes text-task scores will be lower than definition-task scores.

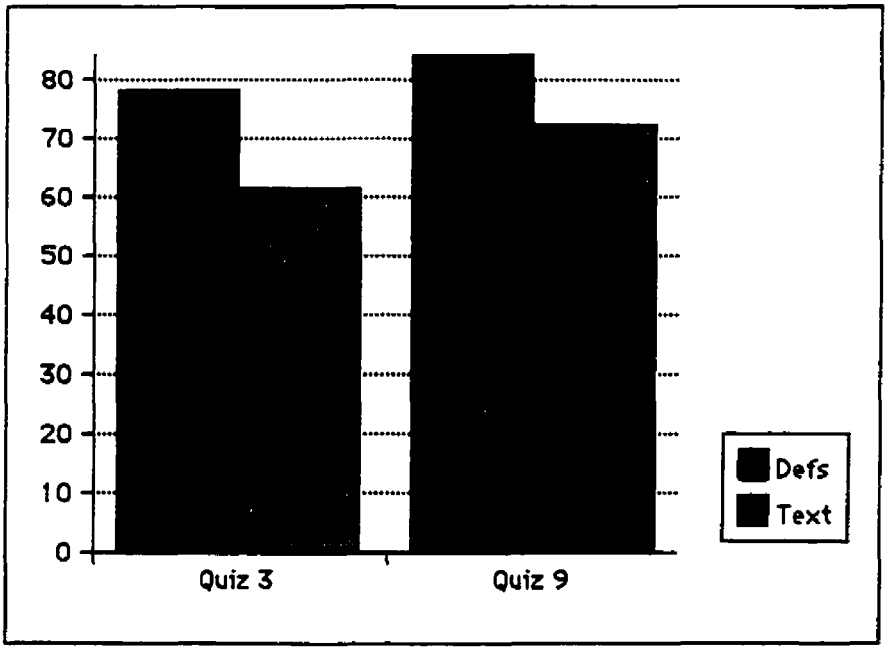
Data was collected in the spring term of 1996 for 29 Band 4 students in two intact groups. On the UWL part of the Levels Test, the subjects pre-tested at 41.0% (SD 15.3) and post-tested at 47.6% (SD 14.3). This represented a gain of 6.6%, significant ($t(28)=2.68$, $p<.05$) but small, as predicted. In terms of the 800 UWL words, it is only about 50 new words. But on the weekly quizzes, scores on the definition part of the quizzes had been high. The Quiz 3 mean was 78.0% (SD 15.1) and Quiz 9 was 84.9% (SD 12.7). So it appears the definitions were learned but not retained.

Figure 13.3 Learning by definitions



Also as predicted, the text-task scores on these quizzes were markedly lower than the definition scores. The text-task mean for Quiz 3 was 50.3% (SD 25), for Quiz 9 it was 72.2% (SD 19.6), as shown in Figure 13.4.

Figure 13.4 Definitional vs contextual ability



So once again, it appears that definitional knowledge of words does not show up in the text task, and further that definitional knowledge by itself is poorly retained.

It would probably not be fair to say that the students were learning nothing in this experiment. The weekly quiz trend is clearly in the right direction on both measures, and the Level Test score probably fails to pick up some learning that actually took place.

The students were well aware of what was missing from this instructional design, as they made clear in their answers to the questionnaire on their UWL work (Appendix H). Although most students could not get comprehensible examples from the corpus, 76% wanted teachers to help them learn the words by "presenting the way words are used in sentences more in class." The problem with that, of course, is that exemplifying 800 new words in class is effectively the old "rich" instruction of Beck and colleagues (1982) that the corpus tutor is trying to deliver more efficiently. The development of a usable corpus is clearly the major challenge.

Revised assessment for extensibility

The claim made above that a corpus tutor is "easily extendible" apparently needs some modification. While it is true that large supplies of text are readily available at present, the instructional value of authentic corpora at least for lexical growth appears to be far from obvious. The exact cost of developing a special corpus to carry the UWL remains to be seen, but it is

still probably less than developing 800 dedicated definitions or pregnant contexts. The way to go about the task is probably not to start with a million-word corpus and begin simplifying, but to proceed in the opposite direction (as with the 2000-level corpus) from a collection of texts that the students are familiar with and build it up. The definition of this corpus is presumably that it should contain no words beyond the 2000 list plus the UWL, just as the definition of the previous corpus was that it should contain no words off the 2000 list. With a suitable corpus, there is no reason that the UWL will not be as amenable as the 2000 list to a complete self-access treatment.

The final battle for lexical independence

There is a long way to go before the UWL extension will be running at full speed, but even so that will not be the end of the road for the tutor. Nation has suggested that direct instruction should continue until inferential learning is feasible, in other words until 19 words in 20 are known in an average text or 95% of word tokens. The difference between 90% and 95% may seem negligible, but in fact between the two figures there is another halving effect, from 1 unknown word in 10, to 1 in 20. The importance of this difference is clear when visualized as lines of printed text, an unknown word every line vs every second line.

Learning 95% of the words of English on an entirely naturalistic basis is a labour of many years; it effectively brings the learner to the lower bound of the native lexicon, about 13,000 word families by one recent calculation (Goulden, Nation, and Read, 1990). Fortunately, once again corpus

analysis can identify feasible sub-sets of the task within discourse genres, in this case the discourse of specific academic subjects.

Sutarsyah, Nation and Kennedy (1994) developed a 300,000-word corpus of texts within a specific discipline, economics, and found that after the 2000 range and the UWL had been subtracted out of the corpus by their computer program VocabProfile (Hwang and Nation, 1994), about half the remaining 10% of the words consisted of a relatively small group of heavily repeated, domain-specific, technical terms. In other words, there appears to be a third high-frequency level within specific disciplines, or at least the specific discipline of economics, that could be the focus of a third and final vocabulary course that would take a learner up to 95% and lexical independence. Whether other disciplines have similar lexical cores is an empirical question, although the default assumption is that they do.

Concordance technology is capable both of finding the high frequency lexis within a discipline, and then presenting it to students tutorially. For both tasks, the challenge as always is the corpus. Typing up whole course textbooks to feed into the concordance program is not easy, even with the help of a scanner. However, as corpus applications become more widely known and used, publishing companies will probably respond to instructors' demands for on-line versions of their books. With a textbook in machine-readable form, any concordance program can easily identify its raw lexical core, and then VocabProfile or EspritDeCorpus can subtract out the 2000 list and the UWL, exposing the specific lexical core of the subject. That core then becomes a third list for instruction, and the textbook(s) becomes the corpus, possibly unmodified in this case. It goes without saying that more textbooks are better then fewer in this process;

and that if the approach proves successful in one discipline, it will probably prove successful in many.

The best-case scenario for both the UWL and subject-specific extensions is that a single subject-specific corpus might be adequate to both tasks. After all, the UWL is as much present in a subject-specific corpus as in a multi-discipline corpus. The UWL and a subject-specific lexis might be able to bootstrap one another if they were taught at the same time, particularly if the subject-specific lexis was getting a lot of concurrent exposure and motivation in a subject-area classroom. There is no rigid sequence of UWL then subject lexis, as there presumably was for 2000 then UWL, and the subject lexis might as easily provide the inferential base for the UWL as vice versa.

The final goal is to have a three-part lexical tutor that accompanies learners from minimal reading ability to independent reading in an academic discipline. It is by no means proposed that such a tutor would be sufficient in itself, just an important complement to the usual classroom materials and activities. Given the unlikelihood that published coursebooks will ever guarantee either lexical coverage or enough exposures for learning to occur, this tutor would operate quietly in the background guaranteeing both.

CHAPTER 14

CONCLUSION

Nation (1982, 1990, 1994) and Meara (1980, 1988, 1993) have argued for years that learners are lexically under-challenged in the majority of published courses. Barnard (1971) argued that students could learn 2000 words in five years of study; Meara (1980) argued that they were probably capable of learning more like 2000 a year. The present study suggests that Meara was closer, and explores one way of building up volume without sacrificing depth. The learner-as-lexicographer fiction and technology allows large numbers of words to be met and processed in context.

Recapitulation

In the introduction, several desiderata were set out for a second-language reading tutor: The tutor should be extensively used by a large number of students over a lengthy period; it should be integrated into an ongoing curriculum; it should be based on theories deriving from basic research; it should be tested for learning effectiveness against a control group, and this information fed back to the development process; it should involve the reading of extended texts; it should use the computer to do things with text that cannot be done or easily done on paper; it should invite students to ask rather than answer questions. It was proposed that the concordance concept and technology made it possible to group these desiderata within an extended program of software development.

• Large numbers and lengthy period: As of June 1996, nearly 1000 students at SQU have used some form of corpus tutor in some way over three years, some for as many as 30 hours. PET•2000 is probably one of the ten hardest-used tutors in the history of CALL, to the extent that amount of use gets reported in the literature.

• Curriculum integration: The concordance tutor was tightly integrated into an ongoing curriculum. It was based on clearly analysed student needs which were impeding progress in their studies, in some cases forcing them to abandon their studies. All computer work was reinforced within the same week in the classroom.

• Based on theory and research: The tutor was designed to exploit research-based information and test its instructional applicability. Instructional research has shown that transferable word knowledge is mainly produced by extensive reading. Both instructional and psychological research have isolated the mechanism of transfer in multicontextuality. This study tested and confirmed the hypothesis that some of the benefits of multicontextuality can also be realized with a concordance program.

• Feedback to development: Learning effectiveness was tested at every step and fed back to development. Particularly, the lessons of PET•200 were fed into the development of PET•2000. The basic multi-contextuality principle was validated in PET•200, applied to massive acquisition in PET•2000, and will be further tested against the University Word List pending the development of a suitable corpus.

• Something to read: PET•2000 involved the reading of texts, possibly as many as 200 paragraphs a week, about 20 pages, for heavy users.

• Exploiting the computer: The computer was used to present text in ways that cannot be done practically on paper. Assembling all examples of a word throughout a term's reading is routine for a concordance, next to impossible on paper or in a classroom. Also, the computer helped the learners produce high-quality, multi-page documents that they could hardly create by themselves (the glossaries), but which were nonetheless created as a result of their inputs and decisions.

• Asking not answering: Many students used PET•2000 to ask for 1000 or more examples of words in use, probably more questions than they asked in class plus all their dictionary look-ups combined.

Whatever happened to the PET?

The reader may wonder why the PET itself has not been used as one of the dependent measures in this study. The reason involves University policy. After PET testing, students and instructors alike are informed of band levels but not raw scores. Since band level is hardly a fine measure of learning, as is particularly needful in the case of vocabulary and reading, it was not used in this study. The PET was used rather to derive an experimental learning task and motivate subjects.

Still, the claims for corpus tutoring would be weakened if the learning detected in this study had not affected the Omani students' PET experience in some way. In fact, the PET has effectively disappeared as a major problem in the College of Commerce, although there is no way of disentangling all the contributing factors. In May, 1994, only 5 out of 20

Band 3 students cleared the Band 4 hurdle; in December, 1995, all 17 Band 3 students went to Band 4; and similar trends existed at the lower levels.

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SAMPLE 1 (out of 20)
(CA=Cambridge; CO=COBUILD; HE=Headway; LDOCE=Longman Dict. defining voc; GSL = West list)

SAMPLE 1												
PET	CA1	CA2	CA3		CO1	CO2	CO3	HE1	HE2	HE3	LDOCE	GSL
able		√	√		√	√	(√)				√	√
about	√	√	(√)		√	√	(√)				√	√
above		√	√		√	√	(√)				√	√
abroad						√	(√)	√	(√)		√	√
absent											√	√
accept						√	(√)		√		√	√
accident*		√	√			√	(√)	√	√		√	√
accommodation*						√	(√)		√			
account (bank)			√			√	√				√	√
ache											√	√
across	√	√	√		√	√	(√)		√		√	√
act						√	√		√		√	√
actor	√	(√)	√				√	√	(√)		√	
actress	√	(√)	(√)				√	√	√		√	
actual(ly)	√	√	√		√	√	(√)				√	√
ad(vertisement)			√						√		√	
add						√	(√)				√	√
address (n)	√	(√)	(√)		√	(√)	(√)	√	(√)		√	√
admire											√	√
advanced						√	(√)				√	√
TOTAL 20	**6**	**9**	**11**		**6**	**14**	**17**	**4**	**10**		**19**	**16**

(√) = word does not appear in this coursebook but appeared in a previous book in the series *

* This counting procedure probably errs on the side of generosity, counting a word present in book 2 or 3 if it was present in any previous coursebook. The presence of parentheses (√) in both Cambridge and Cobuild third coursebooks underlines the point that after about 1000 words direct teaching of new vocabulary drops off. Headway does not even include a vocabulary list with its third book.

SUMMARY of 20 coverage-check samples

	CA1	CA2	CA3	CO1	CO2	CO3	HE1	HE2	LDOCE	GSL
Sample 1	6/20	9	11	6	14	17	4	10	19	16
Sample 2	3	6	10	4	9	10	3	9	13	12
Sample 3	6	9	11	4	13	17	4	9	14	18
Sample 4	2	6	8	4	9	15	1	5	10	12
Sample 5	8	8	10	3	9	10	7	8	9	8
Sample 6	4	12	14	7	11	14	6	8	16	12
Sample 7	6	9	11	6	10	14	8	11	16	13
Sample 8	2	5	10	3	10	14	6	10	11	13
Sample 9	5	5	10	5	11	15	5	10	13	13
Sample 10	8	11	12	7	10	13	10	10	12	10
TOTAL/200	50	80	107	49	105	139	54	90	133	119
MEAN/20	5	8	10.7	4.9	10.5	13.9	5.4	9	13.3	11.9
S.Dev.	2.2	2.4	1.6	1.5	1.8	2.4	2.6	1.7	3.1	
% of Pet Words	*25*	*40*	*54*	*25*	*53*	*70*	*27*	*45*	*66.5*	*59.5* *
X 2400	600	960	1284	588	1260	1668	648	1080		

* The low overlap between various versions of "the basic 2000 words" suggests a need for conceptual alignment and a definitive corpus study on the matter.

Appendix B: Pre-post test for PET•200

BEFORE & AFTER VOCABULARY TEST
CCE ENGLISH - APRIL 4-5 & MAY 15-16, 1994

As you know, you must learn many new words to do well on the PET. You are learning words in three ways - in We Mean Business, in your Vocabulary course, and on the Mac computers. This test is of some of the words you WILL LEARN in these three ways in the weeks between now and the PET. You will do this test now, and then again after you have been taught the words. This gives us, your teachers, information about what you knew already and what you have learned, so that we can make your vocabulary instruction more effective in the future.

