

Computer Words in Our Everyday Lives: How are they interesting for terminography and lexicography?

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Abstract

This paper is about very familiar computer words – those that average, educated persons are likely to encounter in their daily lives (e.g. *Web surfing*, *Y2K*, *snailmail*). Our purpose is to illustrate the practical interest of such words for terminographers and lexicographers. First, we outline the general characteristics of computer words. Second, we illustrate the changes that occur when computer words migrate from specialized to general language. Third, we suggest ways of improving dictionary treatment of computer words in both general-language and terminological dictionaries. We conclude by arguing that computer words illustrate an ebb-and-flow between terminological and general language that is characteristic of our "knowledge society", and that will increasingly blur the boundaries between lexicography and terminography.

1 Introduction

All of us with a professional interest in words, no matter what our particular specialties may be, are confronted by computer words daily. As we go about analyzing and describing words, we may be *surfing theweb*, *bookmarking* and *downloading interesting pages*, admiring the new *wallpaper* on our *desktop* – or perhaps cursing the latest *bugs* in our software while bemoaning that *low-bandwidth* connection. Whether we enjoy the playfulness of words such as *snailmail* and *Y2K*, or cringe at creations such as *screenager* and *cyberpunk*, the interesting question is: What can we – terminographers and lexicographers – learn from these newcomers to the lexical landscape?

Our paper proposes a three-part answer to this question. First, we sketch a general portrait of the computer words in our everyday lives, looking at *where they come from* (how they are formed) and *where they go* (in particular, their migrations from terminological to general language). Second, we suggest that computer words illustrate a subtle ebb-and-flow between terminological and general language, and show how they are interesting to both terminographers and lexicographers¹. Third, we argue that computer words are a symptom of our evolution into a "knowledge society", which may result in an increased blurring of the boundaries between terminological and general language.

1.1 What do we mean by "computer words in our everyday lives" ?

As the title indicates, this paper will not deal with *all* computer words; rather, it focusses on those that average, educated persons are likely to encounter *in their daily lives*. Of course, this latter group of lexical items represents only a tiny fraction of all the words denoting computer-related realities. In fact, the vast majority of computer words are known primarily to computer

experts such as programmers, software engineers, or hardware specialists. In other words, they live out their entire "lives" in the world of computing, known only to experts in the field. Such is the fate, for example, of the names of most of our computer's hardware components, the names of the components and processes of the programming languages that our software is written in, and so on². Since these highly specialized words occur infrequently in general language, they are not the concern of lexicographers, but rather of terminographers.

While this classification of computer words into terminological and non-terminological is useful for our paper, it is also somewhat artificial. In reality, we are dealing with a continuum rather than a dichotomy, since computer words can have varying degrees of "terminologization". For example, many shift from the terminological to the general-language side of the continuum: *download* was known only to serious computer experts a few years ago, while today it has become commonplace. The popularization of *download* was probably not anticipated when the word was created: its use by the general public was precipitated by the explosion of the Internet. In other cases, however, when a word is conceived it may already be clear that it is destined for widespread use among non-computer experts. Consider, for example, user-interface concepts such as *desktop*, *folder*, *recycle bin*, *wallpaper* – all of which were named in a *user-friendly* way at their inception.

In this paper, we shall discuss not only words that designate computational entities and processes, but also a small group of other words that are part of today's computer culture. These include, for example, designations for "computer people" (*mouse-potato*, *techno-nerd*, *computer geek*), non-computer people (*newbie*, *technoplegia*), the language of computing (*netspeak*, *technobabble*), and even opposites of computer realities (*snailmail*).

1.2 Who has a professional interest in computer words?

Both terminographers and lexicographers are interested in computer words, but from different perspectives. In fact, neither group would even speak of *computer words*: terminographers refer to *terms in the domain* (= *subject-field*) of computing, while lexicographers refer to *computer senses* of lexical items. In this paper, we shall use *computer terms* when discussing terminographical issues, *computer senses* when discussing lexicographical issues, and *computer words* as a generic to cover both.

Explained simply³, the job of terminographers is to analyze and describe the words that characterize expert domains of knowledge – as soon as possible after the corresponding concepts emerge. Like lexicographers, they are concerned with describing what a word means, and how it is used in context. Unlike lexicographers, however, when terminographers examine a lexical item, they are interested only in *the meaning of that item in one particular domain of knowledge*. So strong is this orientation that when terminographers refer to a *term*, they are referring to *the meaning of a lexical item in one domain*. For example, *virus* would correspond to at least *two different terms*, one in medicine and one in computing.

To a much greater degree than lexicographers, terminographers are preoccupied with *identifying* new words. We like to describe terminography as "playing catch-up with reality": a terminographer's most basic task is to identify a domain's emerging concepts, and to match these up with suitable terms – *as soon as possible*. "As soon as possible", to a terminographer, means before

a concept has a chance to generate a multiplicity of synonyms. Hence, in contrast to lexicographers, terminographers have a *prescriptive* rather than a *descriptive* role: standardization of terms is extremely important, since it is generally accepted that "high-quality" terminology (e.g. absence of synonymy, transparent term formation) facilitates efficient knowledge development. In other words, the "better" the terminology of a domain, the easier it is for knowledge to be transferred among experts, between experts and non-experts, and across languages.

Computer words are of obvious interest to terminographers for two reasons. First, the vast majority of computer words are highly specialized (i.e. do *not* percolate into our daily lives), and therefore are never recorded in general-language dictionaries, but rather in specialized dictionaries and term-banks. Since computing is one of the most important, and fastest-growing, human endeavors of our time, it is essential to have some terminological "order" in the field to facilitate its efficient development. Second, in the case of computer words that *do* eventually migrate into our daily lives, chances are that they are highly terminological at their inception – in other words, they may eventually be of interest to lexicographers, but they are of interest to terminographers *first*.

