Expression Economy in Computing Terminology: Compounding, Blending and Conversion

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The main aim is to show the morphological processes of compounding, blending and conversion found in some computing manuals and infer the most productive combinations. We must remember that specialized English seeks economy of expression, a feature that the morphological processes of derivation, compounding, blending, conversion and shortening fulfil. In this paper we have concentrated on compounding, blending and conversion because they are some of the most frequent morphological processes in the formation of computing terminology.

Compounding involves the addition of two or more bases to create a new lexical item with a compound base. The combinations that we have found in our morphological analysis of the computing manuals mentioned in the Bibliography as Primary Sources are the following:

a) n. + n. = n.: e.g. *baseline, card slot, communications port* and *computer program*

b) n. + n. + n. = n.: e.g. *custom font size, database file* and *drive selection lever*

c) n. + n. ending in *–er/-or* = n.: e.g. *antinoise cover, circuit breaker, data carrier, interface connector* and *word processor*

d) n. + v. in *–ing* = n.: e.g. *file handling, line spacing* and *paper loading*

e) n. + prep. + n. + n. = n.: e.g. *end-of-entry marker* and *end-of-line marker*

f) adj. + n. = n.: e.g. *boldfacing, floppy disk, freeware, hard disk, hard drive, hardware* and *software*. According to K. Klasson (1977: 74),

> the old collective term *ware* which existed as early as c. 1000 in the sense of articles of merchandise or manufacture, goods, […] is beginning to lose its original meaning (as can be seen from the computer terminology items *firmware, hardware, liveware* and *software*). The morpheme ——*ware* here has little more to convey than the suffix ——*ry* in *circuitry* or *weaponry*. Both types of coinage simply convey the idea of plurality, collectivity and groupage.

Most adjectives in this formation are monosyllables from Germanic origin.

g) adj. + n. + n. = n. : e.g. *first level entry, full-screen editor, high-speed printer* and *multiple-purpose tester*

h) adj. + n. + n. + n. = n.: e.g. *single sheet entry slot* and *single sheet exit slot*

i) v. + n. = n. : e.g. *checkmark, clipboard, enter key, find button* and *lead tracking*. Coinages of this type are frequent in computer terminology to which the item *write time* belongs. Other similar formations used in the computing field are *read head, read rate* and *run time*

j) n. + v. + n. = n.: e.g. *paper feed knob* and *style edit bar*

k) adv. /prep. + n. = n.: e.g. *not-circuit, on-position* and *outlining*. This combination is frequent in electronic terminology

l) conj. + n. = n.: e.g. *and-circuit, and-gate, and-operation, or-circuit* and *or-element*. This type of compound is especially used in electronics and computer technology. These nouns come from the terminology of the formal logic, which considers the truth or falsehood of a proposition a binary quantity

m) n- + adj. = adj.: e.g. *carrier-free, distortion-free, machine-readable* and *polarity-sensitive*. Some of these patterns are constant and productive. Thus, *free* + n. forms compound adjectives such as *ripple-free* (output), *carrier-free* and *distortion-free*. The adjectives in –*able* are part of compounds with the meaning of ´that can be + p.p. + by + n.´: e.g. *machine-readable*, 'which can be read by a machine'.

n) n- + v. in –*ing* = adj.: e.g. *fluid-carrying* and *time-consuming*

o) adv. + v. in –*ing* = adj.: e.g. *over-increasing*

p) n. + p.p.= adj.: e.g. *air-borne, computer-controlled, custom-designed* and *microprocessor-based*

q) adv. + p.p.= adj.: e.g. *above-listed, well-established* and *well-defined*. As T. Dahl (vid. L. Breivik et al., eds., 1989: 93) points out,

> Marchand 1969 remarks that 'combinations `(of sb/second participle) are practically unlimited today, especially as technical terms´(93). Varantola 1984 indicates the same tendency for the present participle: 'Another discrepancy between the two corpora (general language corpus = GLC, and technical language corpus = TLC) in the first slot is in the use of the present participle. It is fairly common in the TLC but hardly used at all in the GLC´ (119-120).

Both participial structures —with present participle and past participle— provide the fixing of purposes, which is an important part of special languages. Technical terms are frequently coined according to the principles of function and operation method, hence the fact that they need a verbal element, which may be provided by both participles.

