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Communication with users: insights from second language acquisition

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Abstract

The paper addresses the question of how an English language user interface will be understood by users from different linguistic and cultural backgrounds and provides some answers from the study of second language acquisition and the practice of language teaching and learning. It is accepted that for a number of reasons, translation of an English interface into other languages is not always feasible or appropriate. Existing knowledge of language learning problems and solutions can be applied to the design of English language interfaces so that they are more accessible to non-native speakers. The present article categorises language-related problems, gives examples in each category, and provides a set of guidelines. The conclusion reached is that making word collocations and co-occurrences visible and available is the key to building in sufficient verbal context for understanding—a measure which will also be helpful to native speakers of English.

1. Introduction

Some years before international communication issues were sharply highlighted by the proliferation of English language sites on the World Wide Web, Nielsen [1,2] was drawing attention to the fact that “more than half of the world’s software users...” would soon be using “... interfaces that were originally designed in a foreign country” [2]—that foreign country being, more often than not, the United States. It is now recognised that interfaces which must communicate across national and cultural boundaries call into question our assumptions about the interpretation and acceptability of various interface features [3–9].

Information and advice is gradually becoming available to help software designers avoid known pitfalls and build on a shared understanding of symbols and meanings, in interface design and localisation guidelines [10,11], and in special publications such as Intersol’s Web-based newsletter, *The Global Advisor* [12]. This is gradually making linguistic and cultural localisation easier.

Translation of a user interface is not always possible or appropriate, however, for technical, political or economic reasons. Thus many people are obliged to use English language software in its original version. For example, a particular software package, which is only available in English, might be essential to their work, or they are with an international company or organisation whose employees work in the medium of English, regardless of location. These are what might be called ‘non-native users’—that is to say, people for whom English is not their first language, and who may still be in the process of learning it. This category of user includes those who are now living and working in English-speaking countries but who originate from other parts

of the world. Many non-native users are people who make purchasing decisions on the basis of demonstration software, before translation has taken place.

In the environment created by the Internet and the Web, there are countless users who have little say in the matter of the language of the interface. In relation to the original intention of the designers of a website, non-native speakers might be a new category of user, since it is often the case that a site is developed and used locally before being made available to a global audience. Translation agencies promote their services by stating that a multilingual website allows a company to reach more potential customers, which makes commercial sense and justifies the costs and complexities of high quality translation. For non-commercial organisations or more informal groups, the need for translation is often much less pressing. So there is a strong argument for the principle of designing a user interface in such a way that it is understandable to native and non-native speakers of English alike. Interfaces designed with non-native speakers in mind are also easier to translate into a foreign language, should the need be recognised or the opportunity arise.

2. A second language perspective

One significant challenge that interface designers face is to succeed in using the English language in such a way that it will be understandable to users from very different backgrounds. This involves looking into the sorts of language and communication problems that non-native speakers come up against in the user interface. To a certain extent, difficulties are individual in nature, but some will be common to groups of users with a shared background in terms of culture, native language, age, level of English, and so on. Within the science of language and its application in language teaching and learning—including the teaching of English for Specific Purposes (e.g., business, science)—much is known about how communication difficulties arise and how they can be overcome. The main aim of this paper is to present the insights that the study of second language acquisition offers to designers of computer applications or websites which will be used by non-native speakers of English. The study of second language acquisition is based on well-developed theories and an immense body of experience in teaching and learning [13–15]. There is every reason to believe that the issues and difficulties which have been identified and tackled in that domain are also applicable to learning the specific language of an interface [16].