1. Put one of these words in each space. Do not use any word twice.

injections	distribute	athletics	victims	respects
reserves	conferences	opportunity	clients	sightseeing
protect	optimistic	scenery	surprise	stressful

Like other people, doctors travel to foreign countries for many reasons. Sometimes doctors travel to attend large international (1)_____ where they can hear about new ways of helping sick people. Of course they also like to spend their holidays in foreign countries. They enjoy the beautiful (2)_____ of mountains, lakes or beaches, or they go (3)_____ in interesting cities, just as other tourists do. But some doctors spend their holidays in places that are not so beautiful, such as Somalia or Bosnia. For these doctors, their holidays are an (4)_____ to help people in need. They travel to these countries to help the (5)_____ of war, hunger and illness. These doctors open hospitals, treat injuries, give (6)_____, deliver babies and (7)_____ food and medicines. The equipment and medicines they need are often not easily available, and there is the danger of getting killed in the fighting, so their work is very (8)_____. Last month a doctor was killed in Angola. Fortunately, some doctors are always ready to spend some holiday time in dangerous places to help hungry, sick and dying people. They don't get rich doing this work, but everyone (9)_____ them for facing danger to save lives.

2. Put one of these words in each space. Do not use any word twice.

trust	reference	architect	lawyer	training
powerful	adult	persuaded	increased	exported
promotion	refinery	terrible	original	ordinary

Once there was a little boy called Billy Bob whose parents gave him everything he wanted. When he grew up to be an (10)_____, he wanted an important job, of course. His father was rich and (11)_____, so he knew he could get his son a good job in a big company. Billy Bob had low marks at school but his father paid the headmaster of the school some money, and a very good letter of (12)_____ appeared on the company manager's desk. At the job interview, the manager asked Billy Bob what he liked to do. Billy Bob was lazy and didn't really like work of any kind, but he told the manager that he like to draw pictures, so the company gave him a job as an (13)_____. He had no experience or (14)_____ in building things, so he was given easy work to do. Billy Bob's father kept on investing lots of money in the company, and every year Billy Bob got a (15) _____. After a few years Billy Bob was at the top of the company, second only to the manager! And, of course, his salary (16)_____ every year too. Billy Bob didn't like to do (17)_____ work like copying drawings or calculating measurements; he always wanted to make important decisions. One day the company got the biggest contract it had ever had--a contract to build an enormous hotel. Billy Bob (18)_____ the manager to let him plan it alone, without any help from anyone else. The manager didn't (19)_____ Billy Bob, but he couldn't refuse him, so Billy Bob's beautiful hotel was built. This story has a (20)_____ ending, of course. The first time a strong wind blew, the whole building fell down.

3. Choose the right word to go with each meaning. Write the NUMBER of the word beside its meaning. Example:

1. business	
2. clock	
3. horse	_6_ part of a house
4. pencil	_3_ animal with four legs
5. shoe	_4_ something used for writing
6. wall	

3a.

1. carpenter	
2. fuel	____ a car, truck or bus
3. surprise	____ strength over a long period of time
4. vehicle	____ a book that tells a long story
5. novel	
6. stamina	

3b.

1. dissolve	
2. import	____ make someone remember something
3. remind	____ cover with paper
4. wrap	____ mix with water completely
5. sack	

3c.

1. smooth	
2. tiny	____ very small
3. confidential	____ old and well known
4. adventurous	____ personal, secret
5. wise	
6. traditional	

3d.

1. brochure	
2. election	____ rice, wheat, corn
3. fraction	____ a folded paper with information and pictures
4. grain	____ one half, one third, one quarter etc.
5. diversion	____ a piece of money
6. parcel	
7. coin	

3e.

1. demolish	
2. punish	____ break down, destroy
3. apply	____ must return money
4. decorate	____ hurt someone who did something wrong
5. preserve	
6. owe	

3f.

1. nonsense	
2. property	
3. pain	____ very bad feeling, hurt
4. queue	____ silly talk, untruthful words
5. recommendation	____ anything that belongs to a person
6. brooch	____ thing, item
7. object	

THE END

VOCABULARY QUIZ 1
NAME .....

Part 1. SPELLING (1/2 point each)

1. .....
2. .....
3. .....
4. .....
5. .....
6. .....

Part 2. RECOGNITION

Write the number of the word next to its meaning.

1. turn down
2. look up
3. hang up
4. put out
5. tidy up
6. turn off

___ clean
___ make quiet, lower sound
___ find in a dictionary

7. sofa
8. ankle
before
9. blood
10. concentration
11. wardrobe
12. improvement

___ better than
___ place to keep clothes
___ between foot and leg

Part 3. CLOZE

Write a correct word in each gap. Choose from these words:

books	branch	advice
amusing	appeared	burglar
accident	towel	pronunciation
blames	bill	stereo

Let me tell you a true story. One day while I was at home a strange man (1)..... at my door. He introduced himself as Mr. Harami and said that the worked for an insurance company. He said that he had some good (2)..... for me. "You should have insurance ( )," he said. "You could be driving somewhere and suddenly you might have an (3)..... . If the other driver (4)..... you for causing it, you might have to pay a lot of money. But if you have insurance, the insurance company will pay for the damage. Or if a (5)..... comes into your house while you are gone and steals your television, your (6)..... , or your wife's gold, the insurance company will pay." Mr. Harami looked around the room. "The things in your house are worth thousands of rials and you will need to be insured at a high rate. But I will give you a good price, only 300 rials. Just pay me 100 rials now and here is a (7)..... for the rest. I'll bring you the insurance papers and get the rest of the money in a few days." "OK," I said, and I paid him the money. Days passed but I never saw Mr. again and no papers ever arrived. You may think this is an (8)..... story, but I don't.

VOCABULARY QUIZ 2

Name.....

Part 1. SPELLING

1. .....
2. .....
3. .....
4. .....
5. .....
6. .....

Part 2. RECOGNITION
Write the number of the word next to the meaning.

1. bracelet	
2. leather	__ group, family
3. underwear	__ you wear it on your wrist
4. tribe	
5. chest	__ shoes are made of it
6. silk	
7. woolen	
8. shy	__ not intelligent
9. stupid	__ usual, happening often
10. common	
11. adventurous	__ made of sheep's hair
12. certain	

Part 3. CLOZE
Write a correct word in each space. Choose from these words:

crowd	cash	charge
clear	catch	protect
crossroads	frightened	try on
basement	wear	changing room

Policeman: So what time did the phone ring at the fire station last night?

Fireman: At exactly eight minutes after eleven.

Policeman: Then what happened?

Fireman: We all jumped out of bed, got into the fire engine, and we drove to the (1)..... of First Street and Ring Road as fast as we could. There we saw that the shop opposite the bank was on fire.

Policeman: Right. That's the Hirami brothers' shop. So what did you do next?

Fireman: Well, one fireman held back the (2)..... of people who were watching the fire and told them to stay calm and not be (3)..... The other firemen started to put out the fire.

Policeman: What did you do?

Fireman: I ran into the burning building to see if anyone was inside. First I ran downstairs to the (4)..... , and then I went upstairs to the ground floor. That's where I noticed something.

Policeman: What was that?

Fireman: I could smell petrol and then I saw some empty petrol cans.

Policeman: Really? Where exactly?

Fireman: They were in the (5)..... , you know, the place where the customers go to (6)..... clothes before they buy them.

Policeman: Did you see any thing else?

Fireman: Yes, I remember there was a box of matches on the floor.

Policeman: Hmmm. . . . Well, the Hirami brothers have fire insurance worth 500,000 rials on that building. It is (7)..... that they started the fire and hope to collect the insurance money. This is a very serious crime and the police will do their best to (8)..... the person who did it.

VOCABULARY QUIZ 3

Name .....

Part 1. SPELLING

1. .....
2. .....
3. .....
4. .....
5. .....
6. .....

Part 2. RECOGNITION
Write the number of the word next to its meaning.

1. cough	
2. fare	__ a fruit
3. equipment	__ price of a ride, ticket
4. pear	
5. mushroom	__ films, plays, music
6. entertainment	
7. expect	
8. fail	__ put water in another glass
9. explore	
10. pour	__ not do what you want to do
11. sneeze	
12. cry	__ travel to a new place

Part 3. CLOZE

Write the correct word in the gaps. Choose form these words:

booked	earn	enjoy
ever	even	fortunately
chopped	favourite	order
explain	dessert	menu

I work as a secretary for a big company in the center of the city. My work is not very interesting and I don't (1)..... a lot of money. But one thing I really (2)..... is eating in good restaurants. So every week on Wednesday I call up some friends and we go out for dinner. We usually go to a place called Restaurant Lathitha. It's my (3)..... restaurant because the food is tasty but not expensive, and the service is always good. I always (4)..... the same meal: salmon with garlic sauce, salad and fresh strawberries for (5)..... .

Last week on Tuesday I called the restaurant and (6)..... a table for Wednesday evening at 7:00 as usual. But the next day there was so much to do at work and by the end of the day I was too tired to move--much too tired to go out to dinner. I was so tired when I got home that I couldn't (7))..... change my clothes. I just threw myself on the sofa and turned on the television. Just as I was falling asleep, I heard the TV news announcer say, "A terrible fire broke out at the Lathitha Restaurant at about 7 o'clock this evening. Several people have died and many others have been taken to the hospital. . . " I realized then how lucky I was. I might have been killed too, but (8)..... I was too tired to go out that night!

VOCABULARY QUIZ 4
Name.....

Part 1. SPELLING

1. .....
2. .....
3. .....
4. .....
5. .....
6. .....

Part 2. RECOGNITION
Write the number of the word next to its meaning.

1. engaged	
2. divorced	__ you can't read it.
3. guilty	__ against the law
4. pregnant	__ not married anymore
5. illegible	
6. illegal	
7. insist	
8. hurt	__ speak quietly
9. guess	__ try to answer
10. guide	__ show the way
11. scratch	
12. whisper	

Part 3. CLOZE
Write a correct word in each space. Choose from these words:

hiding	politely	hiring
regret	ignore	holiday
bored	irrationally	embarrassed
glad	trick	injury

My grandfather told me this true story. One day soon after he married my grandmother, they decided to go on a nice (1)..... together. So they left their small village and traveled to London by train. They went to lots of museums and parks and they enjoyed themselves very much. One evening they decided to go to a very famous and expensive restaurant. While they were enjoying their meal, a well-dressed man sat down at the table next to them. He ordered some soup, a very expensive main course and a big dessert. The man was eating his soup quietly, when suddenly he shouted, "Oh no! Waiter! There's a fly in my soup!" Everyone in the restaurant could hear this and the waiter was clearly very (2)..... He ran to the man's table immediately and looked at the soup. "Excuse me, but I think you're wrong," he said. "That isn't a fly. It's a bit of black pepper!"
My grand-mother and grandfather looked away and tried to (3)..... what was happening, but the man shouted again, "Help! There's a fly in my soup."
Suddenly, the restaurant manager appeared and looked at the soup. He saw that there was a fly in it. Then he spoke very (4)..... and patiently. "We (5)..... this very much," he said to the man. "Please order something else at our expense. Order anything you like and we will be (6)..... to pay for it!"

"Thank you!" replied the man.
But at that moment the manager noticed that the man was (7)..... a small box of flies in his pocket. The manager lost his temper completely. He was really angry. "You put the fly in the soup!" he shouted. You played this (8)..... on me to get a free meal. Get out of my restaurant at once, you thief!"
My grandparents never forgot this trip to London.

VOCABULARY QUIZ 5
Name.....

Part 1. SPELLING

1. .....
2. .....
3. .....
4. .....
5. .....
6. .....

Part 2. RECOGNITION
Write the number of the word next to its definition.

1. stare	
2. whisper	__ look at long and hard
3. offer	
4. join	__ put together
5. lack	__ not have enough
6. lend	
7. curtain	
8. jail	__ knives and forks
9. luggage	__ suitcases, bags
10. ladder	__ used to reach high places
11. secret	
12. cutlery	

Part 3. CLOZE
Write a correct word in each space.

lonely	likely	lift
load	disliked	law
lock	pullover	vehicle
landlord	decided	rude

This is a true story that happened to a friend of mine from Mexico. My friend went to work in Montreal, Canada for three months. When she arrived in Montreal, she needed a place to live. She saw a newspaper advertisement for a furnished flat near her job. The building manager showed her the flat; she liked it and (1)..... to take it. The rent was $500 a month. The building manager asked her for the $1500 needed to cover the rent for three months, and she paid him the money in cash the same day. He promised to send her money to the owner of the building.

My friend had a lovely time in Canada, but sometimes she missed her family and felt a bit (2)..... She looked forward to returning to Mexico. One evening near the end of her stay, she went back to her flat after work as usual. She took the (3)..... to the fourth floor, walked to her door and put her key in the (4)..... However, the door was already open. Inside was a terrible surprise: There was Mr. Guy, the (5) ....., and with him was a policeman!

"Where is my rent money?" demanded Mr. Guy.

"Don't you know it is against the (6)..... to refuse to pay rent?" shouted the policeman.

"But I gave the rent money to your building manager three months ago!" said my friend. "Didn't he give it to you?"

"No!" said Mr. Guy. "But let me ask you a question. Did you give your money to a tall thin man with a red wool (7) .....?"

"Yes," my friend answered. "Aha!" said Mr. Guy. "Now I understand why my building manager left his job in such a hurry about three months ago," "But what about my money?"

" I don't think you'll get your $1500 back," said the policeman to Mr. Guy. "Even if we catch the thief, he is (8)..... to have spent all the money by now."

VOCABULARY QUIZ 6
Name.....

Part 1. SPELLING

1. .....
2. .....
3. .....
4. .....
5. .....
6. .....

Part 2. RECOGNITION
Write the number of the word next to the definition.

1. minimum	
2. murder	__ list of foods in a restaurant
3. middle age	
4. maximum	__ least, smallest
5. menu	__ killing someone
6. metal	
7. elderly	
8. punctual	__ of first importance
9. miserable	
10. urgent	__ exactly on time
11. convenient	__ without hair
12. bald	

Part 3. CLOZE
Write a correct word in each space. Choose from these words:

childhood	message	adolescent
pensioner	moment	movie
trouble	old age	meal
mistake	weight	mark

Most people think that drugs ( ) are a problem in big international cities like New York and London, but recently I saw a television programme about teenagers and drugs in a small, pleasant town in Great Britain. The programme showed a mother whose teenage son died because of taking too many drugs. She was sitting in his bedroom looking at pictures of her son. In the pictures you could see that he had been a happy baby. Pictures from his (1)..... showed him to be a normal, healthy boy playing with his friends. But in the pictures of her son as teenager, you could see that the boy had lost (2)....., and even though he was young, he looked old and sick. The mother said that her son started getting into (3)..... around the age of 12 or 13 when he became an (4)..... She didn't understand how he could find drugs so easily in this lovely little town.