General languages and special languages use the same linguistic structures, but with a different frequency. This difference may be due to some features of the two variants. General language, as opposed to special language, is used among other things to express subjective statements (cf. the frequency of adverbially modified adjectives, requiring human judgment), while special language is in need of transparent, well-motivated terms for which compound adjectives involving the two participles seem particularly well-suited.

r) v. + adv. = adj.: e.g. *step-down*

s) prep. + n. = adj.: e.g. *off-line* and *on-line*

t) n. + v. = v.: e.g. *to shift-click* and *to word-process*

u) adj. + n. = v.: e.g. *to doubleclick, to highlight, to lowercase* and *to uppercase*

v) adv./ prep. + v. = v.: e.g. *to bypass, to input, to output* and *to upgrade*.

According to M. Görlach (1997: 86), "compounds are normally transparent, that is the meaning of the item is related to that of their individual components; compounds can, however, lose their transparency for various reasons, for example through lexicalization, as a consequence of sound change, by a change of meaning or obsolescence of one of the constituents".

As K. Klasson (1977: 70) points out,

> the process of embedding grammatical structures by premodification is evidently a labour-saving method which helps scientists to be more succinct, enabling them to do away with redundant grammatical features such as prepositions (*computer-controlled*: controlled by a computer), substantives (*punch-card-reader*: the device reads the punch-card), verbs (*pocket-calculator*: the calculator fits into your pocket), conjunctions (*read-write* (cycle): the cycle of reading and writing) and clauses (*AND-gates, EITHER-OR* operation, *IF-THEN* operation, *NOR-element*).

In compounding we also find combining forms of classical origin. In the computing manuals analysed morphologically the most frequent combining forms are *auto-, multi-, photo-* and *tele-*.

With *auto-* we find, for instance, *autocorrection, autodisconnect, auto-enter, auto-indexing* and *Automatics*. One of the recent aims of the scientist has been to replace human labour by the efforts of the machine, and this is reflected in the English vocabulary by a number of recent words with the prefix *auto-*, and of newly-formed compounds with the first element *automatic*.

Technical terms in *multi-* are, for instance, *multichip, multicolumn, multicomputing, multi-digit, multifinder, multilaunch, multiline, multipage, multiprocessing* and *multiprogramming*.

The following nouns adopt the combining form *photo-*: e.g. *photodiode, photoresistor, photosensor* and *phototypesetting*.

Some nouns with *tele-* are, for instance, *telebit, telecommand, telecommunications, telecomputer, telefax, telescreen, teletext, teletype* and *telex*. *Tele-* was actually used as a prefix in Classical Greek. Today *tele-* is a useful combining form for designating distant control. Man´s conquest of space, and his ability to perform certain actions over long distances, is shown in the large number of words containing this combining form.

Compounding is also produced by means of blending. As F. Katamba (1994: 184) states, "BLENDS are hybrid words. They are compounds made in an unorthodox way by joining chunks of word-forms belonging to two distinct lexemes. This word-formation method has grown in popularity in recent decades". This process is very rarely recorded for early stages of European languages, but has greatly increased in modern times.

Some computing combinations are: *ABEND* (<u>Ab</u>normal <u>End</u>), *ALGOL* (<u>Algo</u>rithmic <u>L</u>anguage), *alphameric* (<u>alpha</u> + nu<u>meric</u>), *bit* (<u>bi</u>nary di<u>git</u>), *dataphone* (<u>data</u> + tele<u>phone</u>), *D-bus* (<u>d</u>ata <u>bus</u>), <u>E</u>-mail (<u>e</u>lectronic <u>mail</u>), *kbyte* (<u>ki</u>lo<u>byte</u>), *pixel* (<u>pix</u> + <u>el</u>ement), *telex* (<u>tele</u>typewriter <u>ex</u>change) and *transistor* (<u>tran</u>sfer re<u>sistor</u>). As B. A. Fennell (2001: 177) emphasizes, "what is remarkable about much of the new vocabulary is that it does not involve borrowing, but rather combining or blending existing words (e.g. *alcopop* = <u>alco</u>hol + <u>pop</u>; […] *Euroskeptic* = <u>Euro</u>pe + <u>skeptic</u>)". According to T. Pyles and J. Algeo (1993: 285), "nowadays English forms most of its new words by combining words or morphemes already existing in the language. Compounding and affixation account for two-thirds of our new

words. Most of the others are the result of putting old words to new uses or shortening or blending them".