Many concepts currently used in human–computer interaction (HCI) literature have quite different meanings when they are used in the study of language and communication. ‘Context’ is an important example. In HCI literature, the meaning of the term has been much debated. Currently, it tends to be defined and classified in relation to type of system or application. For instance, Patel et al. [17] propose a framework of contexts for designing intelligent tutoring systems which consists of an interactional context, an environmental context, and an objectival context that relates to teaching objectives. Turner [18] describes context as being a part of a situation that impacts agent behaviour. In their textbook on HCI, Preece et al. [19] refer to context of use as a factor that determines the meaningfulness of an interface feature (e.g. an icon). All these uses of the term would be recognised in language studies, but in addition, context often refers to surrounding words, so that it is synonymous with

‘verbal context’ or ‘co-text’ [20]. In a recent discussion of this topic in relation to vocabulary acquisition, Engelbart and Theuerkauf [21] propose ‘verbal context’ as a generic term for both grammatical and semantic context, contrasting this with context that is ‘non-verbal’ (situation, subject, etc.). The essence of verbal context is that the meanings of words are influenced by other words that are their neighbours. For example, the meaning of the verb *to take* is altered each time we put another word next to it: take in, take on, take up, take off, take over. This allows us to see how understanding might be affected when vital words are left out due to conflicting priorities and practical constraints. Articles (a, the), adverbs (as, up, down...), and prepositions (of, at, in...) are small words, yet they play a vital role in determining meanings. When language is used, surrounding words help to specify actual word meanings—as opposed to potential meanings, such as one would find listed in a dictionary.

In many existing interface styles, especially ones that feature menus, options, toolbars and buttons, verbal context is missing. Native speakers can be relied on to fill in some of the missing information thanks to their familiarity with the full range of potential meanings and the typical behaviour of words in English. Knowing that zoom is used when talking about cameras and lenses, for instance, and being familiar with the verbs zoom in and zoom out, is useful in understanding a windows interface which has a ‘zoom’ button. Knowing that entry is a term used when talking about dictionaries means that native speakers can easily associate it with *dictionary* or *glossary*, e.g. a glossary entry. Similarly, given a verb, they can guess what noun might be implied (what sorts of things can you *cancel*, *submit*, *revise*, *apply*?). Non-native speakers are certainly disadvantaged here: a single word may conjure up the wrong associations, based on similarities with words in their native language—or no associations at all.

It would be unwise to suggest that other kinds of context (e.g. social, situational, graphical, application, task) are not important, that it is only verbal context that counts. However, two points need to be emphasised. Firstly, in user interface design, verbal context is easily neglected if it is not clear who should take responsibility for providing it, or it is being provided in facilities which are relegated to the tail end of a project when there is pressure to complete (e.g. a help index may be treated in this way). This can be contrasted with graphic design, for instance, which is typically the responsibility of specific individuals and may be prioritised. Secondly, we know from second language acquisition that verbal context has the special advantage of helping learners to become productive users of a new language [22], which can make them more productive in their use of an interface. They are enabled to ask questions about an application using appropriate language, which should make it easier for them to interact with search and query facilities and with technical support people.

3. Areas of difficulty for non-native speakers

In a sense, all computer users are in the same situation as language learners, because in using any new application they find themselves having to learn the meanings of specialised words they have never encountered before, or words they thought they knew, but which turn out to have subtly different meanings. Non-native speakers of English face some of the same problems as native speakers, but they have additional difficulties, which stem from their less complete knowledge of the English language, its sounds as well as its word forms and structures, and from interference between

their first language and English. The main areas where difficulties are likely to occur fall into the categories listed below. Each one is subsequently discussed, and examples of interface terms are given. It should become clear that these problems have a direct and practical impact on HCI applications. The discussion is followed by a set of guidelines for interface developers, which address these potential areas of difficulty for users.

- Words similar in form
- Culture-specific meanings
- Incorrect pronunciation
- Abbreviations
- Words related in meaning
- Semi-technical terms
- Ambiguous words
- Stacked modifiers
- False friends
- Idiomatic expressions

3.1. Words similar in form

If terms from a particular application or operating system interface are first encountered in speech (e.g. in a demonstration), there is no strong association between a word's meaning and its accurate written form. This can lead to confusion. In general, words with similar beginnings, especially if they are semantically related, may pose this kind of problem, for example *border* and *box* in word processing terminology (Microsoft Word). Other examples of pairs of terms of this type are: *clear* and *close*, *refresh* and *restore*, *expand* and *extend*, *form* and *format*, *clip* and *click*. In English writing guides, words like this are sometimes referred to as 'confusibles'.