But that town isn't as lovely as it looks. The TV interviewed some teenagers and they said that it is easy to buy drugs in that town. Drugs are available everywhere at any (5)..... of the day or night. The teenagers said that drug sellers try to sell them drugs while they are shopping in the supermarket or having a (6)..... or a drink in a restaurant. Drug sellers approach them in the cinema as they wait for the (7)..... to start. People even tried to sell them drugs at school!
The TV reporter spoke to hundreds of secondary school students in the town. Around 75% of the students said that friends had offered them drugs, and nearly half of the students said that they had actually tried them. The (8)..... of the TV program is clear: Drugs are not just a big city problem.

Police (8)..... would like to catch these drug sellers, but the problem is that drug sellers and their young customers don't look like criminals--they look like (9)..... people.

VOCABULARY QUIZ 7
Name.....

Part 1. SPELLING
1. .....
2. .....
3. .....
4. .....
5. .....
6. .....

Part 2. RECOGNITION
Write the number of the word next to the meaning.

1. nervous	
2. normal	__ very small
3. noisy	__ not quiet, loud
4. exhausted	__ worried, anxious
5. filthy	
6. tiny	
7. departure	__ person who has something
8. newsagent	
9. notice	__ person who serves food on a plane
10. stewardess	
11. officer	
12. owner	__ leaving, going

Part 3. CLOZE
Write a correct word in each space.

yacht	ordinary	harbour
order	offer	opportunities
view	objects	valleys
coastline	tours	enquiries

Travel Agent: Good morning. How can I help you?
Customer: I'm thinking about visiting Oman, and I'd like to ask a few questions.
Travel Agent: Go ahead.
Customer: Well, I'm wondering what there is to do in Oman as a tourist. Can I go sightseeing there?
Travel Agent: Yes, of course. There's lots to do and see. For example, there are lovely old forts and interesting markets. Tourists like to walk along the Mattrah Corniche to see the boats in the (1)..... and visit the souk nearby.
Customer: That sounds nice, but how can I find these places?
Travel Agent: Well, a travel agency there can give you all the information you need. They can also arrange bus (2)..... to visit villages and forts.
Customer: What's the countryside like?
Travel Agent: Oman has a (3)..... that is over 1000 kilometers long--all of it is lovely sandy beaches. And there are beautiful mountains and green (4)..... . You'll find that Oman is full of (5)..... to enjoy yourself.
Customer: Are there any good hotels?
Travel Agent: Yes, of course. The best place to stay is the Al-Bustan Palace Hotel. It's an enormous new resort hotel, beautifully furnished, and the restaurant food is delicious. And--something special--every room has a (6)..... of the beach.
Customer: It sounds really wonderful and it must be very expensive. Are there any cheap (7)..... hotels?
Travel Agent: Yes, I'll give you some names and prices.
Customer: Just a moment. Before you do that, let me think about this trip for a few days. Oman is far away and I'm sure it costs a lot to fly there.
Travel Agent: Well, fortunately I can (8)..... you a special price on air fares this month. It's only $2000 round trip...

VOCABULARY QUIZ 8

Name.....

Part 1. SPELLING

1. .....
2. .....
3. .....
4. .....
5. .....
6. .....

Part 2. RECOGNITION

Write the number of the correct meaning next to the word.

1. coach	
2. ambulance	__ hurt, bad feeling
3. messenger	__ person who delivers information
4. camper	
5. patient	
6. pain	__ bus
7. keep fit	
8. swerve	__ turn suddenly
9. damage	__ keep safe
10. injure	__ get ready
11. protect	
12. prepare	

Part 3. CLOZE

Write a correct word in each space.

got out of	took	property
rode	got off	perhaps
persuade	pleasant	prices
prove	promotions	park

I am a journalist and I write articles for the business section of a well known English newspaper. I heard that shopkeepers are having a difficult time these days, so I decided to interview some shopkeepers in the center of London where some of the most expensive shops in the world are found. I (1)..... a taxi to an expensive jewelry shop on Oxford Street. I (2)..... the taxi, paid the fare and went into the shop. The owner of the store was happy to discuss his business problems with me. My first question was, "Why don't you just put higher (3)..... on the things in your shop? Won't that help you make more money?" He answered that shoppers have less money to spend these days. They don't want to pay more for a watch, bracelet or necklace--they prefer not spend their money at all. I asked him about ways to save money. "(4)..... you could lower your expenses by paying your sales assistants smaller salaries," I suggested. He agreed and said that giving them fewer (5)....., longer hours and shorter holidays would help too. However, he had a problem with these suggestions. "When people have to work harder for less money, the work place is not very happy or (6)..... , and people often do poor work." Then he told me about a new idea. He said that some London shopkeepers are trying to (7)..... landlords to charge lower rents for shop space. There has been some success with this plan. Many landlords now accept less rent money for their (8)..... because they prefer getting a little less money to having an empty shop. Rents have come down by around 15% in many parts of Britain and even more in London. The rent for a shop on Oxford Street used to be £3500 per square meter, but now, in 1994, the cost is 30% less, only £2500 per square meter!

(Based on an article in The Independent, April 1994)

VOCABULARY QUIZ 9

Name.....

Part 1. SPELLING

1. .....
2. .....
3. .....
4. .....
5. .....
6. .....

Part 2. RECOGNITION

Write the number of the word next to its meaning:

1. regret	
2. repair	__ send away from a job
3. remind	
4. design	__ take, agree with
5. sack	__ fix, mend something broken
6. accept	
7. reasonable	
8. organized	__ planned, having a good system
9. stressful	
10. sociable	__ causing worry, full of problems
11. creative	
12. unskilled	__ using new ideas

Part 3. CLOZE

Write a correct word in each space.

refuse	advert	appointment
reason	queue	experience
diaries	lawyer	qualifications
reserve	reduce	rather

Every year thousands of people from all over the world enter the United States to begin new lives there as Americans. There are two ways to do become American, a legal way and an illegal way. If you want to become a legal citizen of the United States, it will probably take a long time and a lot of patience. First you have to go to the American embassy in your country, where you may find a long (1)..... of people waiting to apply. Then, after you finally get the application forms and fill them in, you will have to provide many other papers such as your birth certificate, your medical records, your school diplomas and many more. After months of waiting you may get an (2)..... for an inter-view. At the interview it is especially important to show that you can earn enough money to take care of yourself in your new country. Work (3)....., good health and a high level of education are also important. But even if you have all these (4)..... , the American government may (5)..... to give you American nationality. This is because only a small number of people are allowed to become Americans each year. Every year thousands of people are told to try again next year.

Entering legally is difficult, especially if you are poor. For this (6)....., thousands of people try to find ways to enter the United States illegally. Sometimes they come on small boats in the night and land on a beach far away from any town. The next morning all that is found is an empty boat. Others try to enter by land from Mexico. The police are trying to (7)..... the number of people who enter illegally. But it is impossible to watch every small beach and all of the long border between the United States and Mexico, so some people will always succeed in entering illegally.

There is also another way to enter the US. It is not illegal but it is not exactly legal either. Sometimes you may see an (8)..... like this in a newspaper in a poor country: Wanted--single American female for marriage and travel to the USA.

VOCABULARY QUIZ 10

Name.....

Part 1. SPELLING

1. .....
2. .....
3. .....
4. .....
5. .....
6. .....

Part 2. RECOGNITION

Write the number of the word next to its meaning:

1. suitable	
2. guilty	__ like, of the same kind
3. smooth	
4. relaxed	__ not nervous
5. similar	__ plain, not difficult
6. simple	
7. burglary	
8. smuggler	__ robbing a house
9. murder	__ something new, unexpected
10. warning	
11. scenery	__ killing someone
12. surprise	

Part 3. CLOZE

Write a correct word in each space. Choose from these words:

exploded	signed	serious
shot	season	crime
sightseeing	planted	silly
stay	spend	arrested

Tourists from all over the world have always loved to visit Egypt because of its ancient history. Everyone wants to see the famous pyramids in Giza, and many visitors like to travel up the Nile River to do some (1)..... in the towns of Luxor and Aswan. During the winter months, the weather in Egypt is pleasant--a little cool, but much warmer than the winter (2)..... in North America and Europe. For all of these reasons, Egypt is a popular place for tourists to visit.

However, in recent months the number of tourists traveling to Egypt has fallen because of terrorist activity there. Many people are now afraid to go there because of what they have seen in the news. Terrorists have (3)..... bombs in Cairo restaurants and hotels and in tour buses. Some of these bombs have (4)....., causing injuries and several deaths. The Egyptian police have caught some of the terrorists and (5)..... them, but the problem is far from being solved. Last month terrorists (6)..... and killed a policeman who was investigating their activities in a town south of Cairo called Assyut.

This is a (7)..... problem for Egypt because tourism is so important for the economy. Tourists (8)..... millions of dollars in Egypt every year on hotels, restaurants, boat rides, camel rides, souvenirs and many other things. If the tourists stopped coming, Egypt would lose a lot of money.

VOCABULARY QUIZ 11
Name.....

Part 1. SPELLING
1. .....
2. .....
3. .....
4. .....
5. .....
6. .....

Part 2. RECOGNITION
Write the number of the word next to its meaning.

1. generous	
2. foolish	__ usual, common
3. tidy	__ stupid, not sensible
4. traditional	
5. typical	__ in the old way
6. extravagant	
7. tip	
8. salary	__ money earned
9. traffic	__ extra money for a service
10. trouble	
11. tour	__ cars, trucks, vans, etc.
12. license	

Part 3. CLOZE
Choose from these words:

touch	ugly	trust
cost	unlucky	taste
unable	dishonest	unfortunately
unusual	retail	afford

Shoplifting is the crime of stealing goods from a shop without paying. We have probably all seen a child pick up a piece of chocolate, put it in his pocket, and run out of the shop so quickly that the shopkeeper is (1)..... to catch him. Stealing a bit of chocolate may not seem very important, but when a lot of people do it, the shopkeeper loses a lot of money.

Shoplifting is a serious problem in clothing stores where it is so easy for a (2)..... person to take a few pieces of clothing into a changing room and put them all on, one on top of the other, and then just walk out of the shop when the sales assistant isn't looking. Similarly, it is easy to steal earrings or other pieces of jewelry because they are so tiny. Shoplifters simply put them in their pockets or purses while the salespeople are busy with other customers.

So these days many shop owners feel they cannot (3)..... the people who come into their shops, and they have found ways to protect their property against shoplifters. Some stores use video cameras to keep an eye on the customers. Or they hire people to follow the customers around the store and watch what they do. As soon as one of these shop detectives sees someone (4)..... a piece of clothing, he approaches and watches the shopper closely. Many clothing stores in the United States protect their goods with an electronic alarm system that makes a loud noise if you leave the shop without paying. But owners of small shops can't (5)..... to buy an expensive system like this, so the shoplifting problem is especially hard on them.

It is clear that replacing stolen goods and hiring a detective or buying an alarm system (6)..... the shopkeeper a lot of money, and someone has to pay for this. (7)....., this means that honest customers like you and me have to pay higher prices to help cover these expenses. Think about it the next time you buy something. Part of the (8)..... price you pay goes to fight shoplifting!

QUIZ 12 Name.....

Part 1. SPELLING

1. .....
2. .....
3. .....
4. .....
5. .....
6. .....

Part 2. RECOGNITION

Match the number of the word to the correct meaning.

1. atmosphere	
2. interval	__ advertisement
3. commercial	__ break between two parts
4. victim	
5. wallet	__ person hurt or killed
6. vote	
7. wise	
8. valid	__ intelligent and good
9. dreadful	
10. whole	__ all of it
11. superb	__ excellent
12. amazing	

Part 3. CLOZE

Choose from these words:

whether	dramas	wasted
channel	wished	documentary
warned	wonderful	programmes
wondered	team	frightening

I enjoy watching different kinds of television (1)..... . I usually watch the ten o'clock news at night and the comedy show that comes on afterwards. I like detective series and quiz shows too, but I never watch soap operas because I think they're so silly. Last evening when I turned on the TV, there was a soap opera on, so I immediately changed the (2)..... and started watching something else. It was an interesting (3)..... with lots of information about how rich countries sometimes do a poor job of helping poor countries. It showed some foreign advisors from a rich country who went to a poor village in Mexico to help the people to have a better life. The people in this village had grown corn for centuries, but the foreigners felt that the traditional ways of farming were not good enough. Soon after, a (4)..... of foreign scientists arrived in the village to study the corn. They found that a different kind of corn grew faster and taller and had more vitamins in it than the old corn that the village farmers had always grown. The foreign advisors told the farmers they should grow this new kind, and they promised the farmers (5)..... results: the new kind would grow twice as quickly as the old kind and produce three times as much corn. The farmers weren't sure (6)..... they should plant the new kind or not. But many of them agreed to try it. In the first year half of the 84 farmers in the village planted the new corn. It grew well and produced much more corn than the old kind. The foreigners left the village thinking that they had done a lot to improve the lives of these poor villagers. But when the advisors returned to the village three years later they found that only three farmers were growing the new type of corn. They (7)..... why so many farmers had stopped growing it. The answer was simple: the farmers' wives didn't like it. They said that it wasn't good for cooking and they didn't like the taste! So the rich country (8)..... a lot of time and money trying to help people who didn't really want help. I liked this TV show because I felt I learned something from it.

992 VOCABULARY QUIZ
(PET 2000 A-Z)

Name.....

Part A. Recognition
(1 each =18 points)

Put the number of the word next to the correct definition.

1. original
2. private __ complete
3. royal __ first
4. slow __ not public
5. sorry
6. total

1. apply
2. elect __ chose by voting
3. jump __ become like water
4. manufacture __ make
5. melt
6. threaten

1. blame
2. hide __ keep away from sight
3. hit __ have a bad effect on something
4. invite
5. pour __ ask
6. spoil

1. accident
2. choice __ having a high opinion of yourself
3. debt
4. fortune __ something you must pay
5. pride __ loud, deep sound
6. roar

1. basket
2. crop __ money paid regularly for doing a job
3. fresh
4. salary __ heat
5. thread __ meat
6. temperature

1. birth
2. dust __ being born
3. operation __ game
4. row __ winning
5. sport
6. victory

Part B. Cloze
(1 each = 15 points)

Text 1

Put a suitable word in each space.
Choose from these words:

illness	respects	opportunity
shoots	scenery	conferences
injured	dangerous	conversations

Like ordinary people, doctors travel to foreign countries for many reasons. Sometimes they travel to attend large international (1)..... where they can hear about the latest medicines and learn new ways fighting disease. Of course they don't always travel for work. They go sightseeing in interesting foreign cities or they visit mountains, lakes or beaches to enjoy the beautiful (2)....., just as other tourists do. But some doctors spend their holidays in places that are not so beautiful, such as Somalia or Bosnia. For these doctors, their holidays are an (3)..... to help people in need. They travel to these countries to help the victims of war, hunger and (4)..... . These doctors open hospitals, take care of (5)..... people, deliver babies, and pass out food and medicines. The work isn't easy and sometimes it's (6)..... . Last month, for example, a doctor was killed in Angola. Fortunately, some doctors are always ready to spend some holiday time in troubled places to help hungry, sick and dying people. They don't get rich doing this work, but everyone (7)..... them for facing great difficulties to save lives.