What, then, is the lexicographer's interest in computer words? Typically, computer words catch the lexicographer's attention when they start appearing regularly in the kinds of texts that average educated persons are likely to read (newspapers, magazines, novels). The bigger the dictionary, the more computer senses – and indeed terminological senses for all domains – it is likely to contain. Unlike terminographers, whose unit of lexicographic description is the *term* (i.e. a given sense in one domain only), lexicographers have a broader view. Their treatment of the computer sense takes place within the descriptive unit of the *dictionary entry*, a superset of all the senses that a word may have in both general language and in domains other than computing.

The lexicographer will typically describe a computer word in less depth than the terminographer. When one compares a term entry with a lexicographic description of the same word, one tends to find that term entries describe the concept in more depth, often including more technical terms within the definition. These differences stem from the fact that users of terminological dictionaries are assumed to have more domain knowledge for the word they are looking up than do users of general-language dictionaries. Terminographic resources, for example, tend to be used by language professionals (e.g. translators, technical writers) who work with specialized documents produced by domain experts. The users of general-language dictionaries, in contrast, tend to have less domain expertise. Of course, we are again dealing with a continuum rather than a dichotomy [Cf. Kalliokuusi/Varantola, this volume]: it is entirely possible that an advanced student of computer science might look in a large general-language dictionary, or on the other hand, that a translator translating a computer text for the first time (i.e. having little knowledge of the field) might consult a term bank⁴.

Who has an easier job dealing with computer words – terminographers or lexicographers? One might be tempted to jump to the conclusion that lexicographers have it easier: after all, they do not have to "discover" computer words, or even what they mean. By the time computer senses are ready for inclusion in a general-language dictionary, they will have been discovered by terminographers previously, and described in greater detail than the general-language dictionary even requires. As we shall argue later (Section 3), however, computer words present lexicographers with a thorny problem: their meanings and behaviour may change dramatically as they

cross the boundary between terminological and general-language usage. Before we examine this issue, let us begin with a brief look at the general character of computer words in the world of computing.

2 Computer Words in the Computer World: A General Portrait

Terminology researchers often note that every domain of knowledge has its own terminological "flavour". Some fields like Chemistry, Botany, and Medicine, for example, are characterized by rigid naming traditions that draw heavily on Latin and Greek. Wakabayashi [1996:359] discusses the naming patterns of English medical terms, illustrating how *cholelithotomy*, for example, can be analyzed to mean 'an incision into the gall bladder for the removal of stones', since *chole* = gall bladder, *lith* = stone, and *otomy* = incision into. While this kind of naming pattern may be equated with conceptual clarity by some (e.g. those who know Latin well), others [e.g. Ahmad, this volume, Hayes 1992, Savory 1967] have criticized that it can make knowledge opaque.

As pointed out in Sager [1990:64], domains with highly systematic designations tend to feature regular patterns of compound terms, developed with multiple elements that indicate hierarchical dependencies. In Chemistry, for example, the class of alcohols are designated by the suffix *-ol*, producing hierarchies such as *alcohol* → *glycol* → *ethylene glycol* [Cf. Merritt/Bossenbroek 1997]. So fixed are the naming conventions in fields such as Chemistry that it is possible to create terms for entities that do not exist yet, but whose existence is theoretically possible.

Clearly, computer science is not typified by the highly structured, scientific-sounding naming conventions of Medicine or Chemistry. What, then, is the terminological character of the domain of computing? Where do computer words come from and what do they look like? To answer these questions, consider the following sample of computer words that, according to Ayto [1999], entered the English language during the 1980s and 1990s:

1980s: *backslash, boot, CD ROM, chat line, computerate, cyberpunk, cyberspace, desktop publishing, domain, dongle, download, drag, electronic mailbox, email, flame, -friendly, hacker, icon, information superhighway, Internet, IT, LAN, lap-top, MailMerge, mega, multi-media, newsgroup, palm-top, personal organizer, reverse-engineer, shareware, smart card, snail mail, spell checker, spreadsheet, technobabble, technostress, telebanking, telecottage, teleworking, toggle, touch pad, vapourware, virtual, voice mail, Windows, wysiwyg*

1990s: *applet, cybercafJ, cybernaut, cyberpet, DVD, e-verdict, FAQ, home page, HTML, intermercial, internaut, internot, Java, mail bomb, millenium bug, Mini Disc, morphing, mouse potato, netizen, Nettie, offliner, screenager, screen saver, sig, spam, spamdex, surf, tamagotchi, technoplegia, V-chip, Web, Web site, wired, World Wide Web*

As pointed out by Ahmad [this volume], some of the most common words in computer science are of Middle English origin, and hence rooted in Latin. *Computer*, for example, derives from

the Latin *computare*. Ahmad associates similar origins with words such as *algorithm*, *data*, and *program*. As in the more traditional scientific domains, computing also presents a certain amount of systematicity in naming patterns, as in the hierarchical sequence *printer* → *laser printer* → *colour laser printer*.

When one examines Ayto's list above, however, it is not the Latin origins, nor the systematicity, that strike us most. On the contrary, observers of computer language are much more captivated by the informality (*cyberpunk*, *sig*), the playfulness (*snail mail*, *mouse potato*), the surprising origins of metaphors (*spam*, *surf*), and the very form of the words (*toggle*, *dongle*).

To understand computer *words*, one needs to understand the computer *world* and those who typify it. *Cyberculture*, as it is often called, is driven by young, anti-authoritarian personalities – Steve Jobs and Bill Gates being quintessential examples. This is a culture with a "language" of its own, which avoids heavy, scientific-sounding terms in favour of words that are colloquial, fresh, playful. In the words of Emerson [1999]:

For every dull... term, there seem to be 10 more that sound as if some punchy programmer simply made them up as a source of personal amusement. These are words that provide a chuckle, or perhaps simply words that nobody has since had the time to replace with anything better.