In words which start with a 'prefix', this first part of the word can in itself be misleading. For example, the prefix *super* in the English word *superscript* means 'over', the same as in the word *superimpose*, not 'extraordinary' as in the word *superman*. In other languages which use the same prefix, the second meaning is the dominant one, used in many everyday words, so it is likely to be assumed by speakers of these languages when trying to figure out the unfamiliar meaning of the term *superscript* in a word processing application.

3.2. Incorrect pronunciation

For people learning English, first contact with a new term brings with it the risk of misunderstanding based on mispronunciation. When users first encounter terms on a computer screen, the sound component is usually absent, so they are left to figure out how terms might be pronounced. *Previews* may not be distinguished from *previous*, for instance; *access* may not be distinguished from *assess*. What is more, a word that is mispronounced can sometimes come to resemble a word from the user's first language, and so form in the user's mind an association with a partially or totally incorrect meaning. An example of this is the word *type*, which lends itself to mispronunciation (voiced as 'tip' or 'teep'). *Type* has several potential meanings in

English, and an intended meaning in a given interface. If it is pronounced incorrectly, its range of meanings is altered, that is to say it is aligned to those available in the user's first language. In this process, the meaning that was originally intended can be ruled out. For example, the meaning of the Polish word 'typ', pronounced 'tip', does not relate to printing or typing, only to categorisation.

What role might pronunciation play in an interface? We know that verbalisation is a strategy language learners commonly employ—reading text aloud is a way to objectify and gain control over what is being directed at them [23]. In research on reading, it is thought that subvocalisation may have a function in helping to hold in short-term memory words that cannot be immediately understood or otherwise dealt with [24].

There is considerable irony in the way the French have adopted the term *e-mail*, changing it to *mél* to reflect the way it is pronounced in French, and making the term unrecognisable to an English speaker. It is worth adding that even when there is the option of hearing how a word is pronounced in English (e.g. audio instructions), the non-native speaker is liable to cling to what is recognised and familiar, and a relatively subtle difference in sound may go unnoticed.

3.3. Words related in meaning

Words that are unlike each other in sound or spelling, but are closely related in meaning present another area of difficulty: for instance, what exactly are the differences between *mistake*, *error* and *fault*? These are synonymous words that are often used and interpreted incorrectly. *Contents* and *index* are sometimes used interchangeably, or taken to mean similar things. Other such pairs are, e.g. *search* and *find*; *directory* and *file*. These can present a problem to native and non-native speakers alike. In a recent evaluation of the user interface to the Infromedia digital video library system [25], it was found that users were confused by the terms *filmstrips*, *skims* and *data abstractions*, which are all used in the system and appear to have similar meanings. *Filmstrips* and *skims* are in fact two presentation schemes for abstracting key information in a segment of digital video—*filmstrips* present the segment as a sequence of still images, while *video skims* are played and disclose information temporally. Both may be referred to as *data abstractions*. The precise meanings and relationships between these terms could not be worked out from the information provided in the interface.

A person who has learned an English word and linked it to its semantic equivalent in his or her first language will not necessarily be aware of its relationship to words of similar meaning, e.g. the relationship between *change* and *convert*; or between *delete*, *remove*, *erase* and *clear*. This limits their repertoire when it comes to information retrieval strategies, such as might be required when accessing a help index or using a search facility. Many existing search mechanisms assume that users will be capable of trying different synonyms.

3.4. Ambiguous words

The potential for different meaning interpretations, known as ambiguity, is all-pervasive in language. The most frequently used English words are highly ambiguous

or vague, and this is particularly true of verbs, e.g. *move*, *go*, *have*. Lytinen [26] has explored the difference between words which are vague and those which are ambiguous, giving *went* as an example of a vague word, i.e. one that has several related meanings and needs refinement through surrounding words in a sentence. Draw is an example of a word that is ‘genuinely ambiguous’, as the meanings are unrelated, e.g. *draw a picture*, *draw fans to a match*.