--based on news sources dated May 1994

Text 2

Choose from these words:

persuaded	landlord	unfortunately
enormous	powerful	experience
headmaster	terrible	increased
	trust	

Once there was a little boy called Billy Bob whose parents gave him everything he wanted. When he grew up, he wanted an

important job, of course. His father was rich and (1)..... , so he knew he could get his son a good job in a big company. Billy Bob had low marks at school but his father paid the (2)..... of the school a lot of money to write a letter about Billy's wonderful skills and qualifications. This letter of recommendation soon appeared on the desk of the manager of a building company, and even though Billy had no (3)..... at all of building things, he was given a high-paying job as an engineer. Billy Bob's father kept on investing lots of money in the company, and every year Billy Bob's his salary (4)..... . After a few years Billy Bob was at the top of the company, second only to the manager! One day the company got the biggest contract it had ever had--a contract to build an (5)..... tourist hotel on the beach. Billy Bob (6)..... the manager to let him plan it alone, without any help from anyone else. The manager didn't (7)..... Billy Bob to do a good job, but he couldn't refuse him, so Billy Bob's beautiful beach hotel was built. This story has a (8)..... ending, of course. The first time a strong wind blew, the whole building fell down.

992 VOCABULARY QUIZ 1 (A&B)
Name.....

Part A. Recognition (1/2 each = 10 points)
Write the number of the word next to the correct definition.

1. basin
2. beard
3. blinds
4. butcher
5. brick
6. bullet
7. basement

__ used to build houses
__ bowl
__ hair on a man's face
__ a gun shoots it

1. attractive
2. average
3. awake
4. bitter
5. blonde
6. blunt
7. amazing

__ beautiful, nice looking
__ not sweet
__ not sharp
__ normal, usual, typical

1. argue
2. admire
3. announce
4. bleed
5. breathe
6. boil

__ like, think highly of
__ take in air
__ speak, give information
__ speak angry words, fight

1. ashamed
2. alike
3. anxious
4. awful
5. blind
6. broad

__ not able to see
__ wide, fat
__ same, similar

Part B Cloze

Choose from these words to complete the passage: (1 each = 10 points)

blamed	adventure	advice
amusing	brave	
army	blankets	
bossy	arrived	
abroad	blouses	attitude

Dr. Patricia Simpson Talks About Her Work:

Patricia Simpson is a doctor in the French organization called Medicins sans Frontieres. Translated into English, this means Doctors without Borders. These (1)..... doctors travel anywhere in the world, sometimes to very unsafe places, to help people in need. Patricia is Canadian but she has spent most of her life working (2)..... in countries like Malaysia, Iraq, Somalia, Lesotho and other troubled areas. I asked Patricia why she chose to do this work. She answered that the work is very exciting and she loves the travel and (3)..... Of course, she also likes the feeling that she is doing useful work. She said she doesn't do it for the money; she earns only $700 a month, much less than she could earn as a doctor in Canada. When I asked her if it was difficult to be a woman doctor, she said that in some other parts of the world men didn't like taking (4)..... from a woman. But in Africa she said she had no problems because the Africans are used to (5)..... women!
She likes Africa but she faced the most difficult time of her whole life recently in Rwanda. As you know, there was a terrible war in Rwanda last year. The (6)..... of one tribe was killing anyone who didn't belong to their tribe, even old people, mothers and children. She described how every day thousands of sick, tired and hungry people (7)..... in a place called Goma after a long walk from the unsafe areas in Rwanda. At the Goma camp every family was given food, clothing and (8)....., but the big problem was water. There wasn't enough for the thousands of people to keep clean. As a result, people started dying from cholera. Patricia worked hard to save people but every day hundreds died of the disease, many of them young children. She worked from morning to night but there were too many. She and the other Medicins sans Frontieres workers couldn't save them all. Sometimes, in those dark days, she (9)..... herself for not working harder to save more. She feels that this difficult experience changed her (10)..... to life. "I realized that all of us can die very easily," she says, "and we all need each other."

--adapted from an article in *Cosmopolitan* magazine, December 1994

992 VOCABULARY QUIZ 2 (C)

Part A. Recognition (1 each = 15 points)
Write the number of the word next to the correct definition.

1. candle
2. cabbage
3. candy
4. capital
5. chalk
6. chat
7. comedy

__ conversation
__ green vegetable
__ teachers use it
__ important city

1. chain
2. centre
3. chapter
4. chimney
5. church
6. clinic
7. couple

__ two people or things
__ part of a book
__ doctors work there
__ Christian building

1. cry
2. control
3. charge
4. cover
5. contact
6. comb
7. clap

__ make unhappy sounds
__ make noise with hands
__ ask to pay; cost
__ have power over

1. curious
2. cruel
3. crazy
4. cloudy
5. confident
6. convenient

__ causing pain
__ not sunny
__ always asking questions

Part B. Cloze (1 each = 10 points)
Choose from these words to complete the passage.

continued	customers	catch
century	court	congratulations
cheat	clever	caused
connected	curly	contained

Young Computer Criminals

Computers have changed our lives in many ways and made so many things easier to do. Most of us would probably agree that the computer is the most important invention of the 20th (1)..... By now most of us know how to use a computer and these days children learn how to use them at school. This sounds like a great idea. Computer games are good entertainment and educational programs are clearly very useful. But some children are able to do surprising things with computers. For example, in the United States some young computer users found a way to rob banks! These very (2)..... boys made a computer program that wrote thousands and thousands of different telephone numbers. When they (3)..... their program to the bank's telephone, the computer started dialing the numbers. The computer (4)..... dialing the phone numbers, day after day, until the bank's secret telephone number was finally found. Then the boys were able to open the files which (5)..... bank account information, and they started changing things. As you can imagine, you could easily make yourself very rich just by opening a new file and typing some numbers! Of course, bank (6)..... soon noticed that there were problems with their accounts and they started complaining to the bank manager. The police were brought in but it wasn't easy to (7)..... these criminals because no one expected the thieves to be children. In the end the police weren't sure what to do with the boys. They were too young to be sent to a (8)..... of law, and they were certainly too young to go to prison. The bank just had to find a better way to protect its files. Computer criminals have also (9)..... problems for credit card companies in the same way, and these companies have lost a lot of money. Finally, you may be interested to know that students who are good with computers have found a new way to (10)..... Again, by trying thousands of different numbers, they find their way into the computer network of their school or college and simply change their marks!

992 VOCABULARY QUIZ 3 (D&E)
Name.....

Part A. Recognition (1 each = 15 points)
Write the number of the word next to the correct definition.

1. disappoint
2. drown
3. disturb
4. discover
5. explode
6. exchange
7. encourage

__ say kind words to help
__ make unhappy
__ suddenly break into pieces
__ find something new

1. embassy
2. escalator
3. exhibition
4. employee
5. employer
6. dessert
7. discussion

__ worker
__ sweet after dinner
__ conversation, talk
__ electric stairway

1. diagram
2. drugstore
3. drum
4. effort
5. duvet
6. envelope
7. doll

__ chemist
__ simple picture
__ trying hard, work
__ little girl's toy

1. depressed
2. double
3. embarrassed
4. delighted
5. deaf
6. dusty

__ not able to hear
__ very happy
__ very unhappy

Part B. Cloze (1 each = 10 points)
Choose from these words to complete the passage.

disagree	exactly	extraordinary
ever	extremely	die
example	death	divides
essential	explains	exercise

How to Live to 120

A few weeks ago a French woman called Jeanne Calmet celebrated her 120th birthday. She is so old that she can remember watching the Eiffel Tower being built and she saw the first film (1)..... made. Journalists asked her for her secret to long life, but she didn't really have an answer. She just laughed and said that she had stopped smoking three years ago, and maybe that helped!

There are several reasons why some people live to the (2)..... age of 100, 110 or even 120 years. One of them is family background. If your grandparents or great-grandparents are (3)..... old, there is a good chance that you will live a long life too. Another important cause of long life is climate: people who live in cool, high, dry places often live longer than people in other climates. There is little you can do about the family you were born into or the climate of your country, but there are some things you can do to improve your chances of a long life. For (4)....., you can make sure you have an active life. People who work hard and get lots of (5)..... usually live longer. Many of the world's oldest people do a little work every day and they continue to enjoy sports. Another important thing you can do is to watch what you eat. But the big question is: (6)..... which foods help you to live longer? Doctors (7)..... about this. Some think you should avoid meat and butter and eat more fruits and vegetables. Others think eating fish is (8)..... And others think it doesn't matter what you eat as long as you stay calm and avoid stress. A recent study offers a new answer to this old question: The secret to long life may be olive oil! The study found that the main cause of (9)..... in older people is heart disease. It also found that the problem of heart disease is small in countries like France, Italy and Spain where people use a lot of olive (oil in their cooking. On the other hand, in the United States, Britain, Finland, and other countries where olive oil is not so popular, heart disease is a great problem. So perhaps this (10)..... why Jeanne Calmet lived to be 120. She's French and the French love olive oil.

---based on BBC Radio's "Letter from America" by Alistair Cook, February 1995

992 VOCABULARY QUIZ 4 (F&G)
Name.....

Part A. Recognition (1 each = 15 points)
Write the number of the word next to the correct definition.

1. follow
2. finish
3. freeze
4. glance
5. grill
6. guard
7. frighten

__ look quickly
__ move behind in the same direction
__ grill over fire
__ complete

1. fiance
2. fuel
3. flesh
4. festival
5. fiction
6. flag
7. fever

__ music or plays for many to enjoy
__ high body temperature
__ coloured cloth for a country
__ wood, oil, coal etc.

1. guilty
2. fit
3. funny
4. furious
5. glad
6. grateful
7. foolish

__ amusing
__ wrong, at fault
__ full of thanks
__ healthy, exercised

1. fiction
2. fork
3. ferry
4. glove
5. ground
6. gallery

__ you wear it on your hand
__ place for an exhibition
__ you eat with it

Part B. Cloze (1 each = 10 points)
Choose from these words to complete the passage.

grocer	government	famous
fortunately	figures	fortnight
finally	foreigners	goals
farmer	gaols	group

What Makes People Intelligent?

Who are the best students in Canada? Last year, the Canadian (1)..... made a study of students in secondary schools and I read about the findings of the study in a Canadian newspaper about a (2).....ago. You might expect that the best students are sons and daughters of rich white engineers, doctors or lawyers. Not so. Surprisingly, many of the top students in Canada are Asian and come from families that don't have a lot of money or education. During the last thirty years, a lot of people from Hong Kong, Vietnam, India, Pakistan and other Asian countries have come to Canada to live, and their children have done extremely well in Canadian schools--in many cases better than white children, and better than blacks well. So in today's Canada it is often true that a child whose grandfather was a simple (3)..... in India or China gets higher marks than a white Canadian child whose parents are rich and highly educated.

Does this mean that Asians are more clever than European and African people? Clearly, this is cannot be true of every Asian person--some are intelligent and some are not. But when you consider Asians as a (4)....., it looks like the answer might be yes. The (5)..... in the Canadian study show that 35% of all Asian children in Canada are high level students but only 25% of white Canadian children are at the same high level. In other words, the study seems to be saying that the average Asian is more intelligent than the average white person.

However, some people don't believe that Asians are born smarter than other people. They argue that Asians just try harder. It's true that when (6)..... come to a new country, they work hard to be successful. And everybody in Canada knows that Asians are hard workers--they are (7)..... for it. For example, if you need fruit or vegetables late at night, you can always go to a Chinese or Korean (8)..... . Their shops are open 24 hours a day, even during holidays! These new Asian Canadians have high (9)..... for their children, and they encourage their children to study hard. So maybe this explains why their children do so well in Canadian schools.

Probably, the best way to explain the high marks in Asian Canadian secondary students is to accept both sides of the argument. Asian children do well in school because they are born with a small advantage over the rest of us, and because they get a lot of encouragement from their parents. (10)....., I should mention another interesting finding in the study: No matter what the background--Asian, black, or white--girls were found to do better in school, on average, than boys. So now people are asking the same question about girls: Are they born smarter or do they just try harder? ●

992 VOCABULARY QUIZ 5 (H&I)
Name.....

Part A. Recognition (1 each = 15 points)
Write the number of the word next to the correct definition.

1. inch	__ good people go there
2. index	when they die
3. harbour	__ builder's tool
4. hammer	__ about two centimeters
5. heaven	__ list arranged by alphabet
6. handle	

1. introduce	
2. hitchhike	__ change s.o.'s way
3. include	of thinking
4. intend	__ want something to
5. invite	happen, plan
6. influence	__ get a ride with s.o.
7. hang	__ have with, contain

1. hut	
2. hedge	__ you blow your
3. headline	nose in it
4. invasion	__ poor house
5. island	__ entering by force
6. interval	__ small trees,
7. handkerchief	bushes

1. initial	
2. honest	__ happy about the
3. independent	future
4. hopeful	__ at the beginning
5. hopeless	__ truthful, good
6. international	

Part B. Cloze (1 each = 10 points)
Choose from these words to complete the passage:

human	horror	industry
hero	history	informal
hardly	however	instead of
heart	impossible	intelligent

In Love with Fear

The frightened girl is running for her life and is too tired to run much further. But then she sees a little door in the wall and quickly runs through it into a garden. The killers run past, not noticing the gate. "I've escaped" she thinks and throws herself down on the soft green grass to rest. "I'm safe at last!" But then suddenly a bloody hand reaches up out of the ground, grabs her leg, and starts pulling her down, down, down.... The girl in the film screams. You and all your friends scream too, and then you start laughing. After it's over you all agree that it was a great film and that you really enjoyed it. It frightened you and you loved it.

People who work in the film making (1)..... have known for a long time that people will pay money to feel afraid. In fact, some of the most successful films in the (2)..... of the cinema have been stories about dead people who return to life, or some other (3)..... thing like people who must drink blood in order to live, or people who are part (4)..... and part animal. The story of Frankenstein, the doctor who made a new person by taking a (5)..... from one dead body, a head from another, and the rest from yet another body, has been filmed again and again. These days a new version of that old story is making lots of money.

Isn't it strange that people enjoy (6)..... films? Why do normal, healthy, (7)..... people like you and me enjoy feeling afraid? Psychologists say that it isn't really so strange. One reason why you enjoy seeing frightening things in films is that it makes your own real life seem happy and safe. Another reason is that people often feel good and really alive when they experience powerful feelings. And clearly, it is better to get strong feelings from a film (8)..... having real experiences of danger, pain, fear and death! A third reason is that these films give you the chance to feel like a (9)..... Not many of us have the chance to rescue a drowning child, or pull an old woman out of a fire, or kill a horrible man-eating monster! (10)....., when you watch the kind of film we are talking about, you can imagine that you are doing wonderful things to save people in danger, and this makes you feel really good. ●

992 VOCABULARY QUIZ 6 (J-K-L-M)
Name.....

Part A. Recognition (1 each = 15 points)
Write the number of the word next to the correct definition.