What, then, are some of the principal characteristics of the computer words in our everyday lives? Let us examine first their meaning, and second their form.

2.1 A Semantic Portrait: Metaphors We Compute By

To describe the general character of computer words, we like to employ *user-friendly* (itself a computer word!). Many computer words are already familiar⁵ to us because they are re-uses of existing general-language senses – *terminologizations*, according to Picht and Draskau [1985:106]. Such is the case for *mouse*, *desktop*, *boot*, *mega*, *mailbox*, *domain*, *virtual*, *windows*, etc.

Interestingly, some of these words terminologize via another domain before they enter computing. *Surfing*, for example, most likely derived from television's *channel-surfing*. *Bandwidth*, denoting a data transfer rate in computing, probably derived from telecommunications, where it denotes the spectrum of a communications channel. And *virus*, of course, has a medical meaning.

What contributes most to the user-friendliness of computer words is that so many of them are metaphorical. Computing in general, and the Internet in particular, have probably generated some of the most interesting metaphors in the history of terminology.

Why are metaphors so prevalent in computing? In the oft-cited words of Lakoff and Johnson [1980:5], "The essence of metaphor is understanding and experiencing one kind of thing in terms of another." Clearly, one important reason for the popularity of computing metaphors is that in their conceptual simplicity, they blend easily with the general "culture" of computing, and the type of language it prefers, as discussed earlier. In our previous work on computer metaphors [Meyer *et al.* 1997b and Meyer *et al.* 1998a], we also proposed that metaphors aid

in palliating technostress, by allowing computer users to conceptualize a potentially complex concept in terms of a simple, well-known one. Indeed, software developers have become keenly aware of the marketing potential of metaphors. Hence the many metaphorical terms found in the vocabulary of user interfaces, such as *desktop*, *wallpaper*, *menu*, *file*, to name just a few.

Many computer metaphors seem to cluster around central themes, a phenomenon that has been noted for other domains as well [e.g. Knowles 1996, Bies 1996, Pavel 1993]. The principal themes can be summarized as follows:

Office: *desktop, recycle bin, files, folders*

Transportation: *information highway, web traffic, on-ramp*

Architecture: *site (construct/build a site), under construction, gateway, window*

Printed medium: *web page, bookmark, browse the web, e-zine*

Animals: *mouse, snailmail, web, spider*

Community: *cyberculture, virtual community, home page*

In contrast to this metaphorical systematicity, other computer words surprise us with their unexpected origins. *Spam* (Internet junk-mail) is a particularly interesting case. *Spam* is well known in America and Great Britain as a cheap, canned meat substitute marketed during the war, when meat was hard to come by. More recently, *spam* was popularized in a Monty Python skit that re-introduced it to a younger generation. Understandably, these cultural implications of the metaphor are a great source of translation problems [Cf. Meyer *et al.* 1998a].

Another element of surprise comes from mixed metaphors. Consider common examples such as *surfing the web* or *downloading a site*. And while computing metaphors are, on the whole, conceptually *useful* in that the images they invoke facilitate one's understanding of the underlying technical concept, some metaphors actually distort the meaning somewhat. Consider *visit/go to + site* as an example. This collocation gives users the impression that they are somehow being "taken" to a remote site, when the *reverse* actually occurs: data from the remote site is being sent *to* the user's computer.

In summary, on the one hand, computer metaphors illustrate a certain amount of conceptual consistency, and hence, predictability. On the other hand, however, they also present a dose of conceptual "surprise" – which, ironically, could be argued to be entirely "consistent" with the anti-authoritarian, informal, playful character of cyberculture. These elements of informality and playfulness are reinforced by the structure of computer terms, discussed next.

2.2 A Structural Portrait: the Form of Computer Words

We noted above that many computer words seem "familiar" to us because they are actually terminologizations of general-language word senses. In many cases, however, the originating words are not adopted intact, but rather undergo some structural changes when they are used in computing. The principal changes one sees are compression and affixation, discussed in 2.2.1-2 below. We shall also discuss some phonological aspects of computer words in 2.2.3.

2.2.1 Compression

Compression [Sager 1997] includes any form of shortening. The computer words in our daily lives are particularly rich in abbreviations/acronyms, clipped forms, and blends – all of which reinforce the informal, playful character of computer words already noted earlier.

Abbreviations/acronyms. Ayto's list above provides 5 standard abbreviations (*CD, IT, DVD, HTML, WWW*), to which we should also add the recent *Y2K*. His list furthermore provides 4 "pronouncable" abbreviations, i.e. acronyms (*LAN, FAQ, ROM, wysiwyg*). Acronyms are particularly catchy when their pronunciation is "pushed" a bit, as in *wysiwyg* (*what you see is what you get*), and more technical terms such as *SCSI* (*small computer system interface*, pronounced "scuzzy") and *VRML* (*virtual reality modelling language*, often pronounced "vermil").

Clipped forms include commonly used words such as *net, web, e-mail, sig* (for signature), *morphing* (metaphorhosis) and *megs* (megabytes).

Blends. Ayto [1999:ix] claims that "The 1980s and 90s in particular have been addicted to the blend's cool snappiness". Blends on Ayto's list above include *computerate, cyberpunk, email, cybernaut, netizen, screenager*, and *technoplegia*. To these we would add *netiquette* and the very recent *e-tailing*. Some blends are what Ayto terms *cross-genre terms*, such as *intermercial* (computing + television/radio) and *technoplegia* (computing + medicine).

2.2.2 Affixation

As we noted earlier, affixation is a central term formation strategy in fields with highly structured nomenclatures, particularly those with Latin or Greek influences. Computing, to a lesser degree, is also marked by a number of popular affixes, such as *cyber* (*cyberpunk, cyberspace*), *e-* (*email, e-verdict*), *-ware* (*software, shareware, vapourware*), *techno* (*technobabble, technostress*).