Contran (con̲t̲r̲o̲l̲ tran̲s̲lator) is a computer language. The element *–tran* is also used in *Fortran* (for̲mula tran̲s̲lation), a computer mainly used for scientific purposes.

Sometimes industries use similar words that are "quasi-learned" as commercial designations for their new products where we notice analogy with previous forms in English. Thus "families" of words are formed: e.g. *binistor* (b̲istable tran̲s̲istor̲), *Dynistor* (d̲y̲natron trans̲istor̲), *Ferristor* (fer̲r̲omagnetic trans̲istor̲), *Fieldistor* (external fie̲l̲d̲ trans̲istor̲), *Remscope* (rem̲aining trace oscillo̲scope̲) and *storascope* (stora̲ge oscillo̲scope̲).

Certain number of words formed in this way are accepted in the English language (and some of them in the Spanish language) and are commonly used: e.g. *bit* and *transistor*.

The words are merged into distinguishable elements. The new words formed by joining elements frequently belong to commerce —new devices, fabrics, furniture, etc.—.Thus sciences such as chemistry, medicine, sociology, psychology and computing form a new vocabulary . As T. Pyles (1982: 279) points out,

> the blending of two existing words to make a new word was doubtless an unconscious process in the oldest periods of our language. The *hathel* ´nobleman´ in line 1138 of the late fourteenth-century masterpiece Sir Gawain and the Green Knight is apparently a blend of athel (OE aethele ´noble´) and haleth (OE haeleth ´man´) […] Other early examples, with the dates of their earliest occurrence as given in the OED, are *flush* (flash plus gush); *the Random House Dictionary* says "in some senses, further blended with blush) (1548); *twirl* (twist plus whirl) (1598); *dumfound* (apparently dumb plus confound) (1653); and *flurry* (flutter plus hurry) (1698)

According to I. de la Cruz Cabanillas (vid. E. Bernárdez Sanchís et al., 2001: 711), "aunque en inglés moderno temprano se documentaba algún caso, este mecanismo no prolifera hasta el inglés contemporáneo". As they are recent creations, "resulta difícil predecir qué creaciones permanecerán en la lengua y cuáles serán únicamente producto de una moda pasajera" (ibid., 712).

Another morphological process in computing terminology is functional shift or conversion, especially nouns are turned into verbs and vice versa (vid. E. Pérez

Iglesias, 1998: 71-72). As N. F. Blake (1996: 27) states, "an advantage that the fall of inflections has brought is the ease with which we can now use functional shift, the process by which one part of speech may be used as a different part of speech". But he adds (ibid., 323), "this is a feature which has run riot in more recent times and is often criticised by those who regard themselves as guardians of the language".

Some nouns used as verbs are the following: *display, format, highlight, monitor, network, package, process* and *program*. These nouns, when changed into verbs, adopt several semantic patterns: e.g.

´to put into´: 'a package´ = *to package*

´to provide with´: ´programs' = *to program*

´to send by´: ´telex´= *to telex*

´to cause´: ´shortcircuit´ = *to short-circuit*.

As C. Portero Muñoz (2004:139) emphasizes,

> new technologies seem to be responsible for many of the denominal verbs that are now very common. To give just one example, take the word *xerox*, which is the name of the company that produces the well-known photocopying machines. Much to the dismay of the company, the term *xerox* has lost its specific brand name denotation and has come to be used to describe the process of photocopying in general.

Some verbs used as nouns are the following: *drive, feed, input, interrupt, output, printout, start* and *stop*. Conversion of verbs into nouns and nouns into verbs is extremely productive in English. Usually the same word-form can be used as a verb or a noun, with only the grammatical context enabling us to know which category it belongs to. According to C. M. Millward (1996: 331),

> from EMnE on, functional shift […] has been a highly productive source of new vocabulary in English. All parts of speech can participate, at least to a limited extent, but the major types involve nouns to verbs, verbs to nouns, and adjectives to either nouns or verbs. Noun-to-verb conversion has given PDE *to blackmail, to eyeball, to facsimile, to network,* and *to trash*, for instance. Verb-to-noun shift is examplified by *a commute, a flare, an interrupt*.