1. jazz	__ bags you take when you travel
2. jeans	__ absence, not having something
3. luggage	__ kind of music
4. lock	__ kind of trousers
5. lack	
6. leather	

1. mix	__ hit hard with your foot
2. lose	__ not have any longer
3. leave	__ go away
4. kick	__ change place
5. look up	
6. move	
7. lump	

1. method	__ she gets paid to wear new clothes
2. model	__ you see yourself in it
3. mirror	__ where a leg bends
4. lighter	__ it starts a cigarette burning
5. land	
6. kitten	
7. knee	

1. lower	
2. lazy	__ happens every 4 wks
3. lonely	__ happy
4. monthly	__ not as high
5. merry	
6. magic	

Part B. Cloze (1 each = 10 points)
Choose from these words to complete the passage:

marriage	kidnap	lucky
joke	millions	knocked out
kept on	miserable	movie
lovely	laundry	murdered

The Fall of a Hero

Have you heard the story of O. J. Simpson, the famous black American football star? Ten years ago he was a famous sports hero in the United States, loved by children and admired by adults. He was rich, handsome, intelligent, and a model of success for young black American boys. Until last summer, it looked as if he was a (1)..... man who had everything: money, fame, a beautiful house, and a (2)..... wife. But suddenly one day last May things started to look very different.

Early one morning, police found O.J.'s wife, Nicole Simpson, lying dead in a pool of blood. Clearly, she had been (3) ..... . Did her husband do it?

Probably he did, but no one saw him do it. The police couldn't find the knife that the killer had used, but when they searched O.J.'s house they found some bloody clothes in his (4) ..... . A few days later when the police came back to arrest him, he tried to escape, and this made him look even more guilty. When crime touches the life of a famous person, it's news. (5) ..... of Americans watched on their televisions as the police tried to catch Simpson driving away as fast as he could on a Los Angeles motorway. It all looked like a (6) ..... , but it was real.

After his arrest, journalists discovered that O.J.'s life was not as wonderful as it had seemed. Nicole's friends said that there were problems in their (7) ..... . They had many bad arguments, and Nicole had become afraid of her husband. He often beat her, once so hard that she was (8) ..... . Journalists also discovered that she had tried several times to call the police and tell them that her husband was hurting her, but the police didn't listen. They didn't want to arrest a man that was so popular and famous. Finally, Nicole became so (9) ..... that she left O.J. and moved to another house. But he (10) ..... calling her - he couldn't live with her or without her, and he was jealous of her new friends.

Now O.J. is on trial for his life in a court of law in California. It is almost certain that he will be found guilty. The death of Nicole Simpson is sad, but even sadder is the disappointment so many Americans feel. One woman lost her life, but America lost a hero.

992 VOCABULARY QUIZ 7 (N-O)
Name.....

Part A. Recognition (1 each = 15 points)
Write the number of the word next to the correct definition.

1. niece	
2. nephew	__ your sister's daughter
3. onion	
4. opinion	__ vegetable
5. oven	__ hot place for cooking
6. nonsense	
7. ocean	__ crazy talk, untrue

1. nail	
2. neck	__ you hammer it
3. net	__ you catch fish in it
4. nylon	__ nothing, zero
5. nil	__ between head and shoulders
6. needle	
7. owner	

1. original	
2. on sale	__ at a lower price
3. out of date	__ unemployed
4. out of work	__ new, the first
5. narrow	__ not wide
6. nervous	
7. necessary	

1. offer	
2. nod	__ need to pay money
3. order	
4. owe	__ move your head
5. organize	__ go around a car
6. overtake	

Part B. Cloze (1 each = 10 points)
Choose from these words to complete the passage:

neither	normal	opportunity
ounces	nature	navy
oval	notice	neat
orange	never	nowadays

Unnatural Tomatoes--The Way of the Future?

The next time you go to a big supermarket like Al-Fair or Mattrah Cold Stores, take a look at the tomatoes. If you compare the tomatoes grown in Oman with the tomatoes imported from Holland, you will (1)..... some differences immediately. The Dutch tomatoes are all the same size and color, and they are all exactly the same perfectly round shape. Each one weighs exactly six (2)..... (175 grams). There they sit in nice (3)..... rows, waiting to be bought. They look like something produced by a machine, not by (4)..... .

On the other hand, the local Omani tomatoes are different sizes and shapes. There are large ones and small ones. Some are round and others are more egg-shaped or (5)....., and they range in color from yellow or (6)..... to bright red. They are much cheaper than the tomatoes imported from Holland, and more importantly, they taste much better .

The Dutch tomatoes are just one example of a vegetable that has been specially engineered for shipping to international markets. Scientists have found ways to grow tomatoes that have strong skins and are not too soft or juicy, so that they won't be damaged during shipping. In Holland these tomatoes are picked by machines while they are still green, and then a special gas is used to make them all turn red at the same time. After that another machine sorts them into groups by size and weight. In the end you have vegetables that are (7)..... natural-looking nor good to eat. And it gets worse: Tests have shown these tomatoes contain less vitamin A and C than tomatoes that are grown and processed in the (8)..... way.

Specially engineered foods like the Dutch tomatoes are common (9)....., and will probably become even more common in the future. So while it is still possible, take the (10)..... to buy local, farm-grown vegetables. Even though they don't look as perfect as the imports, they are cheaper -- and better for you!

992 VOCABULARY QUIZ 8 (P)
Name.....

Part A. Recognition (1 each = 15 points)
Write the number of the word next to the correct definition.

1. packet
2. powder
3. pump
4. perfume
5. pronunciation
6. prize
7. price

__ cost, charge
__ it smells sweet
__ sugar, flour, soap
__ paper container

1. private
2. pleasant
3. punctual
4. pink
5. perfect
6. purple
7. possible

__ exactly on time, not late
__ not public
__ 100% correct
__ pale red color

1. print
2. pray
3. plug in
4. pack
5. promise
6. put on
7. perform

__ say you will do it
__ do; sing, speak, or act
__ put things in a bag
__ connect to electricity

1. pause
2. pattern
3. pot
4. pence
5. pool
6. patient

__ bowl, dish, pan
__ break, short period of time
__ small amount of money

Part B. Cloze (1 each = 10 points)
Choose from these words to complete the passage:

palace	probably	popular
pardon	pain	population
painful	political	poor
persuade	pick up	put up

Flor's Story

Last month in Singapore a Filipina worker called Flor Contemplacion was blamed for the killing of two people, another worker and a young boy. The court found her guilty of the double murder, and shortly after that she was hanged in a Singapore prison. Governments all over the world had asked Singapore to (1)..... her for the crime, but Singapore refused and insisted on punishing her by death.

When her body was returned to the Philippines to be buried, thousands of sad, angry people poured into the streets of Manila. Most of the Filipino (2)..... believes that she was not really guilty of killing anyone. They say that the Singapore police are well known for being cruel and using (3)..... to make prisoners talk. Some people who were in jail with Flor Contemplacion said that the police beat her and didn't stop until she said she was the murderer. And a doctor who saw the bodies of the people Flor is supposed to have killed said that it looked like the work of a strong man, not that of an older woman like Flor.

Was she guilty or not? People in the Singapore think she was and people in the Philippines think she wasn't. The real truth will (4)..... never be known, but the result of it all is that there are now great (5)..... problems between the two Asian countries. In an interview at his (6)..... in Manila, Philippines President Fidel Ramos said that he wants to (7)..... the Singapore government to look at the case of Flor Contemplacion again to see if she was really treated fairly. If they refuse, he is thinking of closing the Philippines embassy in Singapore, and perhaps breaking all connections with Singapore. The problem with this idea is that the Philippines is (8)..... and it depends on Singapore economically. The Filipino economy needs the money that people working in Singapore send home. And the Filipinos themselves need these jobs. When a plane was sent to Singapore last week to (9)..... any workers who wanted to return home, it returned half empty. Clearly, the workers preferred staying in a country where they are not very (10)..... to giving up their jobs.

based on articles in *The Oman Observer*, April 9, 1995

992 VOCABULARY QUIZ 9 (Q-R)
Name.....

Part A. Recognition (1 each = 15 points)
Write the number of the word next to the correct definition.

1. repair	
2. request	__ get well; find again
3. recommend	__ lift up
4. realize	__ understand, know
5. raise	__ say it's good
6. rob	
7. recover	

1. queue	
2. roof	__ paper to show you paid
3. receipt	__ line, row of people
4. rubbish	__ on top of the house
5. razor	__ Islam, Christianity, Buddhism, etc.
6. rubber	
7. religion	

1. rescue	
2. roar	__ make loud noise
3. revise	__ study again
4. receive	__ make someone remember
5. remind	
6. reward	__ give a prize
7. rent	

1. round	
2. rather	__ not calm, not smooth
3. responsible	
4. ripe	__ ready to eat, fully grown
5. regular	
6. rough	__ usual, normal

Part B. Cloze (1 each = 10 points)
Choose from these words to complete the passage:

respect	questions	quiet
quantity	run out	run down
reduce	really	quality
refused	quarrel	remain

Saving the World's Fish

Last month near Newfoundland on Canada's eastern coast, a Canadian police boat fired its guns at a Spanish fishing boat. Canada is a (1)..... , peace-loving country, and the world was surprised to see Canada act in this unusual way. What was it all about? Was Canada planning to go to war with Spain?

Of course, Canada doesn't (2)..... want a war with Spain or any other country. But what it does want is to save the world's supply of fish, and Canada thinks the Spanish are catching too many. For centuries, the sea near Newfoundland was one of the richest fishing areas in the world, and ships from all over the world caught millions of fish there every year. But as more and more boats came, the numbers got smaller and smaller. In the 1980s, it became clear that if the fishing continued, the supply of fish would soon (3)..... completely. Governments all over the world have recognized the problem, and recently they agreed to (4)..... the number of fishing boats in the area. Limiting the fishing gives the few fish that (5)..... a chance to lay eggs and increase their numbers. It is hoped that after a few years, the (6)..... of fish will be much greater, and maybe even return to normal levels.

The agreement is good for the future of the world fishing industry, but it has been bad news for the fisherman of Canada. Thousands of Newfoundland fisherman had to stop doing the only work they knew, and unemployment rose to over 50%. Most other countries have kept to the international agreement to do less fishing in the Newfoundland area, but unfortunately, Spain has (7)..... . That's why the Canadians are so angry.

Does this (8)..... between the Canadians and the Spanish have any relation to fishing in Oman? Perhaps it does. Like the Spanish, the Japanese have little (9)..... for international fishing agreements, and there are lots of Japanese fishing boats in Omani waters. How many fish are the Japanese catching? Are they catching more than they need? Are they using nets that allow the young fish through so they can grow up and lay eggs? Most importantly, will there be enough fish left in Omani waters ten years from now? Certainly, these are important (10)..... that need to be answered.

992 VOCABULARY QUIZ 10 (S)
Name.....

Part A. Recognition (1 each = 15 points)
Write the number of the word next to the correct definition.

1. spring
2. shower — smooth cloth of China
3. stomach — your food goes there
4. stocking — the train stops there
5. sweater — season before summer
6. station
7. silk

1. smile
2. spill — use a gun
3. shoot — show a happy face
4. scratch — turn off or on
5. switch — angry bees do it
6. sting
7. suppose

1. shallow
2. solid — good , OK
3. sore — hurting, painful
4. sudden — unexpected
5. satisfactory — like jam on your fingers
6. single
7. sticky

1. shock
2. sleeve — unpleasant surprise
3. shoulder — tool for cutting
4. square — part for your arm in a shirt or blouse
5. scissors
6. signal

Part B. Cloze (1 each = 10 points)
Choose from these words to complete the passage:

staff	salary	silly
servant	succeeded	spend
society	several	spite
sightseeing	serious	social

The Queen's Money Problems

How much money does the Queen of England earn? I don't know exactly what her yearly (1)..... is, but it must be hundreds of thousands of pounds. It is well known that 69-year-old Queen Elizabeth II is one of the richest women in the world. So it may surprise you to hear that the Queen has money problems, in (2)..... of her great wealth.

In fact, the Queen has enormous bills to pay. One of her biggest expenses is paying all the people who work for her. As you know the royal family has (3)..... huge palaces and each of these needs cleaners, cooks, gardeners, accountants, secretaries and so on. In addition to paying her (4)....., she has to pay for keeping the palaces in good condition. Last year there was a big fire at Windsor Castle and a lot of (5)..... damage was done. Famous paintings were lost and a lot of beautiful old furniture was destroyed. Since it is her house, she is responsible for paying the millions of pounds it will cost to repair the damage. Recently a new expense was added. A law passed last year says that she has to pay taxes ( ), just like any ordinary wage earner in British (6)..... . So the Queen is no longer a special case.

For these reasons, the Queen has been looking for ways to reduce her expenses and increase her earnings. One way is employing fewer workers and she has (7)..... in doing this. As a result, she has some spare houses on her land that are empty. Last week, it was announced that some these furnished cottages are for rent. She is looking for people -- rich Americans, perhaps -- who would be happy to (8)..... £35,000 a year just to be able to say that they lived near a palace and rented from the Queen of England.

Yet another idea for making money was to open her most famous home, Buckingham Palace in London, to the public. So the next time you set out to do some (9)..... in London, after you've visited Big Ben, London Bridge and the Tower of London, you can go and have a look around Buckingham Palace. Do you think you will get in for free? Don't be (10).....! You have to pay an entrance charge, and the Queen is hoping to sell lots of tickets.

--based on an article in *The Guardian Weekly*, April 23, 1995

992 VOCABULARY QUIZ 11 (T)
Name.....

Part A. Recognition (1 each = 15 points)
Write the number of the word next to the correct definition.

1. tower
2. toy
3. team
4. theatre
5. toothache
6. traffic
7. term

__ tall building
__a child plays w/ it
__ cars and trucks
__ group of players, workers

1. taste
2. tear
3. take off
4. try on
5. turn down
6. turn back
7. take place

__ a) remove; b) go up
__ lower, make less
__ pull to pieces
__ happen

1. toe
2. thumb
3. towel
4. tongue
5. thunder
6. throat

__ part of your hand
__ part of your foot
__ you use it after a bath
__ you use it to speak and taste

1. thirsty
2. tidy
3. thoughtful
4. tight
5. thick
6. tired

__ clean, neat
__ not loose, close
__ needing water

Part B. Cloze (1 each = 10 points)
Choose from these words to complete the passage:

typical	ties	twentieth
truth	total	toilet
terrible	taps	thousands
timetable	translated	twelfth

Iqbal's Story

Beautiful handmade carpets from Turkey, Afghanistan, Iran and Pakistan are admired all over the world. (1)..... of these traditional wool or silk carpets are sold every year. Everyone knows what they look like and perhaps you even have one on the floor of your home. But have you ever stopped to think how these carpets are made? Who (2)..... the millions of tiny knots ( ) that make up a handmade carpet? Too often the sad answer to this question is very young children. Here is what happened to a young Pakistani boy called Iqbal Masih.