2.2.3 Phonology

The role of phonology in reinforcing the playful character of computer words has already been noted above for acronyms and blends. Other phonological phenomena include internal rhyme. Take *snailmail* for example. From a semantic viewpoint, the metaphor of the snail of course clearly brings out the slowness of conventional mail compared with email. From an aesthetic viewpoint, however, a large part of the "charm" of this word lies in its internal rhyme. A similar rhyme exists in *shareware*.

Computer words even offer their share of puns. *Gopher*, for example (a precursor of the Web, now outdated) was an extremely effective pun on *go fer*, since the purpose of this technology was to allow users to find things (i.e. "go for" them) on the Net. Another pun, *internot*, is described by Ayto [1999:589] as "a facetious coinage (inspired by *internaut*...) implying a range of negative relationships with the Internet...".

Finally, we should note the phonological interest of a small number of true neologisms in computing, for example *dongle, toggle*, and *kludge*.

3 The Migration of Computer Words into our Everyday World

As mentioned earlier, most of the computer words in our everyday world were originally terms known only to computer experts. While some computer terms live out their entire "lives" in the discourse of experts, we are interested in this paper in the small subset that migrates out of expert discourse into our everyday language. Elsewhere, we describe this lexical migration process as "de-terminologization" [Meyer *et al.* 1997a].

Why do some computer words de-terminologize? Primarily for the obvious reason that computers are central to our everyday lives. In the words of Ayto [1999:iv], the lexicon is "a mirror of our times" . We cannot help adopting words such as *surfing*, *downloading*, *desktop*, and *email* because we are faced with these concepts daily. Other computer words, in contrast, such as *virtual reality*, may become extremely popular even though they are not at all part of our daily experience – *virtual*, for example, has exploded into a buzzword [Meyer *et al.* 1997a]. In cases such as *virtual*, it appears that certain computer concepts capture the attention of the media and general public, probably because of exciting future applications. Savory [1967:34] has pointed out a similar phenomenon in other scientific domains, where words that "though composed with the intention of describing no more than some strictly scientific item, have for some reason caught the popular imagination" .

It is highly likely that the "friendly" , uncomplicated nature of many computer words may also facilitate their de-terminologization. For example, the word *mouse* – with colourful derivatives like *mouse-potato*, and the verb *to mouse* – has no doubt caught on much faster in general language than its original equivalent, *X-Y position indicator* would have caught on⁶. Whether consciously or unconsciously, some experts may consider the potential ease of de-terminologization when they name them. This is certainly the case for user-interface words.

How should lexicographers describe computing words that have moved into general language? Most importantly, they cannot simply "borrow" existing terminographic descriptions intact. The process of de-terminologization can cause words to undergo significant changes in semantics, level of language, and grammar. It can also cause a "reactivation" of the original general-language word-sense. All these aspects are discussed below.

3.1 Semantic changes

Semantic changes can be of two types. On the one hand, the *essence* of the terminological sense (i.e. the sense of the computing term) may be retained after de-terminologization (3.1.1). On the other hand – and much more difficult for lexicographers to handle – conceptual changes can be substantial, with the range of application for the word differing significantly from that of the original term (3.1.2).

3.1.1 Retention of fundamental domain sense

In many cases, when a computer word starts to be used in general language, the *essence* of the underlying concept perceived by laypeople is similar to that perceived by experts. In other words, when laypeople refer to the concept, they are still referring to it in its basic *domain sense*.

Consider computer words like *hardware*, *software*, *email*, *memory*, etc. In cases such as these, terms pass into general language with the essence of their domain sense fundamentally intact, though of course, the layperson's understanding of the words is much shallower than that of true computer experts. In these cases, the lexicographer may base her description of the word on an existing terminographical description, though simplifying the latter (e.g. including less encyclopedic information, using fewer terms in the definition). The problems of simplifying terminographical definitions will not be dealt with here, as this paper focusses on the more substantial aspects of de-terminologization, described next.

3.1.2 Significant dilution of original domain sense

De-terminologized words in this category have "loosened" so much that when people use them, they no longer designate the basic domain sense of the original term. Rather, the semantic actants of the word change, and the de-terminologized word acquires a much broader – even fuzzy – range of application. To better understand the meaning dilutions that may occur, consider the following examples:

- (1) Fortunately, the weaker parts of this production [a play] can be easily debugged as the summer run progresses.

Original computer meaning: remove a faulty programming code

- (2) The Liberal health critic is accusing the government of downloading health-care costs to the public.

Original computer meaning: transfer programs/data from a larger computer to a smaller one

- (3) Our exhausted, stressed employees throw up their hands and say 'I'm out of bandwidth'.

Original computer meaning: data transfer rate

- (4) Don't hesitate to use the modern stand-alone pay toilets found on streets throughout the city if nature calls at a seemingly inopportune time.

Original computer meaning: (said of hardware) not connected to a network, e.g. a *stand-alone computer*

- (5) Jean-Paul and Simone were to be each other's life-long "central love", but "peripherals" [i.e. affairs] were encouraged. . .

Original computer meaning: input and output devices of the computer

- (6) A president who enjoys multi-tasking [talking to congressmen on the phone while enjoying sexual gratification]

Original computer meaning: (said of operating systems) able to run several applications simultaneously

In all these cases, the underlined computer words no longer designate the basic domain sense of the original term. Clearly, the original computer meanings have been diluted significantly, with major modifications of the semantic actants. In essence, the new de-terminologized usage has a Janus-like status: on the one hand, it has acquired a new sense in general-language, but on the other hand, it is still "coloured" ⁷ by its terminological computing sense.

3.2 Changes in level of language

The meaning changes observed above may be accompanied by pragmatic changes: the level of language may change significantly from terminological to de-terminologized usage. As illustrated in the above examples, all of which were taken from Canadian newspapers, de-terminologized words tend to be used rather colloquially. Exactly how colloquial usage will be depends on the individual word. In some cases, it borders on slang.