English also has many nouns and adjectives which have the same form as verbs or which function as verbs, e.g. *file*, *block*, *log*, *extract*, *frame*, *chart*, *page*, *screen*, *release*. If these words stand alone in menu options or on buttons, it can be very hard to predict their intended meaning. Just like native speakers, non-native users can be perplexed, but if their knowledge of English is limited, they can sometimes assume a particular meaning—the only one they happen to be familiar with, which is not necessarily the right one.

Certain adjectives are likely to attract ambiguity—*next* and *previous* are worth noting here. In the digital video user interface mentioned earlier, the phrase *load previous segment* was found to be ambiguous in the video playback window—it was not clear to users what “previous” meant in that context, there were several possible interpretations. In the same application, *copying a video selection to the clipboard* meant “part of a video clip”, rather than “a selection of different video clips”—the use of the term selection was shown to be a source of ambiguity. Horton et al. [27] have made the point that the term *display* is confusing to non-native readers of English—it can refer to a physical object (when the display flickers), a software feature (the display option), or a user action (to display a chart).

3.5. False friends

‘False friends’ are a common problem between related languages, and cause difficulties for speakers of one language trying to learn and use the other. English shares with other languages many words of Greek or Latin origin whose meanings have evolved over time. The French word *report* can mean postponement, image transfer, or amount carried forward, even though it looks like the English word *report*. Similar words are also a potential problem, for instance *replace* looks similar to the French *replacer*, but the French word means ‘put something back again’, not ‘put one thing in place of another’. *Delay* looks similar to *délai*, which in French means ‘time allowed’. There are plenty of examples in other languages, including Spanish, Portuguese, and Italian. The Italian *cancellare* corresponds in meaning to the English *delete*, though in form it is more like *cancel*. In Spanish, the word *clasificación* corresponds to the English *sort*; *dirección* is an address; and so on.

3.6. Culture-specific meanings

Culture-specific meanings are another problem area. Within one culture, people tend to have a shared understanding of meanings, but cross-cultural communication poses problems. English is made up of geographically determined varieties, which means that it is more sensible to talk about ‘Englishes’ rather than English [28], and about different English cultures. So for example the American English meanings of *faculty*, *graduate*, etc. differ from those of British English when used in specific educational contexts. Research by Evers et al. [29] has shown that in a particular educational

website interface (the virtual campus of DirectED, www.directed.edu/core.html), the term *faculty* could be interpreted to mean “subjects”, “buildings” or “academic staff members”, depending on users’ cultural and linguistic backgrounds (in this case British, Dutch and Sri Lankan). A study by Kulkulska-Hulme [30] with British and Brazilian Web users suggests that the meaning of the term *video clip* (found in the interfaces to many websites) is dependent on users’ prior experience of video in a given culture.

Sometimes the relationship between words is that of overlap: there is some common ground, but there are also differences in meaning. To give an example from French and English, the word *document* is wider in scope of meaning in French than in English—in French it can also be used to refer to papers, books, notes, evidence, materials, etc. Conversely, the English word *report* corresponds to the French *rapport*, but also to *compte-rendu*, *reportage*, *communiqué*, *critique*.

3.7. Abbreviations

English language teaching materials and major dictionaries for language learners typically include some information about deciphering abbreviated language forms. An example of the use of abbreviations is the language of small advertisements in the press. A native speaker of English would be expected to understand a phrase like “rehabbed grnd flr apt in semi-det hse”, but a learner of English needs plenty of practice in identifying the words and their culture-specific meanings. Examples of these types of abbreviations functioning as computing terms are *ctrl*, the *INS* key, *PGDN*. Abbreviations can also engender ambiguity—compare the meaning of “caps” in drop caps, keycaps and caps lock, for instance.

Abbreviated language of a different kind can be seen in menu options which do away with prepositions; for example, in the ‘Message’ menu of SoftArc Inc. FirstClass computer conferencing system, there is a ‘special’ option comprising the following choices: *Reply All*, *Reply Sender*, *Reply Conference*—the preposition “to” has been left out. Arguably, in this instance the meaning is unaltered, but the grammatical structure has been hidden. If, as stated earlier, grammar is part of ‘verbal context’, implications of this practice for understanding and for translation should be investigated further.