Iqbal Masih was born in a poor Pakistani village. His family was so poor and his father needed money so badly that he decided to sell Iqbal to a carpet maker. He didn't get much money, only a few rials, because Iqbal was only four years old! Young Iqbal's (3)..... was long and hard. He and the other children had to work 16 hours a day, seven days a week. Their only breaks were to eat or to go to the (4)..... The work damaged the children's eyes and some of them became blind. To make sure that they didn't escape, the factory owner chained the child workers to the carpet-making equipment. But after six years Iqbal somehow managed to escape. He went to the city of Lahore where he found safety with a group of people who are trying to prevent the employment of child workers. When Iqbal told his (5)..... story to journalists people in Pakistan were shocked. But what was really shocking was the fact that Iqbal's story was not unusual; in fact, his story is (6)..... of what happens in many poor families there. A study of the problem found that the (7)..... number of young Pakistani children working long hours for no pay may be as high as 10 million!

Iqbal's story was (8)..... into many languages, and he became a voice for child workers everywhere. So because of Iqbal, people all over the world realize that even now in the (9)..... century, many children are made to work hard at a young age. In 1994 Iqbal was invited to the United States to receive a the Reebok Human Rights Award for Youth in Action. He said hoped to use the money to go to school and become a lawyer. But there is a sad ending to this story. Last week while Iqbal was bicycling near his village, someone shot him dead. Why? We don't know but perhaps a carpet factory owner was angry with him for telling the (10)..... about child workers in Pakistan.

--based on an article in *Newsweek*, May 1, 1995

992 VOCABULARY QUIZ 12 (U-Z)
Name.....

Part A. Recognition (1 each = 15 points)
Write the number of the word next to the correct definition.

1. wrap	
2. wish	__want, hope
3. wear out	__lose, use badly
4. undress	__take off clothes
5. vote	__choose, elect
6. worry	
7. waste	

1. universe	
2. umbrella	__pounds or kilograms
3. weight	__sun, stars, earth etc.
4. wire	__vehicles have 2 or 4
5. wheel	__long, thin piece of metal
6. width	
7. wedding	

1. weak	
2. well known	__not beautiful
3. wooden	__famous
4. valuable	__recent, modern
5. well made	__worth a lot
6. ugly	
7. up to date	

1. zero	
2. voyage	__sea journey
3. wash basin	__sink
4. wool	__animals live there
5. victory	
6. zoo	

Part B. Cloze (1 each = 10 points)
Choose from these words to complete the passage:

warned	various	unable
whole	whether	unlucky
yourself	while	until
whatever	worried	yet

Ebola--How Will It End?

One evening last week my friends and I sat down to watch a video. The name of the film was "Outbreak" and it told the story of a strange and terrible disease. The disease suddenly attacked a small village in Africa and doctors were (1)..... to help people who caught it. (2)..... parts of their bodies (hearts, livers and kidneys) turned to blood, then blood started to pour out of their ears, eyes and noses, and soon after that they died. A person could be perfectly healthy one day and dead the next. In the film the American doctors wondered what to do. They had to decide (3)..... they would help the sick Africans or not. If they stayed to help they might be killed by the disease themselves, but if they left, the deadly disease might never be stopped. In the film, the American government decided to drop a bomb on the (4)..... village and destroy the patients, the doctors and the disease itself--it was hoped. But this was not the end of the story. Later the disease appeared in America and killed many more people, as you will discover if you ever see this film (5)..... .

We thought it was just a crazy story in a movie, but (6)..... we were watching the news a few days ago, we saw --to our great surprise-- that much of this horror film has become real! In the African country of Zaire, at least 57 people have died of a mysterious killer disease called Ebola. As in the film, the Ebola virus turns people's body parts to blood and causes death in a very short time. Doctors haven't (7)..... found a way to cure the disease, and so far it looks like the only way to prevent it is to keep it from traveling farther. For this reason, the Zairian government has told people not to travel, and (8)..... that the police will arrest anybody trying to leave a village where there have been cases of Ebola.

Specialists at the World Health Organization in Geneva are working day and night to find a way to fight Ebola, but (9)..... a cure is found, the situation is will probably get worse. They say that nine out of ten people who catch Ebola die, and today's newspaper reports that the disease is traveling fast in spite of the government's efforts to keep people in their villages. In "Outbreak", the doctors succeed in finding a cure and the film has a happy ending, but no one really knows what will happen with the Ebola virus. These days the (10)..... world is waiting, hoping and praying for a happy end to a horror story that became real.

--based on the feature film *Outbreak* and an article in *The Oman Observer*, May 15, 1995.

1070 UWL Before-and-After Quiz
Name: .....

A. Write the number of the word next to its definition:

1. affluence	
2. axis	__ introduction of a new thing
3. episode	
4. innovation	__ one event in a series
5. precision	
6. tissue	__ wealth
1. deficiency	
2. magnitude	__ swinging from side to side
3. oscillation	
4. prestige	__ respect
5. sanction	__ lack
6. specification	
1. configuration	
2. discourse	__ shape
3. hypothesis	__ speech
4. intersection	__ theory
5. partisan	
6. propensity	
1. anonymous	
2. indigenous	__ without the writer's name
3. maternal	
4. minimum	__ least possible amount
5. nutrient	
6. modification	__ native
1. elementary	
2. negative	__ of the beginning stage
3. static	
4. random	__ not moving or changing
5. reluctant	
6. ultimate	__ final, furthest
1. coincide	__ prevent people from doing something they want to do
2. coordinate	
3. expel	
4. frustrate	
5. supplement	__ add to
6. transfer	__ send out by force

B. Cloze 1. Choose from the words below to complete the passage:

intellect	frontier	terror
rebelled	monarch	prospered
invaded	derived	confronted
hero	restored	signified

Palmyra's Warrior Queen

One of the world's great historic sites is Palmyra in Syria. A well known travel guide reads, "If you're only going to see one thing in Syria make it Palmyra." Palmyra, or Tadmor as it is called in Arabic, has beautiful old stone temples, market places, roads, a theater, and thousands of columns, all carefully (1)..... for the tourist to enjoy. But just as interesting as the city itself is the story of its famous Arab queen, Zenobia.

Her story begins in the year 266 A.D. when her husband, King Odenathus, was killed and Zenobia proclaimed herself (2)..... . In those days Palmyra was a rich Roman town that (3)..... its wealth from taxes that traders paid to bring silk from China through Palmyra and on to Rome. Under Zenobia's rule the city (4)..... even more and became the centre of a strong kingdom. She was an expert military leader and her armies (5)..... Egypt and other areas to the east of Palmyra. She was known for her (6)..... but she was beautiful as well. According to the historian Gibbon, Zenobia had glowing skin, pearly white teeth and "her large black eyes sparkled with an uncommon fire." Many compared her to Cleopatra of Egypt.

She was also a ruler who knew how to laugh. A shopkeeper was to be punished for charging high prices and was called to appear at the theater before the queen and the public. He stood shaking with (7)..... expecting that a lion would be released from behind a door to eat him. But when the door opened, the crowd roared with laughter. The shopkeeper turned around to be (8)..... by a chicken!

Zenobia's downfall came when she (9)..... against Rome and tried to make her kingdom independent. She lost the battle against the Romans but she was a (10)..... to the end. Instead of giving herself up to the encircling enemy forces, she tried to escape on a camel. But eventually, the Romans captured her, took her to Rome and paraded her in the streets bound in golden chains. Aurelian, the Roman emperor, wrote of Zenobia: "Those who say that I have conquered only a woman do not know what this woman was."

Cloze 2. Choose from the words below to complete the passage:

compelled	inhibited	resident
scheme	source	starved
detriment	estimated	trend

Gulf War Setbacks for Jordan's Economy

Jordan was one of the main economic victims of the Gulf War. The United Nations (11)..... that the damage done to the Jordanian economy in the 12 months following August 1990 was at least US$8 billion. The war caused Jordan to lose its main trading partner -- about a quarter of the goods produced in Jordan were exported to Iraq before the war. Jordan also lost its main (12)..... of cheap oil and had to go looking for more expensive alternatives in Syria and Yemen.

The loss of salary money sent home by Jordanians working in Gulf Arab countries also caused great (13)..... to the economy. Because King Hussein had allied himself with Saddam Hussein, many Jordanians were no longer welcome in the countries where they were working and were (14)..... to come home. In 1993, 30% of the labor force was still out of work.

In spite of these difficulties, there is hope for the future. The government has a (15)..... to irrigate many desert areas and this will increase agricultural production. And now the war is over, tourism in the area is expected to revive.

--both passages adapted from *Jordan and Syria, a Travel Survival Kit* published by Lonely Planet

UWL Quiz 1: abandon-assent
Name: .....

A. Write the number of the word next to its definition (12 points).

1. assemble	
2. appraise	__ agree, say yes
3. arouse	__ change, adapt
4. adjust	__ judge its worth
5. assent	
6. allude	

1. appendix	
2. adolescent	__ study of humans
3. ambiguity	__ person of high social class
4. analogy	
5. anthropology	__ at back of a book
6. aristocrat	

1. adequate	
2. amorphous	__ enough
3. abnormal	__ yearly
4. abstract	__ in the mind, not real
5. annual	
6. angular	

1. accomplishment	
2. affluence	__ money, wealth
3. affiliation	__ achievement
4. appreciation	__ liking; thanks
5. abandonment	
6. adherence	

B. Cloze. Choose from the words below to complete the passage (8 pts):

aggression	apparatus	accelerate
anomalies	admiration	absorbed
access	altered	adults
administer	alternatives	align

Death in Texas

In the United States, the people of Texas are famous for being proud of their state. Every-thing is always bigger and better in Texas. These days Texans have another reason to be proud, or perhaps ashamed. In the last 20 years, the state of Texas has put over 100 murderers to death, more than any other state. And recently the government of Texas (1)..... state laws to make it easier to punish criminals by death. Specifically, the government has shortened the amount of time prisoners have to prove their innocence and reduced their (2)..... to lawyers and legal aid. As a result of these changes, the number of death sentences in Texas is expected to (3)..... .

Of the 50 states in the US, 12 states sentence murderers to prison for life rather than kill them. In the 38 other states that (4)..... death sentences, the most common method is the electric chair. Some of these states allow the prisoner to choose one of four (5)..... : the electric chair, hanging, being shot, or breathing poisonous gas.

In Texas there is yet another way. There the victim is tied down to a hospital bed and a hollow needle connecting to a tube and a bottle is put into the man's arm. A deadly drug passes from the bottle into the man's body while another (6)..... records the exact moment that breathing and heartbeat stop. Corrections officer Larry Fitzgerald, who has seen more than a dozen men die, reports that the men are quiet and show no (7)..... in their final moments. "They know they 're guilty and they have been expecting this for a long time," he explains.

Most Texans are full of (8)..... for their prison system and feel they are fighting crime effectively. But some Americans worry that the Texans are too eager to kill. They find it strange that Texas has only 8% of the population of the US but over 30% of the punishments by death. And, worse than this, in 1986 one so-called murderer was put to death even though someone else had admitted to the crime!

-- from *The Globe and Mail*, Toronto, Nov.18, 1995

UWL Quiz 2: assert-communicate
Name: .....

A. Write the number of the word next to its definition (12 points):

1. bureaucracy
2. career
3. cell
4. circumstance
5. commodity
6. collapse

__ falling down
__ product, thing for sale
__ job

1. carbon
2. circuit
3. column
4. chapter
5. asset
6. commune

__ valuable thing, money
__ team that works together to benefit the state
__ tall thin shape

1. capture
2. cater
3. cease
4. assess
5. coincide
6. commit

__ provide food and drink
__ stop, end
__ measure, judge size

1. averse
2. colloquial
3. bulky
4. cogent
5. bureaucratic
6. authorized

__ allowed, permitted
__ against, opposed
__ unusually large

B. Cloze. Choose from the words below to complete the passage (8 points):

auspices	comments	bomb
clarify	code	civic
clients	automatic	catalog
category	aware	assume

Welcome to the 21st Century!

Everybody is talking about the Internet these days; if you aren't yet you soon will be. But what is the Internet exactly? Let me try to (1)..... . It's a new system for using your telephone line to connect your computer to thousands, maybe millions of computer files all over the world. How do you get on to the Internet? First you have to buy an access program -- the most popular one in Oman is called CompuServe. Each CompuServe disk has a number and two secret (2)..... words on it, and after you enter these along with your credit card number and other information, you can ask your computer to phone the Internet and start opening files.

You start by choosing a (3)..... such as news, weather, business, or games. Or you can open a forum. A forum allows you to exchange information with other users. For example, if you're interested in cars, you could open a forum called Worldwide Car Network. You could see pictures of new models and read the (4)..... of people who have driven them. Or you could type in a question about a part you need and you might get help from someone halfway around the world. If you like old cars, you could ask to see the (5)..... of classic cars for sale, and perhaps even order one, all from your computer screen. Or you could just ask if anybody knows what it feels like to drive the latest Ferrari.

Business people are excited about the Internet because it is capable of giving up-to-the-minute information about world markets, and businesses can communicate with (6)..... all over the world. But we should also be (7)..... of the dangers. No government really controls the Internet and that means that all kinds of information are available to anyone who can turn on a computer. Children can easily open files that are meant for adults only. Also, some people create files full of false information about a particular national group or religion. Recently it was discovered that you can even find a file that tells you exactly which chemicals to use to make a powerful (8)..... !

UWL Quiz 3: compel-crucial
Name: .....

A. Write the number of the word next to its definition (12 points):

1. consult
2. comprise
3. convene
4. correlate
5. consent
6. confront

__ agree to, give permission
__ ask for advice
__ gather together, meet

1. constant
2. crucial
3. concentric
4. credible
5. contingent
6. complex

__ not simple
__ important
__ depending on an unknown future event

1. configuration
2. critic
3. component
4. criterion
5. conflict
6. compulsion

__ person who makes judgments
__ arrangement
__ fight

1. controversy
2. contradiction
3. contribution
4. concentration
5. conservation
6. competence

__ ability, skill
__ gift
__ attention directed to one thing

B. Cloze. Choose from the words below to complete the passage (8 points):

confined	crisis	compound
constitute	contemplating	continent
converted	cooperating	comprehend

A Losing Battle

What is the most profitable business in the world? Contrary to what you might think, it is not oil or banking; it is the dirty business of drug dealing. The dealers at the top of the drug business (1)..... a small but growing group of billionaires who are rich beyond our wildest dreams.