As well as being used colloquially, words in this category (i.e. 3.1.2) are often used rather creatively and playfully, as if people wanted to "test" just how far their meanings could be stretched. Consider the following examples:

- (7) The World Wide Wait [common way of referring to the World Wide Web, when access is slow]
- (8) When do you think you'll be upgrading my allowance? [asked by a pre-teen of his parent]
- (9) Yours virtually, ... [found at the end of an email message]
- (10) One of my actual sons, who has doubled as a virtual son ever since he discovered computers... [newspaper article]
- (11) Horticultural producers will soon offer their wares to winter-weary Montrealers itching to reboot their gardens. [newspaper article]

3.3 Grammatical Changes

Some de-terminologized words change not only their meaning and pragmatics, but even their grammatical behaviour. *Mega*, for example, has shifted from a nominal prefix (e.g. *megabyte*), to an adjective (*the film was mega!*) and even an adverb (*mega lively hotel*).

Similar grammatical changes can be noted for *virtual*. The originating computer senses of this word always involved attributive use of the adjective, as *invirtual reality* and *virtual memory* (computing) and *virtual image* (optics). The original general-language 'almost' sense of *virtual* was also restricted to attributive use, as in *a virtual dictator* or *virtual darkness*. In its new, de-terminologized senses, however, *virtual* may be used predicatively, as in *his travels are virtual these days* (meaning 'he visits travel-related sites on the Internet'). Virtual reality has furthermore given birth to a new sense of the adverb *virtually*: *to travel virtually*, *to perform surgery virtually*, etc. As these examples illustrate, *virtually* has undergone a grammatical transformation: its terminological usage is limited to a clause constituent that follows the verb.

3.4 Re-activation of original general-language sense

As we saw in Section 2, many computer terms are familiar to us because they are essentially terminologizations of general-language words. When such words de-terminologize, their popularity sometimes causes the original general-language word to be used more frequently than

before, and in unusual contexts, even in puns. *Mega* is a telling example. Its original, general-language sense was ‘very large’. When it terminologized into computing, *mega* acquired the more specialized sense of ‘bigger by a factor of 2^{20} (i.e. about one million)’. These days, *mega* is still used in its original general-language sense of ‘very big’, but much more frequently due to its association with computing. One finds, for example, *mega-store*, *mega-project*, *mega-show*, etc.

In some cases, one finds the computer word in contexts where previously (i.e. before its use in computing) another word would likely have been used. Consider for example:

(12) Start with the osso buco recipe, but delete the tomatoes and replace the Marsala with. . .

(13) Virtual cheesecake [offered on a restaurant menu]

In (12), prior to the computer revolution, one would most likely have found *leave out* in a recipe. In (13), an older menu would probably have read *low-calorie cheesecake*, or *light cheesecake*.

The pun on *reboot* (one’s garden) that we saw previously in example 11 is yet another example of how a computer sense can “rub off” on the general-language sense from which it originally derived. In all these cases, lexical migrations have come full circle: from general-language to terminological, and back again.

4 How are computer words interesting for lexicography and terminography?

In the previous two sections, we have tried to show that computer words illustrate a subtle ebb-and-flow between general and specialized language. Regarding general-to-specialized movement, general-language words like *mouse* and *desktop* migrate to the computing domain when experts use them to name new technological concepts. We have seen that these “familiar”, “short-and-snappy” words (metaphors, acronyms, blends) fit well into the general culture of computing, with its disdain for heavy, scientific-sounding language. Regarding metaphors in particular, we have described them as “user-friendly” in that they explain potentially complex concepts by means of simple, well-known ones.

On the other hand, regarding specialized-to-general lexical movement, we have seen that computer terms migrate into general language when the corresponding realities become important in our everyday lives (*download*, *bandwidth*), or when they capture the public’s imagination (*virtual*). Most interestingly, we have noted that substantial changes can occur to a term when it de-terminologizes: the original domain sense may be diluted significantly (*multi-taskingpresident*, *stand-alone toilets*) and used creatively (*World Wide Wait*, *reboot a garden*); grammatical changes may occur (*mega lively hotel*, *travel virtually*); the level of language can become more colloquial (*upgrade my allowance*), even bordering on slang; and finally, the originating general-language sense can be re-activated and “coloured” by the computing sense (*mega*).

Are computer words some kind of fringe phenomenon, or do they illustrate lexical tendencies that apply to other words as well? In our view, computer words are of broader interest than this

paper has shown thus far: they are symptomatic of a lexical phenomenon that is found in words from many domains of knowledge. Ultimately, this phenomenon stems from our evolution into what Drucker [1993] has termed a "knowledge society" – a society in which specialized knowledge is replacing manual labour as the axis around which economic development revolves.

While computing is central to this new society, other domains of expertise such as economics, environmental studies, genetics and healthcare also spill over into our daily lives. Furthermore, our appetite for this knowledge is voracious: witness, for example, the popularity of the "For Dummies" books, one of the best-selling publications of the 1990s. Although the series made its debut in computing topics, it rapidly moved into hundreds of other domains of knowledge that interest the public [Bellafante 1998].

Becoming a knowledge society means that specialized knowledge will percolate into more and more aspects of our everyday lives. Lexically speaking, this implies that increasing numbers of terms migrate into general language. In the words of Savory [1967:63]:

The new words that have arisen since the beginning of the twentieth century provide . . . something of a contrast with those of its predecessor, in that a larger *proportion* of them are familiar outside the laboratory . . . the public. . . is now much more keenly alive to the effects which scientific advances may have on their individual lives. Any discovery that is not too remotely academic is likely to provoke interest and discussion, to be heard on the radio and seen on television, with a genuine attempt to grasp and to use the new terms in which the novelties are described.