3.8. Semi-technical terms

Words that are not normally encountered in language learning situations present particular problems. For example, the meanings of word processing terms like *paste*, *merge* and *flush* right will be far from obvious to non-native speakers. *Cropping* will not normally be a familiar term (“Cropping an image is like cropping a photograph”—beginning of explanation in Paint Shop Pro, Jasc Software Inc.). This is mostly the domain of semi-technical vocabulary, which users from a non-technical background have difficulty with—the meaning is not so specialised that it obviously has to be explained, so it tends not to be. For example, in computing, the meaning of the word *open* is different to the everyday meaning; it also changes from one application environment to another. Web browsing software can allow you to *open a location*—‘open’ means here ‘visit a new document specified by URL’.

When faced with semi-technical or technical terms, some non-native users report bypassing meaning altogether, preferring instead to learn a set sequence of key strokes, or to memorise the position of an item in a menu. If a new version of the software is released and the interface differs from what they are used to, they are unable to adapt as quickly as native speakers.

3.9. Stacked modifiers

In some varieties of English, including professional written varieties, there is a tendency to put a series of modifiers in front of a noun to alter its meaning. *Easy open pack* is an example from the labelling on packaging—meaning ‘this is a pack which is easy to open’. Structures like this can be difficult to decode for anyone who is not already familiar with them. There are plenty of examples of this type of structure in interfaces and help facilities, e.g. *the re-enter password box*—meaning ‘the box for re-entering a password’ (in Microsoft Excel); *the Customise Toolbars dialog box*—meaning ‘the dialog box for the Customise Toolbars option’ (in Microsoft PowerPoint). This tightly packed writing style, combined with new terminology, produces awkward and perplexing expressions, e.g. *the most recently ungrouped group* (PowerPoint help).

3.10. Idiomatic expressions

Familiarity with idioms is considered to be one of the distinguishing marks of a native-like command of English. Idiomatic usage applies to words that are used figuratively; examples from current user interfaces would be: *shredding files* (Dr Solomon’s Anti-Virus Toolkit), *to fine-tune preferences* (Netscape Help). In everyday language, idioms include complex expressions like *to make the best of a bad job*, as well as simpler constructions involving a verb and preposition, e.g. *to give in* (allow oneself to be overcome by something).

For learners of English, phrasal verbs (verbs which include prepositions or adverbs) are especially difficult. In the user interface, prepositions are a special case of verbal context because they may not always be as helpful to non-native speakers as they are to native speakers in terms of understanding. It is important to be aware that they do not guarantee an unambiguous interpretation in every case. It is something that is worth checking out with prospective users. Examples of potentially confusing similarity in meaning are: *to call up a person* and *to call on a person*; *to close up* and *to close down*; *to find* and *to find out*. The meaning of each preposition is not literal, and furthermore it changes with the meaning of the verb it is attached to, e.g. “up” carries quite a different meaning in *break up* and *close up*.

4. Verbal context in user interface design

It is well understood in language teaching and learning practice that ‘verbal context’, in the sense mentioned earlier—text or speech surrounding a particular word—is a vitally important influence on meaning, and can be used to help learners distinguish between words which would otherwise be confused or misused. For example, a word like *form* can mean: shape, method, grade, style, model, mould, level of fitness, etiquette. In a computer application, a short verbal context such as *select a form* goes some way towards eliminating possibilities within this group of meanings. Further

information would be needed to completely remove the ambiguity. It could come from a more elaborate verbal context; through a connection to the everyday or professional activity and specific task to which the word refers; or by showing a picture of a form. Other words that have the potential to cause difficulties for users because of their wide range of meanings include *case*, *note*, *block*, *reference*, *record*. A limited amount of verbal context (i.e. two or three words) will not always solve the problem of ambiguity, but it is one important means of reducing it.