We also find some technical terms which are adjectives and adverbs: e.g. *off-line* and *on-line*. Conversion is not restricted to nouns and verbs. Adjectives too can undergo conversion. Likewise, some adverbs are formed from adjectives without any perceptible change in shape. This type of conversion is very frequent in American English where many of these words first appear. Modern technologies, such as computer technology, have included them in their terminologies.

The lexicon is the most changed aspect of English in the PDE period. This is largely due to the development of scientific-technological vocabulary and, at the end of the twentieth century especially, the rapid progress of computer/communications technology and computer literacy.

Conclusiones

There are speech sub-varieties that are associated with particular occupations. These sub-varieties are primarily distinguished by their jargon (i.e., their peculiar words and expressions). The manufacture of jargon is one of the richest sources of new words.

In the last few decades computer jargon has spread into the linguistic mainstream as the use of computers has spread. The means by which computing terminology creates lexical units are various: derivation, compounding, conversion, blending, shortening, etc. In this paper we have concentrated on compounding, blending and conversion because they are some of the most frequent morphological processes in the formation of this terminology.

As for compounding, in the computing manuals analysed morphologically we have found some very productive combinations such as n. + n. = n., n. + n. + n. = n., n. + n. ending in –*er/-or* = n., n. + n. ending in –*ing* = n., adj. + n. = n., adj. + n. + n. = n., v. + n. = n., n. + adj. = adj. and n. + p.p. = adj., and very productive combining forms such as *auto-, multi-, photo-* and *tele-*.

The list of combinations that has been shown is not exhaustive, but sufficient to demonstrate the frequency of compounding in computing terminology of current English based on their appearance in some computing manuals which we have analysed morphologically. It must not be forgotten that compounding has become one of the main methods of lexical formation and that the number of combinations is greater in technical English than in general English.

It must be taken into account that technical language is mainly distinguished from general language by its lexicon. The lexicon of EST is international, exact, unambiguous, unique, neutral and self-explanatory, or transparent. Moreover, compounding leads to the formation of long noun syntagms, which contribute to expression accuracy and conciseness, another feature of EST, to which computing terminology belongs. We must remember that specialized English seeks economy of expression, a characteristic that the morphological processes of compounding, blending and conversion fulfil.

REFERENCES

Primary Sources

A Beginner´s Guide to HP-UX (1989). Colorado: Hewlett-Packard.

Apple Hypercard. User´s Guide (1987). Apple Computer, .

Apple ImageWriter II. Owner´s Guide (1988). Apple Computer.

CLARIS FileMaker Pro (1990). Santa Clara, California: Claris, .

Compuprint 4/20-4/21. User Manual (1987). Italia: Honeywell Bull, S.p.A., IBM.

Quattro Pro. User´s Guide (1989). Scotts Valley, Ca.: Borland.

Works Cited

Bernárdez Sanchís, E. et ál. (2001). *Lingüística histórica inglesa*. Barcelona: Ariel.

Bl**ake, N. F.** (1996). *A History of the English Language*. London: Macmillan.

Breivik, L. E. et ál. (eds.) (1989). *Essays on English Language in Honour of Bertil Sundby*. Oslo: Novus Forlag.

Fennell, B. A. (2001). *A History of English: A Sociolinguistic Approach*. Oxford: Blackwell.

Görlach, M. (1997). *The Linguistic History of English: An Introduction*. London: Macmillan.

Katamba, F. (1994).*English Words*. London: Routledge.

Klasson, K. (1977). *Developments in the Terminology of Physics and Technology.* Stockholm, Sweden: Almqvist & Wiksell.

Millward, C. M. (1996). *A Biography of the English Language.* Orlando, Florida: Harcourt Brace College.

Pérez Iglesias, E. (1998). *Análisis del inglés informático.* Salamanca: Hespérides.

Portero Muñoz, C. (2004). *A Course in English Morphology.* Universidad de Córdoba: Servicio de Publicaciones.

Pyles, T. (1982). *The Origins and Development of the English Language.* New York & London: Harcourt Brace Jovanovich.

Pyles, T. and **J. Algeo** (1993). *The Origins and Development of the English Language.* Boston: Heinle, a division of Thomson Learning.