Just as computer words are lexically interesting because of the changes they may undergo during de-terminologization, so too are non-computing words worthy of our attention. Consider these two examples from the domains of environmental studies and health-care:

- (14) Yeltsin asked the Duma to give the country's crucial chief banker's job to Gerashchenko, a **recycled** official who was fired from an earlier government
- (15) The plot is positively **anorexic** [said of a film]

What can we learn from computer words specifically, and also from the other specialized words that enter our everyday lives? How can we apply what we have learned to the production of better dictionaries, both today and in the future? These questions are addressed below, from the viewpoints of lexicography and terminography.

4.1 Lexicography

The phenomenon of specialized words becoming "active" in general language is, of course, not new: lexicography has a long tradition of describing the most important domain-specific meanings in general-language dictionaries. As mentioned earlier, when a word becomes active in general language, it may take one of two general "paths" of de-terminologization. On the one hand, the essence of the original domain sense may be retained, as in *hardware*, *email*, *memory* – or, from other domains, *AIDS*, *genetic engineering*, *bull market*. On the other hand, the original domain sense may become significantly diluted (as in *stand-alone toilets* and *multi-tasking president*), with consequent effects also on the word's level of language and grammatical behaviour.

4.1.1 Retention of fundamental domain sense

Since this case has already received much attention in the lexicography literature, we shall not discuss it in depth here. We would only like to suggest, consistent with Kalliokuusi and Varantola [this volume and 1998], that the traditional distinction between a terminographic definition (assuming users with more domain knowledge) and a lexicographic definition (assuming users with less domain knowledge) may not always be adequate. In our own experience, for example, we have seen users of general-language dictionaries (for example, computer science students) complain that the information in the dictionary is too superficial.

We believe that the new technologies will make it simple, in principle⁸, to reduce such complaints in the dictionaries of the future. Why not think along the lines of Atkins' [1996] *virtual dictionary* – a large, hyperlinked database which presents to the user only that data corresponding to the user's specific request. As we enter the age of Web dictionaries, the concept of a *virtual dictionary* can be broadened to comprise the concept of a *system of hyperlinked dictionaries*. As well as a traditional, simple-language definition of a specialized word-sense, a general-language dictionary could provide a hyperlink to a term bank entry for users requiring more specialized information. One could also envisage a hyperlink to a graphical representation of the system of concepts in which the term is situated, in order to provide the user with an overview of the domain or part of it. Such graphical representations are already found in many terminological publications today (e.g. those in the Scandinavian tradition), and will become more common in the emerging knowledge-based approaches to terminography [Otman 1997].

Finally, one could imagine a hyperlink to a corpora (both general and specialized), so that dictionary users can see examples in context.

4.1.2 Significant dilution of original domain sense (semantics, stylistics, grammar)

Semantics. Existing general-language dictionaries often do very well at providing simple-language definitions of the original domain sense of a word. Consider, for example, the following definitions of *download* taken from the *Random House Webster's Unabridged Dictionary* and the *Oxford Dictionary of New Words*:

down•load *v.t.* *Computers.* to transfer (software, data, character sets, etc.) from a distant to a nearby computer, from a larger to a smaller computer, or from a computer to a peripheral device. [DOWN ' + LOAD]

download *transitive or intransitive verb*

To transfer (the contents of an electronic data file) from a larger system to a smaller or peripheral one.

A compound of *down*, in its figurative adverbial sense of 'moving from a superior to an inferior position', and *load*, meaning 'to store data in a computer'.

The term came into use in 1980 to describe the process of obtaining data from a central storage system; the data may be text, graphics, audio, video, or executable software. The source may be one to which the user's computer is connected by means of a local area network (see LAN) or one to which it is linked by telecommunications, such as an ELECTRONIC *bulletin*

board or the INTERNET. *Download* is also used for the process of transferring operating data from the user's system to some peripheral equipment: for example, sending fonts to a printer. The action is **downloading** or a **download**; a file is **downloadable** if it is possible to obtain it by *downloading* it; the person who does this is a **downloader**; *downloadable* is sometimes used as a noun, to refer to a file which is available by this means. The opposite is UPLOAD.

These definitions do a perfectly adequate job of explaining in non-technical language what the term *download* means in its computing sense. What they do *not* do, however, is explain that one can also use *download* in much looser ways, as in the following:

- (16) It [non-digital camcorder called the Panasonic palmcorder] uses a mini film cassette that runs for about 30 minutes and, at any time, can be put inside a special VHS-sized cassette for viewing. But unless you want to be constantly buying new minis, you need to free it up by **downloading** each new 30 minutes [to a standard videotape].
- (17) The Liberal health critic is accusing the government of **downloading** health-care costs to the public.
- (18) Our schools cater to a handful of achievers, and produce a horde of failures... They **download** into society wave after wave of people crippled by a sense of failure.
- (19) Breast-fed infants can receive what is called a "safe" lifetime dose of dioxin within their first six months of breast-feeding. Meanwhile, the mother's concentration of toxins declines. What she's doing, therefore, is **downloading** her lifetime accumulation of carcinogenic toxins to her baby.

In short, the allowable semantic actants (the OBJECT of downloading, its SOURCE, and its TARGET DESTINATION) of the original terminological sense of *download* have become much looser. The objects in the above examples include video data (16), costs (17), people (18), and even breast-milk (19), while the SOURCES and TARGETS are equally diverse. In 16, the closest to the terminological usage, data is transferred between machines, but the data is not digital, and the machines are not computers. Similar dictionary inadequacies for semantic changes in determinologized words have been reported for *virtual*, in Meyer *et al.* 1998b.