Collocations [20], which are regularly occurring combinations of words, e.g. *fill in a form*, *file a form*, *sign a form*, are classified according to the strength of the relationship between the words involved. A frozen collocation is a combination, in which none of the components can be moved, replaced or left out and no new element can be added without changing the meaning. In the language of computing, examples of frozen collocations are ‘compound terms’ like custom dictionary and document template, but in relation to a particular system only. The same collocations used in computing generally would be ‘restricted’ rather than frozen, since there is a wider, but not infinite, range of dictionary types, and the same goes for templates [31]. Collocations of everyday words change when these same words are used in computer applications, e.g. in everyday language you might *call a meeting*, *plan a meeting*, etc., whereas in an appointments application (e.g. in Microsoft Outlook) you *create a meeting*, *send meeting requests*, *add people to a meeting*.

Although computers simplify many tasks, it is also true that an action which is easily conceptualised in its traditional form can become very complex in a computer setting, requiring mastery of a number of terms and expressions. Page numbering by hand compared with numbering in a word processing system is one example of this. Reese [32] writes that students using Microsoft Word “come to the Helpdesk when they are unable to position, or delete, or print page numbers. They are confused by the sophisticated terminology and control for headers and footers.” [32; p. 11]. It turns out that to understand page numbering, users might need to understand: *headers*, *footers*, *alignment*, *number formats*, *insertion points*, and so on. These ‘co-occurrences’ of page numbering—terms which occur in help texts about this concept—form a meaning cluster which determines how well page numbering will be understood.

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- 1) Identify words that are similar in form
 - consider whether their meanings can be construed as being similar
 - enquire whether any words look similar to words in users' native language
 - check whether similarity of form or meaning troubles users
 - 2) Identify words that are similar in meaning
 - check to see whether users can distinguish between them
 - check users' ability to think of synonyms when searching or using a help index
 - 3) Identify potentially ambiguous words
 - look out for words with a wide range of meanings
 - look out for abbreviations
 - look out for words whose technical meaning is not recognised
 - check users' interpretation of intended meanings
 - 4) Identify words which may have culture-specific meanings
 - compare scope of meaning between English and other languages
 - 5) Identify stacked modifiers
 - check whether they are easily and correctly understood
 - 6) Identify idiomatic words and expressions
 - check users' understanding of idioms, including phrasal verbs
 - check users' understanding of phrasal verbs with and without prepositions
 - look out for meanings attributed to prepositions
 - 7) Listen to how words are pronounced by users
 - enquire about similar sounding words in users' native language
 - look out for inability to distinguish between some sounds in English
 - 8) Compile collocations and co-occurrences of words
 - check users' ability to generate or identify these without help
 - show collocations and co-occurrences in the interface or in help facilities
-
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Fig. 1. Guidelines for interface language analysis

5. Guidelines for interface developers

We have looked at how the needs of non-native speakers of English can be addressed by being aware of known areas of difficulty for language learners. On that basis, it is possible to take some practical steps to make communication with users easier and more successful. As every language teacher knows, a definitive set of rules about how language should be used cannot be prescribed, because so much depends on the act of communication: who is involved and what are they trying to achieve. Representatives of target non-native users should assist in the process of design and user testing, although it is important to bear in mind that people who are learning a language are not always fully aware of the pitfalls and misunderstandings that can occur. Each of the areas of potential difficulty described in this paper should be examined in relation to a particular interface. Potential difficulties can then be checked against difficulties anticipated by users, and actual difficulties experienced by users. More than one iteration will be needed if any changes are made or additional explanations and facilities are introduced.

The set of guidelines proposed in Fig. 1 can be used as a starting point. These include all the areas discussed, but grouped a little differently. The guidelines propose a systematic way of analysing the language of a user interface. They should be customised for different applications and target non-native users based on users' feedback and the experience of developing particular types of interface. The people who carry out this kind of language analysis will need to have a basic understanding of the underlying concepts of language and communication, and language learning,

i.e. meaning, ambiguity, synonymy, collocation, and so on. Some knowledge of the target users' native language would be desirable. The most important practical and interpersonal skills are ease of communication with users, observation and listening skills, and the ability to work systematically.