The country people usually think of first when they think of drugs is Colombia. Farmers in this South American nation grow the coca plant in their hillside fields. The leaves of the plant are taken to well hidden factories where they are (2)..... into cocaine. The white powder then begins its long illegal journey to the United States and Europe where it is sold on the black market for billions of dollars annually.

And, billions have also been spent trying to put an end to the drug business in Colombia. American agents work in conjunction with Colombian police to arrest anyone who grows, manufactures, transports or sells cocaine. Planes fly over the fields dropping a chemical (3)..... which destroys the coca plants. But the problem is not (4)..... to farmers and factories; it goes much further to the highest levels of government. Colombian politicians say they want to end the drug trade in their country and they appear to be (5)..... with the Americans in their war on drugs, but in fact, many government officials and policemen help the drug dealers in exchange for receive secret payments. Recently the Colombian government succeeded in capturing one of biggest dealers, but soon after it was discovered that he was still doing business from his prison cell!

These days the problem is spreading to other countries in the South American (6)..... . Colombia's neighbor, Peru, is now the number one cocaine producer in the world, and another neighbor, Bolivia, is second. The minister of economics of Argentina recently warned that his country is rapidly "becoming Colombia." Leaders of these countries want to fight drugs, but they feel that they cannot win the battle because the real reason for the (7)..... is the huge demand for drugs outside their countries. They argue that as long as there is a demand for cocaine in places like the United States and Europe, people in poor South American countries will find ways to supply it. There is simply too much money to be made. Sometimes the numbers are so big that they are hard to (8)..... . For example, the drugs trade is thought to have brought $30 billion into the economy of one country in the region last year. That is equivalent to approximately 10,000,000,000 Omani rials!

--from *Toronto Globe & Mail*, Feb.

1996 UWL Quiz 4: crystal-dynamic
Name: .....

A. Write the number of the word next to its definition (12 points):

1. diagram	
2. drama	__ length, width, or height
3. debate	
4. denominator	__ controversy, argument
5. doctrine	
6. dimension	__ picture, chart
1. deny	
2. diverge	__ separate, go a different way
3. distribute	
4. demonstrate	__ show
5. distort	__ give the meaning
6. define	
1. digestion	
2. deprivation	__ low place; sadness
3. domination	
4. depression	__ writing spoken language
5. deficiency	
6. dictation	__ power, control
1. deficient	
2. dynamic	__ lacking, poor
3. distinct	__ false; stretched out of shape
4. divine	
5. deliberate	__ active, energetic
6. distorted	

B. Cloze. Choose from the words below to complete the passage (8 points):

diverse	detriment	drastic
decades	culture	cumbersome
detect	devote	dense

The Price of Development

An Amazonian Indian is walking down the streets of Washington in the middle of rush hour traffic. His shoulders are broad and his hair is long and black. He walks as if he isn't used to wearing shoes, as if he finds his clothes heavy and (1)..... . He doesn't seem to notice the traffic but he is constantly watching the trees where his hunter's eyes can (2)..... the smallest movement of a bird or animal.

What is this stranger from the jungles of the Amazon doing in Washington? He has come to make a complaint to the Inter-American Commission on Human Rights. He has come to say that his people and their (3)..... are being destroyed by development. Development should bring benefits to a country but in the case of the Huaorani Indians of the Amazon, it has brought little but (4)..... . How did this happen? First, about three (5)..... ago, oil was discovered in the part of the jungle where the Huaoranis live. Since the coming of the oil companies, the pipes have burst 27 times, poisoning the drinking water over a huge area and killing plant and animal life. Secondly, the (6)..... forests of the Huaorani homeland are being destroyed, tree by tree, and the valuable wood is being exported all over the world. This may be good business but it means the destruction of a natural environment. The wildlife of the Amazon jungle is extremely rare and (7)..... . Many of the thousands of different kinds of plants and animals that live there are found nowhere else on earth. Scientists predict that if the present rate of development continues, the Huaorani lands will be completely bare of trees in about twenty years. And their oil resources will be used up too, having satisfied the oil demands of the United States for about 13 days!

And what is happening to the Huaorani Indians? Many of them are leaving the Amazon jungle to go and live in cities. But few of them have the job skills or education that they need to succeed there. Most are unable to adjust to the (8)..... change in their lives and they rapidly sink to the bottom levels of society. The proud Indian hunters degenerate into people without hope.

Will there be a happy ending to this story? Perhaps, but so far it looks like we may pay a high price for development -- the destruction of life on this planet.

--from *Toronto Globe & Mail*, March 96

UWL Quiz 5: economy-final
Name: .....

A. Write the number of the word next to its definition (12 points):

1. element
2. emotion
3. entity
4. episode
5. fallacy
6. ethics

__ belief system, sense of right and wrong.
__ part, component
__ thing

1. edit
2. enhance
3. err
4. expel
5. exhaust
6. execute

__ be wrong
__ make something appear better, improve
__ do, make happen

1. fertile
2. elaborate
3. equidistant
4. explicit
5. external
6. feasible

__ possible
__ clearly explained
__ productive

1. exploitation
2. faction
3. exertion
4. elevation
5. emphasis
6. enrichment

__ effort, energy
__ full and complete use
__ height; high place

B. Cloze. Choose from the words below to complete the passage (8 points):

estimating	experts	exports
exposed	establishing	expand
enable	features	ensure

A Winner in the Toy Business

Who was born sometime in the 1950s and still looks like a teenager forty years later? Her name is Barbie and she is the best-selling doll in the history of toy manufacturing. She isn't very big, about 40 cm tall, but unlike most dolls, she doesn't look like a baby. This may be the secret of her success. Perhaps young girls love her so much because she embodies all the (1)..... they would like to have when they grow up: a pretty face, a perfect figure and long beautiful hair.

Whether you think Barbie is beautiful or not is a matter of opinion, but it is a fact that this American doll is a best seller worldwide. And she is also very popular here in the Gulf. This is why Mattel Inc., the toy company that produces Barbie, has announced that it will open a regional office in Dubai in May of this year. Last week, Jonathan Hughes, the company's manager for (2)....., visited Dubai and talked about the plans. He said that Mattel wants to (3)..... its market share in the Gulf, and eventually, they hope to become the largest toy supplier in the area.

Mattel will start, he explained, by (4)..... a big central supply warehouse in Dubai. This will (5)..... that the products are always easily available to any shopkeeper. If a toy shop runs out of the dolls, the shopkeeper can simply call Dubai instead of waiting for a new shipment to arrive from the United States.

Because the Barbie doll has been so successful in the Gulf, Mattel wants to (6)..... customers here to buy other Barbie-related products like Barbie clothes, cars and doll houses. These new items will be available soon and are expected to sell well.

And the company announced another idea: Mattel is looking for local businessmen who are interested in using the Barbie label to sell their products. For example, locally manufactured food items, school supplies, or children's books could carry Barbie's name or picture on them. How would Mattel benefit from this? Well, a lot more people would be .....to the name 'Barbie', and this might cause them to buy more dolls. It would help advertise Mattel products. And what would you get out of putting Barbie's name on your product? You would get help and advice from people who are (8)..... at advertising and marketing, and maybe Barbie would bring you a little of her amazing success: Last year she was sold in 140 different countries and she earned her makers 1.4 billion dollars!

--from *The Khaleej Times*, April 1996

UWL Quiz 6: finance-index
Name: .....

A. Write the number of the word next to its definition (12 points):

1. fluctuate
2. ignore
3. implement
4. frustrate
5. imply
6. found

__ establish, begin
__ do, make happen
__ give no attention to

1. focus
2. fraud
3. fuel
4. frontier
5. index
6. impulse

__ making money in a wrong way
__ oil, coal, wood, etc.
__ center of attention

1. finite
2. hostile
3. incessant
4. inconsistent
5. identical
6. fundamental

__ unfriendly
__ without stopping
__ exactly the same

1. fulfillment
2. harbor
3. illumination
4. fragment
5. geography
6. incompatibility

__ difference, lack of agreement
__ part, piece
__ boats stop there

B. Cloze. Choose from the words below to complete the passage (8 points):

genuine	friction	import
image	finance	forego
impact	fraction	identify

The Economics of a Disease

Have you eaten a hamburger recently? Or are you avoiding beef these days? Since last month many people all over the world have decided to (1)..... eating beef because they are afraid of 'mad cow' disease.

Recent research in Britain has suggested there could be a connection between mad cow disease and a deadly brain virus in humans called Creutzfeldt-Jakob. Scientists are working hard to (2)..... the exact cause of Creutzfeldt-Jakob, but so far they have not been able to prove for sure that the disease is passed from cows to humans. Even if there is a connection between eating beef and getting the disease, your chances of catching Creutzfeldt-Jakob are extremely small. Only a very small (3)..... of the population gets it annually -- in most European countries the incidence is around six or seven cases per million people each year.

Although the actual danger is tiny, the publicity surrounding mad cow disease has been enormous, and this has done a great deal of damage to the (4)..... of British beef in the minds of consumers. They simply no longer see it as a healthy or desirable product, and countries all over the world (including Oman) are refusing to (5)..... British beef. This boycott has had a huge (6)..... on the British economy and farmers there are very worried. Millions of cows -- most of them probably healthy -- will have to be killed before consumers will regain confidence in British beef.

The British government now faces the problem of how to compensate farmers for the loss of their animals. The cost is enormous and the British have asked their European neighbors to help (7)..... the payments to farmers. But the Europeans have not been very generous and are granting $250 million less than the British had hoped for. This illustrates, once again, how difficult it is to achieve (8)..... economic cooperation in the European Union. And the announcement yesterday that a new case of Creutzfeldt-Jakob has been discovered in France will only make things worse.

--from *The Herald-Tribune*, April 7, 1996

UWL Quiz 7: indicate - liberate
Name: .....

A. Write the number of the word next to its definition (12 points):

1. innovation	
2. incident	__ conversation
3. integer	__ new thing
4. intellect	__ number
5. interview	
6. kindred	

1. intense	
2. ingenious	__ with you at birth
3. intrinsic	__ bright, powerful
4. intermediate	__ middle, between
5. individual	
6. innate	

1. insist	
2. instruct	__ separate
3. liberate	__ free
4. legislate	__ make a law
5. isolate	
6. intersect	

1. judicial	
2. injured	
3. interpreted	__ opposite
4. inverse	__ mixed together
5. inhibited	__ explained, trans-
6. integrated	lated

B. Cloze. Choose from the words below to complete the passage (8 points):

investigate	indicates	irrigation
launched	induces	invaded
items	indigenous	inferior

Riches or a Few Old Bottles?

Christopher Columbus is famous for discovering America, but of course he did not really discover it. There were plenty of people already living there. Because he thought he had arrived in India, he called these (1)..... people 'Indians'. Many of the American Indians you see in films appear to poor, simple people, but in fact, the Indians of Peru and Mexico and were rich and highly developed. They had well organized governments and lived in planned cities. Many could read and write, and their engineers designed a complex (2)..... system to bring water to their farmlands.

But Columbus, and the other Spanish and Portuguese explorers who came after him, had little respect for the people of the lands they 'discovered.' They felt Indian culture was (3)..... to their own, and they worked hard to convert the Indians to Christianity. But there was one thing that the Europeans saw there and liked: gold, and huge amounts of it. Again and again during the sixteenth and seventeenth centuries Europeans (4)..... South America and robbed the Indians of their gold, silver and jewels. Thousands of Indians died, whole societies were destroyed, and the valuable treasure was carried away to Europe on ships.

However, not all of those ships filled with gold managed to reach Spain or Portugal. Many sank in storms or were destroyed in battles near the Caribbean island of Cuba. Today the government in Cuba estimates that there are 6,000 sunken ships in the waters along its coasts. Recently the Cuban government (5)..... a plan to find the sunken ships and the valuable treasure inside them. The plan involves using a boat equipped with computer technology and metal detectors. The boat pulls a metal detector along the ocean floor. When the detector finds metal, it (6)..... the exact location of the find on a map on the computer screen. Later divers can return and go under water to (7)..... the area. Hopes are high --the same technology succeeded in finding jewels worth $400 million in a sunken ship near the coast of Florida. So far the Cuban project has found eight sunken ships but none of them have contained gold, silver or jewels. Divers brought up some (8)..... from one of the ships but after the layers of sand and dirt were removed, they turned out to be 200-year-old bottles!

--from *Toronto Globe and Mail*, March,1996

UWL Quiz 8: linguistics-outcome

Name: .....

A. Write the number of the word next to its definition (12 points):

1. magic
2. magnetic __ strange
3. moist __ wet, damp
4. odd __ old, out of date, useless
5. obsolete
6. mature

1. margin
2. orbit __ reason to do something
3. null __ circular movement
4. navy __ empty space at the edge
5. motive
6. momentum

1. mobile
2. maternal __ choosing neither side
3. nuclear __ showing clear thinking
4. neutral __ able to move
5. normal
6. logical

1. litigation
2. location __ movement, travel
3. migration __ duty, responsibility
4. notation __ way of writing
5. orientation
6. obligation

B. Cloze. Choose from the words below to complete the passage (8 points):

outcome	occur	magnitude
monarch	nutrients	occupy
maintain	luxuries	obvious

The Man Who Broke the Bank

Barings Bank used to be one of the oldest and most respected British investment banks. It had branches all over the world and many famous customers including the British (1)..... , Queen Elizabeth. But last year in February there was bad news at the Singapore branch. In fact, it looked like Barings was in serious trouble. At first the (2)..... of the problem was not clear. Nobody knew for sure how many bad investments had been made or how much money was involved, but it soon became (3)..... that the losses were over $1.3 billion dollars, and so large that the 232-year-old bank was forced to close with great losses to its customers.

How could such a disaster (4).....? How was it possible for such a respected and trusted institution to have made such mistakes? The top management of Barings promised a thorough investigation and they soon found out who was responsible: a young trader called Nick Leeson.

Here is his story: Leeson had done very well at Barings and had received huge bonuses and rapid promotions for his excellent performance. He came from a very ordinary working-class English family, and he and his wife enjoyed their new life and the (5)..... that came with wealth and success in Singapore. They ate at the finest restaurants and played tennis at the best club. Leeson became determined to (6)..... his record of success at the bank.

His method was simple. He made very large, very risky investments for Barings in the hopes that there would be enormous profits. If there were losses, he entered them in a secret account, and hoped to pay off the growing debt with profits from the next investment success. But the debts increased so fast that Leeson lost control. By the time the fraud was discovered, it was too late to save the bank.

As we know, Barings went bankrupt, but what was the (7)..... for Nick Leeson? He has been given a prison sentence of just six and a half years for his crime, and he does not seem to be very sorry about what he did. How does he (8)..... his time in prison? It looks like he has been writing. He has just published a book called Rogue Trader--How I Brought Down Barings Bank and Shook the Financial World. Buy it and read it if you like, but remember: Your purchase is helping to pay the legal bills of a thief.