To rectify such inadequacies, lexicographers need to be aware that any specialized word sense has the potential to "loosen" in this way. Hence, looking for this phenomenon should be a standard part of the job of analyzing terminological senses. Lexicographers also need to be aware that such semantic "loosening" can happen quickly, and that they must therefore consult very recent corpora. For a word such as *download*, then, a more complete dictionary entry than those illustrated above would put a special note, or perhaps even a separate word sense, indicating that *download* is also being used colloquially in a non-computer sense to designate various types of transfer, typically of unpleasant things from one level of an organization/society to another. To really give users a full sense of the broad potential of this word, however, such a definition needs to be complemented by a wide range of examples (including less central ones, such as 19).

Grammar/Stylistics. We noted earlier (3.3) that words such as *virtual* and *mega* underwent grammatical and as well as semantic shifts. In Meyer *et al.* 1998b, we showed that none of the grammatical changes in *virtual* had been reflected in the entries of a number of current dictionaries.

Mega is interesting in that it illustrates both grammatical and stylistic shifts. Again, dictionaries differ widely in how well they reflect these changes. One of the better attempts can be found in this excerpt from the *Collins-Cobuild English Dictionary* entry, although it does not illustrate the fact that *mega* can be used predicatively, as in *the film was mega*:

... Young people sometimes use **mega** in front of nouns in order to emphasize that the thing they are talking about is very good, very large, or very impressive... *her newly acquired mega salary. ... the mega superstar Madonna. ... mega-* combines with nouns and adjectives in order to emphasize the size, quality, or importance of something... *Now he can begin to earn the sort of mega-bucks he has always dreamed about. ... A Hollywood mega-star."*

Improving coverage of grammatical and stylistic shifts again involves the lexicographer's increased sensitivity to the potential for this to happen whenever a significant semantic shift also occurs. Examples are of course essential, particularly when users are not likely to understand the grammatical terminology (e.g. predicative use of an adjective). Dictionaries might also consider making explicit comparisons between old and "new" grammatical patterns (e.g. saying that *a virtual dictator* is fine, but not *the dictator is virtual*, in contrast with *virtual travel* and *his travels are virtual*, both of which are acceptable).

4.1.3 The problem of meaning potential

By far the most difficult lexicographical challenge posed by de-terminologized lexical items is that of just how far their meaning can be stretched in creative, playful or humorous usage, as discussed in 3.2. Such information is important for advanced language learners, and even native speakers. For almost none of the various words mentioned in this paper have we found any dictionary entries indicating explicitly that the word is prone to creative usage, or what rules govern how far its meaning can be stretched. One notable exception is David Rowan's *A Glossary of the 90s*, which includes many examples of creative – particularly humorous – usage⁹.

Predicting "rules" for the meaning potential of de-terminologized words is, in our experience¹⁰, an extremely time-consuming task that exceeds the practical timeframes of commercial lexicography. A more practical solution is to tell the user that a given word is prone to creative usage, and to provide numerous examples, so that at least part of the meaning potential can be inferred.

4.2 Terminography

One might wonder what terminographers could possibly learn from "computer words in *our everyday lives*", since by definition, terminography is concerned not with everyday, general language, but rather, with the language of experts. Nevertheless, we shall argue that everyday computer words offer insights for two aspects of terminography, described below.

4.2.1 Understanding term-formation

In Section 2, we attempted to sketch a general "portrait" of the term-formation tendencies in the computing world. In particular, we stressed the importance of central conceptual "themes" around which metaphors tend to cluster. This is consistent with Pavel [1993:25] who states:

... the first concern of terminological research. . . should be to single out the central themes mobilizing the specialists' attention, the intellectual traditions responsible for their thought patterns, the models, analogies and metaphors they use to grasp conceptual attributes. These are the catalysts of concept formation and, as such, the main source of semantic neology in any field of expertise.

Other factors we considered included various structural elements of computer words that enhanced their compatibility with the general "culture" of the computing world. Finally, we suggested that term formation was to some degree influenced by the term's likelihood of de-terminologizing – user interface words, for example, are carefully chosen with user-friendliness in mind.

Terminographers are well aware that a general "feeling" for the term formation patterns in a domain is important for standardization efforts and for the creation of neologisms: the term that is most consistent with the character of a domain is more likely to be generally accepted. Sensitivity to domain-specific term formation tendencies is particularly important for terminographers working in domains of great interest to the general public. In these cases, standardization and neology work must consider not only terminological acceptability for experts, but also acceptability (ease of use) for the general public.

4.2.2 The "domain-focussed" approach to terminography

Terminography has traditionally been a domain-focussed activity in two ways. First, terminographers have been encouraged to work within one domain at a time. Second, they have tended to work outside the framework of general language. Both these traditional aspects of terminography may need some reconsideration.

The "one-domain-at-a-time" view. As mentioned earlier, the fundamental unit of terminographic description is the *term*, which to a terminographer means 'a lexical item as it is used in one particular domain'. Terminographers, therefore, tend to focus on one domain at a time¹¹ a reasonable approach since the cornerstone of any terminographic work is a detailed analysis of a domain's conceptual structures. A terminographer, after all, is only human – we can't expect one person to fully grasp hundreds of domains! Furthermore, the goal of a terminology project is often to produce a domain dictionary, or a cohesive system of term bank entries for a domain, so it isn't logical to fragment the terminographer's attention too much.

On the other hand, however, we would like to point out that *de-terminologization* has some impact on this traditional way of working. Thus far, we have described de-terminologization as a "one-way" path from specialized to general language. This description is, however, overly simplistic. In reality, when a word de-terminologizes, the resultant general-language usages may percolate *back again* into expert discourse. When a term becomes well-known, the general public begins to use it. This "general public" includes experts in a variety of domains. Whether

consciously or unconsciously, these experts may "cash in" on the word's popularity and familiarity by using it to designate new concepts in their domains of expertise. Take *virtual* for example. When *virtual reality* captured the attention of the media, *virtual* started to become a buzzword in general language. However, it also percolated into a variety of specialized domains, where it acquired new specialized meanings (e.g. *virtual currency* in economics).