6. Conclusions

Successful communication depends on the extent of shared knowledge between writers and readers or speakers and listeners [33]. We can assist users in the communication process by providing better information about meanings, thus helping to remove possible misapprehensions. The meanings of terms in any interface should be explained, because they are highly likely to be unique to an application: even the meanings of the most straightforward terms like help, open or cancel cannot be assumed. Ways of drawing attention to meanings and clearing up possible confusion can include cross-referencing in help facilities. Explanations do not have to be phrased in the same variety or style of language as that which is used in the application or operating system interface; for example, the style could be more informal. What is really important is that explanations should help users become aware of the fact that their knowledge of English is changing—both native and non-native speakers undergo some degree of language change by virtue of using an interface. They should feel that they have a degree of control over that process. This will make it more likely that they will welcome the change.

Users also need to build up repertoires of words and structures that will allow them to use their knowledge in an active way. An essential aspect of learning new words is finding out how they function in speech and in writing: when it is appropriate to use them, what their “collocates” are (the words they are typically combined with e.g., what sorts of things can you clear, refresh, etc.). Equipping users to talk about objects, actions and metaphors that figure in the user interface, is part of ensuring that they can be used effectively. The real test of whether one ‘knows’ a language is the ability to produce it—to speak and write. More extensive use of verbal context, where that is possible, will help to ensure that both understanding and production of language are made easier for non-native and native speakers alike.

In summary, there are two complementary approaches we can take: examine known areas of potential difficulties, and provide verbal context to assist users in learning the language of the interface. As has been emphasised here, collocations are a vitally important aspect of a language from the point of view of a learner. Along with co-occurrences, they should be seen as the key to finding out what might constitute ‘sufficient context’ for understanding and communication when the question arises in user interface design.

At the Open University's Institute of Educational Technology, we have been incorporating language analysis into the evaluation framework used for developmental testing of Open University educational software and new websites for teaching and learning. In evaluations of externally produced software (e.g. Informedia DVLS), where we do not have ultimate control over the design of the interface, we have used our findings concerning language in the interface and the language of prospective users to plan additional documentation which will correspond to users' needs. Our research plans include a study of cross-cultural understanding of

multimedia interfaces, and an evaluation of an academic journal website interface in Portuguese and English.

Web pages for the Institute's postgraduate online course in IT Applications in Open and Distance Education, which has participants from all over the world (many of whom are non-native speakers of English), are an important testbed for the effectiveness of cross-cultural communication mediated by the user interface. With 30,000 students taking its courses outside the UK, the Open University already has a very significant international student body. As the university continues to develop new ways of delivering global distance learning over the Internet and the Web, issues of language and cross-cultural communication in interface design are likely to become increasingly important.

References

- [1] J. Nielsen (Ed.), *Designing User Interfaces for International Use* North-Holland, New York, 1990.
- [2] J. Nielsen, *Usability Engineering*, Academic Press, London, 1993.
- [3] P. Russo, S. Boor, How fluent is your interface? Designing for international users, in: *Proceedings of INTERCHI'93*, 24–29 April 1993.
- [4] R. Millwood, G. Mladenova, Educational multimedia: how to allow for cultural factors, in: P. Brusilovsky, P. Kommers, N. Streitziell (Eds.), *Multimedia, Hypermedia and Virtual Reality*, Springer, Berlin, 1994.
- [5] T. Fernandes, *Global Interface Design—A Guide To Designing International User Interfaces*, AP Professional, London, 1995.
- [6] E.M. Galdo, J. Nielsen (Eds.), *International User Interfaces* Wiley, New York, 1996.
- [7] V. Evers, D. Day, The Role of Culture in Interface Acceptance, in: *Interact'97*, Sixth IFIP Conference on Human-Computer Interaction, Sydney, 14–18 July 1997.
- [8] P.A.V. Hall, R. Hudson (Eds.), *Software without Frontiers—a Multi-Platform, Multi-Cultural, Multi-Nation Approach* Wiley, New York, 1997.
- [9] P. Bourges-Waldegg, S.A.R. Scrivener, Meaning, the central issue in cross-cultural HCI design, *Interacting with Computers* 9 (3) (1998) 287–309.
- [10] Apple Computer Inc, *Guide to Macintosh Software Localization*, Addison-Wesley, Reading, MA, 1992.
- [11] S.M. O'Donnell, *Programming for the World: a Guide to Internationalization*, Prentice Hall, Englewood Cliffs, NJ, 1994.
- [12] InterSol, Inc., *The Global Advisor Newsletter*, WWW document (accessed March 1999), [http:// www.intersolinc.com/newsltr.htm](http://www.intersolinc.com/newsltr.htm).
- [13] R. Ellis, *The Study Of Second Language Acquisition*, Oxford University Press, Oxford, 1994.
- [14] P. Lightbrown, F. Spada, *How Languages are Learned*, Oxford University Press, Oxford, 1993.
- [15] M. Swan, B. Smith (Eds.), *Learner English—a Teacher's Guide to Interference and other Problems* Cambridge Handbooks for Language Teachers, Cambridge University Press, Cambridge, 1987.
- [16] A. Kukulska-Hulme, *Language and Communication: Essential Concepts for User Interface and Documentation Design*, Oxford University Press, New York, 1999.