--from *Toronto Globe & Mail*, March 1996

UWL Quiz 9: overlap-pursue

Name: .....

A. Write the number of the word next to its definition (12 points):

1. province
2. prestige
3. port
4. pest
5. peasant
6. principle

__ harbor
__ idea, rule, law
__ farmer

1. postulate
2. prevail
3. persist
4. publish
5. precede
6. participate

__ do with others, join in
__ keep on trying
__ happen before

1. phase
2. prosperity
3. priority
4. prudence
5. pole
6. phenomenon

__ wealth, success
__ first importance
__ happening, event

1. perpetual
2. pertinent
3. physical
4. pragmatic
5. polluted
6. precise

__ exact, accurate
__ connected directly
__ of the body

B. Cloze. Choose from the words below to complete the passage (8 points):

prohibited	policy	protest
predict	provoke	previously
positively	pleads	passive

Television and Crime

Robbers run out of a bank shooting and killing everybody in sight. Switch the channel and you'll see a murderer raising his knife while a crying woman (1)..... for her life. Another channel shows bloody scenes of war. On television screens all over the world young children sit and watch shocking acts of beating and killing again and again every day. Recently, people have started to wonder about the damage this might do. Some parents worry that watching TV might change their children from (2)..... watchers to active participants in crime. It is easy to imagine that seeing a murder on TV might (3)..... a weak or confused person to commit a real murder. To answer the question about a possible connection between TV crime and real crime, psychologists studied a community in Africa before and after the introduction of television. As you might expect, there was more crime after the arrival of television than there had been (4)..... The researchers concluded that as many as 10,000 murders a year in the US may be due to the influence of TV.

So how can we stop children from seeing things they shouldn't see? One answer for parents is to tell their children they are not allowed to watch certain programs. Cartoons are OK but anything with killing in it is (5)..... . This (6)..... is good in theory but difficult in practice. Not all parents have time to police their children's viewing habits constantly. And sometimes it is difficult to (7)..... what will happen in a show. A story may begin quite peacefully and later turn into a terrible tale of blood and death once everyone's attention has been caught. You can imagine the cries of (8)..... when you insist on changing the channel!

A new technological solution to the problem is a device called the V-chip. It allows parents to block out unsuitable programs by making the images unclear. A new law in the United States requires that all TVs produced after 1998 contain V-chips. But is technology the answer? Instead, maybe we should watch what our children watch more carefully.

--from *Toronto Globe & Mail*, March 1996

UWL Quiz 10: quote-series

Name: .....

A. Write the number of the word next to its definition (12 points):

1. radical
2. random
3. reluctant
4. rudimentary
5. respective
6. secure

__ safe
__ basic, simple
__ making a complete change

1. quote
2. restrict
3. release
4. reveal
5. retard
6. select

__ say what someone said
__ choose
__ tell a secret, show

1. radius
2. rhythm
3. role
4. route
5. segment
6. sequence

__ order
__ halfway across a circle
__ music has it

1. rebellion
2. rotation
3. saturation
4. requirement
5. reproduction
6. reinforcement

__ circle movement
__ copy, making again
__ aid, extra strength

B. Cloze. Choose from the words below to complete the passage (8 points):

respond	resource	rigorous
retain	reject	revival
removal	region	seek

Galt, Canada or Galt, USA?

In 1971 a journalist called Robert Perry visited the town of Galt in eastern Canada. This area had a long tradition of industry with many family-owned factories that made products such as shoes, clothing and machinery. But Perry did not feel optimistic about the future of Galt as a proud center of Canadian industry. He thought that many managers of family firms lacked the entrepreneurial skills, the energy and the (1)..... work habits of their grandfathers and great grandfathers who had first established the firms in the nineteenth century. Perry predicted that within a few years most of the factories in the (2)..... would be taken over by larger, more powerful companies in the neighboring United States.

But 25 years later, in 1996, it appears that Perry's prediction was wrong. It is true that a few family companies have been Americanized. In those cases the takeover bids were just too attractive to (3)..... . But many of the Galt manufacturing families (4)..... their family firms, in spite of the enormous difficulties small businesses face in today's global economy. How did these family-owned businesses manage to hold on to their independence? Mostly by being able to (5)..... to changes in worldwide supply and demand.

Take Canadian General-Tower, for example. This company, which is owned by the Chaplin family, has a history of adapting to change. Earlier this century, it used to specialize in products made of rubber, but when this (6)..... became unavailable during World War II, the company had to make its products from something else. So Canadian General-Tower started making raincoats and shower curtains from plastic. Recently, however, plastic imports from Taiwan became so cheap that the Canadian products could not compete. So once again, the company had to (7)..... new customers and a new product. Now the company makes vinyl, a kind of plastic used for covering car seats. Mr. Chaplin presently has 700 employees working for him, compared to 200 in 1974. He is happy that his company has remained in Canadian hands, and pleased that Galt has had a (8)..... instead of the decline Perry expected. But Chaplin warns that independence may be difficult to maintain. "You have to be cautious about being too nationalistic," he says. "In the future we may need to join up with an American company in order to remain successful."

--from *Toronto Globe & Mail*, April 1996

UWL Quiz 11: sequence-telescope

Name: .....

A. Write the number of the word next to its definition (12 points):

1. subjective
2. stationary
3. subtle
4. spontaneous
5. tangible
6. superficial

__ on the surface, not deep
__ you can touch it
__ based on opinion instead of fact

1. series
2. sex
3. stress
4. sketch
5. symptom
6. tape

__ group of things in order
__ sign of a disease
__ male or female

1. subordinate
2. sustain
3. specify
4. subsidize
5. speculate
6. shift

__ change direction
__ put in a lower position
__ say exactly what you want

1. similarity
2. stability
3. suppression
4. shrinkage
5. sophistication
6. summary

__ decrease in size
__ high level of skill or knowledge
__ being like something else

B. Cloze. Choose from the words below to complete the passage (8 points):

techniques	simultaneously	site
sibling sum	starving	status
technology	subsequently	symbol

Henry Ford, Modern Hero

A hundred years ago in 1896 crowds gathered on the streets of the American city of Detroit to watch a "horseless carriage" go by. Horses ran away from it in terror, and police tried to force the driver, Henry Ford, to take the machine off the streets. No one had any idea then that the young inventor would become a twentieth century hero and a (1)..... of success.

He was born into a poor family and he had to work hard to help his father on the farm. But whenever he could, he went around to other farms looking for work repairing clocks and watches -- anything that would give him a chance to work with machines. At the age of 16, he walked to Detroit and got a job as a mechanic's assistant. For his work he was paid the enormous (2)..... of $2.50 a week! (That is about one rial in Omani currency.) But his room cost $3.50, so to keep from (3)....., he had to find another job. Repairing watches at night earned him an additional $2 a week. (4)....., he worked in an engine shop and helped design steam engines for farm machinery.

Soon after this he became interested in a new kind of (5)..... , the petrol engine. In his free time he built his first car in a little shed behind his home. It had a four-horsepower engine, only one seat and a stick instead of a steering wheel.

Ford is a famous inventor but he is even more famous for his ideas about the manufacturing process. He introduced several new (6)..... . Instead of having one worker build a car from start to finish, Ford had the worker do only one task repeatedly until he became really good at it. Parts were brought to the workers on moving belts, so they did not have to waste time walking around the factory. This made it possible to produce large numbers of high quality cars (7)..... . As a result, cars became cheaper to buy and Americans bought the new Ford cars like crazy. Ford became rich beyond his wildest dreams.

But that was later. Initially, in 1903, when Ford was first trying to organize his automobile company, he managed to find only 11 other stockholders. One friend invested $1000 and gave him some land for a factory. Later this investor was able to sell his share in the Ford Motor Company for over $5 million and the factory (8)..... was valued at $30 million. Obviously, it pays to invest in a good idea!

--from *Compton's Encyclopedia*, 1984

UWL Quiz 12: temporary - x-ray

Name: .....

A. Write the number of the word next to its definition (12 points):

1. trivial
2. vital
3. valid
4. temporary
5. urban
6. vertical

__ important
__ not important
__ up and down

1. undergo
2. verify
3. transfer
4. tolerate
5. utter
6. transport

__ make sure it is true
__ accept, allow
__ speak

1. terminology
2. uniform
3. texture
4. upsurge
5. tissue
6. theory

__ idea, principle
__ smoothness or roughness
__ vocabulary

1. violation
2. validity
3. transaction
4. vibration
5. transmission
6. withdrawal

__ shaking movement
__ breaking the law
__ taking away, taking back

B. Cloze. Choose from the words below to complete the passage (8 points):

topics	transform	tropical
visual	underlies	varies
traditional	trends	vast

Discovering Dhofar

The second Apex Explorer's Guide, Discovering Dhofar, will be published in September. The new guidebook will appear just in time for you to visit Oman's most southern region when it is at its best. As you know, at this time of year the monsoon rains (1)..... the area completely. The dryness and dustiness of the desert climate disappears entirely and the wet, greenness of a (2)..... climate takes its place.

Discovering Dhofar is a special book about a special place. It informs visitors on how to explore the best that the territory can offer, without disturbing the privacy of its people or damaging this unusual natural environment. The trips described by author Pauline Shelton take you through geography that (3)..... enormously. There are trips along the coast from Rakhyut to as far as Sudah, and a trip to the north that takes you to the edge of the (4)..... desert known as the Empty Quarter. But the main emphasis of the book is on the beauty of the mountains, or 'jebel,' with its rolling hills, pools and woodlands.

The chapter on Salalah is a gold mine of information. Shelton guides the reader through the souq to the shops that sell the best examples of (5)..... Dhofari jewelry and on to the museum, the bird sanctuary and other places of interest. She also provides useful practical information about hotels, restaurants, and sporting facilities.

The introduction covers a number of (6)..... such as the diverse plant, animal and bird life and the rich history of the area. In addition to being fascinating to read, the book has a lot of (7)..... interest. The many lovely color illustrations will attract new visitors to Dhofar, and serve as beautiful way to remember the trip for those who have already been there. But more important than the information or the pictures is the writer's real love of Dhofar that (8)..... what you actually see and read. There isn't another book on the market with the appeal and quality of Discovering Dhofar. I recommend it wholeheartedly.

Available soon in good bookstores and supermarkets.

--adapted from *Oman Today*, Autumn, 1993

UWL POST-QUESTIONNAIRE RESULTS (46 respondents)

1. To prepare for the weekly University Word List quizzes, I studied the meanings of the words in Arabic.

always	52%
usually	39%
sometimes	4%
never	4%

2. To prepare for the weekly quizzes, I studied the meanings of the words in English.

always	9%
usually	13%
sometimes	57%
never	22%

3. To prepare for the weekly quizzes, I studied the way the words were used in sentences in the Macintosh computer program.

always	0%
usually	2%
sometimes	**22%**
never	76%

4. Studying seventy University Word List words each week was...

easy	2%
OK	33%
difficult	61%
impossible	4%

5. I got the list of words to study from...

my teacher	53%
my friend	31%
Mac lab	16%

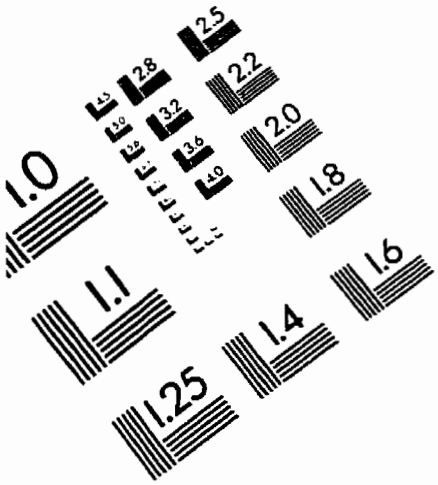
6. I think knowing these words is...

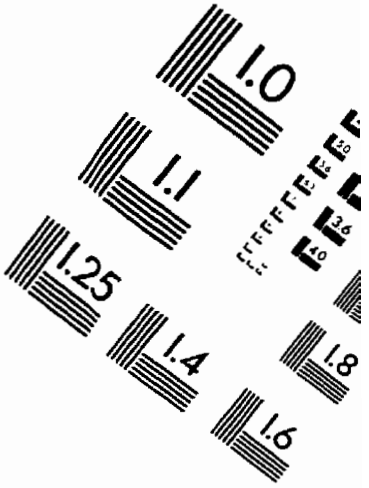
very useful	61%
somewhat useful	33%
not very useful	7%
not useful at all	0%

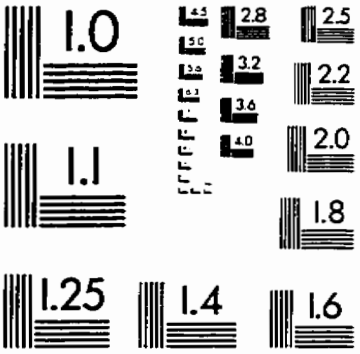
7. Teachers could make learning the words easier by... (you may choose more than one answer)

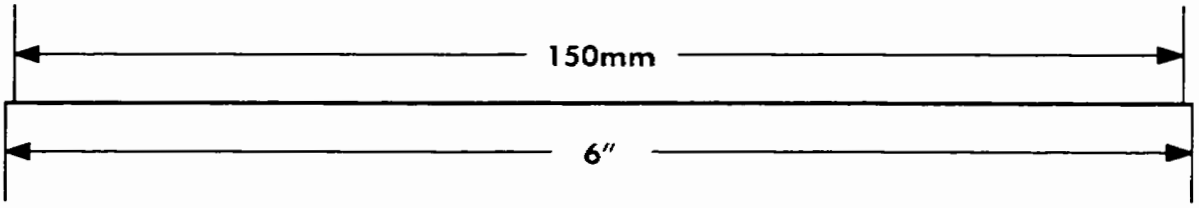
practising the meanings more in class	72%
practising the way the words are used in sentences more in class	**76%**
practising spelling more in class	17%
other practice (explain, please)	11%
no extra help is needed in class	2%

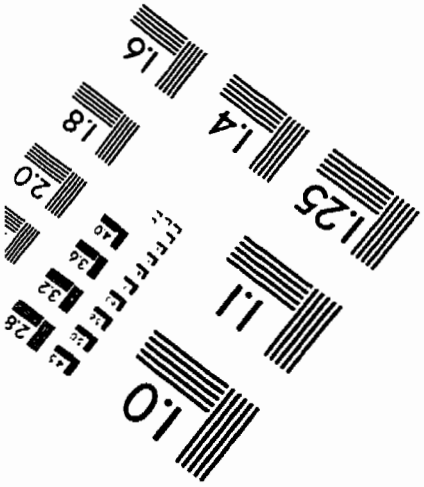
IMAGE EVALUATION TEST TARGET (QA-3)











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