As we evolve into a knowledge society, we are bound to see an increased sharing of words among various domains. This type of inter-domain influence is consistent with the increasing *multi-disciplinarity* of knowledge development – for example, what field does *not* have a computational element these days? Inter-domain influences are also seen in the *convergence* of disciplines, illustrated by blends such as *voicemail* (telephony and computing) and *infomercial* (Web-based commercial). While we are not suggesting that terminographers *abandon* their traditional, domain-focussed ways of working, we do believe that terminographers will need to take a more multi-disciplinary view of terms, since the meaning of a term in one domain may be "coloured" by its uses in others.

4.2.3 The “terminography vs. lexicography” approach

Terminography has traditionally been seen as an occupation quite distinct from lexicography. But we will not broach the history of terminography-*vs*-lexicography debates here. What is interesting is that becoming a knowledge society means the migration of more and more words from terminological to general language. This increasing ebb-and-flow between general and specialized language will, we believe, result in a blurring of the borders between lexicography and terminography. In other words, it will be more useful to view general-language and specialized language as a continuum rather than a dichotomy. Recent corpus-based terminology research, such as that of Pearson [1998], is bringing to light the wide range of discourse types in which terms can appear, from more to less specialized. On the general-language side of the picture, the increase in popularized literature generated by the "knowledge worker's" appetite for information is creating a greater awareness of the range of specialization that can be found in "general" language.

In the days of paper-based dictionaries, terminographers could safely assume that users would have a fair amount of domain knowledge. This assumption was reasonable because specialized dictionaries were simply not very accessible to people outside the domain. As a result, terminographers have been able to work according to a strictly systematic approach based on detailed conceptual analysis. This approach aimed at definitions with as little redundant information as possible, allowing technical words that would be defined elsewhere in the domain dictionary. Kalliokuusi and Varantola [1998], for example, provide the following terminological definition of the *false morel/lorchel* based on a biological taxonomy: "An operculate unitucate (macro)fungus of the order Pezizales, of the class Ascomycetes" .

In this new age of Web dictionaries, terminographic work will become accessible to a much wider public than before. Hence, one can no longer assume that all potential users will have a fair degree of domain expertise. As Kalliokuusi and Varantola [1998] point out, the terminological definition of the *false morel* would not be very helpful to the layperson, who needs to know that this mushroom is poisonous if not prepared properly. Increasingly, terminographers will need to accept the fact that some users will want definitions in simple, non-technical

language. An obvious solution is to encourage terminographers to provide systematically non-technical definitions (similar to those that lexicographers create) in addition to the conventional definitions. In the *virtual* dictionary of the future, users can specify their needs, and have the dictionary filter out what is not desired. In this way, the layperson would be presented with a definition like "a poisonous mushroom (*Gyromitra esculenta*) which closely resembles a brown 'brain' perched on a white stalk [Kalliokuusi/ Varantola 1998].

5 Concluding Remarks

John Ayto [1999:x] has described words as "the servants of events" . In this paper, we have tried to show that computer words are the way they are, and behave the way they do, because of certain extra-linguistic realities: the general character of *cyberculture*, and the layperson's preference for *user-friendliness* in anything that might cause *technostress*. We have argued, furthermore, that computer words are just one symptom of lexical tendencies that are increasing as we become a knowledge society. Finally, we have proposed a number of insights that lexicographers and terminographers can draw from computer words, and that might be applied in the *virtual*, *WWW-based* dictionaries of the *Y2K*. . . and beyond.

Acknowledgements

This paper would not have been possible without the close collaboration of Kristen Mackintosh in virtually all areas of my research over the past 7 years. Krista Varantola also contributed significant ideas. This research has been funded by the Social Sciences and Humanities Research Council of Canada.

Notes

¹ For simplicity, we shall use *lexicographer* to mean *general-language lexicographer* (i.e. a person who works on general-language dictionaries, as opposed to terminological dictionaries). It should be noted that many people (e.g. Bergenholtz/Tarp 1995) consider terminography to be just one type of lexicography, and not a different type of lexical activity.

² Take, for example, *integer execution unit* (part of a processor), *synchronous-link DRAM* (= SL-DRAM, a type of memory), or *HIPPI* (high performance parallel interface).

³ For a more detailed description of the work of terminographers, see Sager 1990.

⁴ Both cases are quite reasonable. An advanced computer science student may not even be aware of the existence of term banks, since in many contexts they are used primarily by language professionals. A translator with little domain expertise in computing may nevertheless look in a term bank first since term banks tend to be multilingual, and hence a very basic resource in the translation profession.

⁵ The second part of this subtitle is borrowed from Rohrer 1995.

⁶ When Douglas Engelbert invented the mouse, he called it an *X-Y position indicator*.

⁷ Leech (1974:16) has termed this phenomenon *reflected meaning*: "Reflected meaning is the meaning which arises in cases of multiple conceptual meaning, when one sense of a word forms part of our

response to another sense. . . One sense of a word seems to ‘rub off’ on another sense in this way only when it has a dominant suggestive power either through relative frequency and familiarity [the case for the computing sense] or through the strength of its associations."

⁸ Of course, since we are suggesting linking general-language and terminological *commercial* dictionaries, there will be practical problems to solve as well, though these are a broader issue of all Web dictionaries (and other Web-based commercial resources).

⁹ Unfortunately, some of the best examples are found not within the entry for the term in question, but in commentaries on other terms. *World Wide Wait*, for example, is found in the entry for *troll*.

¹⁰ We have attempted to illustrate the meaning potential of *virtual* in Meyer *et al.* 1997a, based on Hanks' prototype approach (Hanks 1994).

¹¹ The domain-focussed approach is typical of the most common type of terminography, called thematic terminography. However, a minority of terminographers practices term-oriented terminography, which is not domain-focussed (e.g. Canadian government terminographers who answer telephone queries about individual problematic terms in a wide variety of areas).

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