- [17] A. Patel, D. Russell, R. Kinshuk Opperman, R. Rashev, An initial framework of contexts for designing usable intelligent tutoring systems, *Information Services and Use* 18 (1/2) (1998) 65–76.
- [18] R.M. Turner, Context-mediated behavior for intelligent agents, *International Journal of Human-Computer Studies* 48 (3) (1998) 307–330 (special issue on Using Context in Applications).
- [19] J. Preece, Y. Rogers, H. Sharp, D. Benyon, S. Holland, T. Carey, *Human-Computer Interaction*, Addison-Wesley, Harlow, 1994.
- [20] J. Sinclair, *Corpus, Concordance, Collocation*, Oxford University Press, Oxford, 1991.
- [21] S.M. Engelbart, B. Theuerkauf, Defining context within vocabulary acquisition, *Language Teaching Research* 3 (1) (1999) 57–69.
- [22] P. Meara, Vocabulary acquisition (Foreword), in: D. Summers (Ed.), *Longman Language Activator Dictionary*, Longman, London, 1993.
- [23] M. Grenfell, V. Harris, Learner strategies and the advanced language learner: problems and processes, *Language Learning Journal* (17) (1998) 23–28.
- [24] F. Smith, *Understanding Reading*, Lawrence Erlbaum, Hillsdale, NJ, 1994.
- [25] A. Kukulska-Hulme, R. Van der Zwan, *An Evaluation of the Informedia Digital Video Library System: Final Report*, PLUM report No. 119, Institute of Educational Technology, The Open University, Milton Keynes, 1999.
- [26] S.L. Lytinen, Are vague words ambiguous?, in: S.L. Small, G.W. Cottrell, M.K. Tanenhaus (Eds.), *Lexical Ambiguity Resolution—Perspectives from Psycholinguistics, Neuropsychology, and Artificial Intelligence*, Morgan Kaufmann, San Mateo, CA, 1988.
- [27] W. Horton, L. Taylor, A. Ignacio, N.L. Hoft, *The Web Page Design Cookbook*, Wiley, New York, 1996.
- [28] L.E. Smith, *Discourse across Cultures—Strategies in World Englishes*, Prentice-Hall, London, 1987.
- [29] V. Evers, A. Kukulska-Hulme, A. Jones, Turning the campus metaphor inside out: a cross-cultural analysis of icon recognition, paper presented at the Second National Conference on Iconic Communication, University of the West of England, Bristol, 7 January 1999.
- [30] A. Kukulska-Hulme, *The LUMINA project*, PLUM series report (in preparation), Institute of Educational Technology, The Open University, Milton Keynes, 1999.
- [31] S. Pavel, *Guide to Phraseology Research in Languages for Special Purposes*, Terminology and Documentation Directorate, Translation Bureau, Montreal-Quebec, 1994.
- [32] R. A. Reese, *Word Processing*, article submitted to *Baskerville—newsletter of the UK TeX User Group*, and part of unpublished PhD research at the University of Hull, 1996.
- [33] J. Greene, *Language Understanding: a Cognitive Approach*, Open University Press, Milton Keynes, 1986.

