AFFIXATION IN COMPUTER TERMS

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This article analyzes affixation and its classification in computer terms. Affixation is considered to be one of the widely used means of modern word-formation in computing. Affixation as a word forming means is used by adding derivational affixes to stems. There are different ways of classifying affixes. But the most obvious way is to classify them according to their position.

Key words: word-formation, affixation, computing, computer terms, derivational affixes, vocabulary enrichment.

Introduction

The twenty-first century will be named the age of computing, the Internet and programming due to the development of computer technologies. Together with the rapid progress of computer science the proper terminology was developed and formed.

The science which studies the creation of new words is derivatology. A great contribution to the subject of English word-formation study has been made by A.I. Smirnitsky, I.V. Arnold, N.N. Rayevska, R.S. Ginzburg, O.D. Meshkov and others. Word-formation may be studied synchronically and diachronically. It is necessary to distinguish between these two approaches, for synchronically the linguist investigates the existing system of the types of word-formation while diachronically he is concerned with the history of word-building. Word-formation is the system of derivative types of words and the process of creating new words after certain structural and semantic formulas and patterns. Simple words, however, are very closely connected with word-formation because they serve as the foundation, the basic source of the parent units motivating all types of derived and compound words. A lot of linguists consider affixation, conversion and compounding to be the main processes of English word-formation (Marchand 1969; Meshkov 1976; Ginzburg 1979).

Affixation as the Basic Means of English Word-Formation

The chief processes of English word-formation, affixation, conversion and compounding, are analysed as means of modern word-formation in computing, the Internet and programming. But it must be mentioned that affixation is one of the main ways of modern word formation in computing.

In O. Meshkov's monograph "Word-formation of Modern English" (1976) it is stated that the basic method of today's English word-building is **affixation**. It is generally defined as the formation of words by adding wordforming (or derivaional) affixes to the stem. This process is also known as derivation, for new words created in this way are derived from old forms. The words formed in this way are called derivatives. There are functional and derivational affixes. Functional affixes are used to convey grammatical meaning. They build different forms of one and the same word. The word form is defined as one of the different aspects a word may take as a result of inflection, e.g. *computer, computer's, computers.*

Derivational affixes are used to supply the stem with components of lexical and lexico-grammatical meaning, and thus form different words. Derived words whose bases are

built on simple stems and thus are formed by the application of one derivational affix are described as having the first degree of derivation (e.g. *addition, digital, codify,* etc.). Derived words which are formed by means of two derivational affixes have the second degree of derivation (e.g. *additional, digitally, codification,* etc.).

Affixes can be classified into productive and non-productive types. Productive affixes are used in deriving new words in this particular period of language development.

Affixes are also classified according to their semantic properties, but a lot of affixes can express more than one meaning, so it will not be clear under which category an affix should be listed. At last the most obvious way of classification is according to the positions affixes occupy in words. Thus, affixation falls into two subclasses: prefixation and suffixation. There is also an infix which is considered to be an affix placed within the word, e.g. *-n-* in *stand.* This type is not productive.

Types of Affixes and Their Usage in Computer Terms

Suffixation is the formation of new words by adding suffixes to stems. Unlike prefixes which primarily change the meaning of the stem, suffixes are derivational affixes which have only a small semantic role, their primary function is to change the grammatical function of stems. In other words, they mainly change the word class. Thus, suffixes are classified on a grammatical basis into noun suffixes, verb suffixes, adjective suffixes, etc.

The suffixes in *signify, identity, investigate, federal* are Latinate, while the suffixes in *friendship, sweetness, helpful, brotherhood* are of native Germanic origin. The Latinate suffixes such as *–ify, -ate, ity*, and *-al* prefer Latinate bases and often have bound roots as bases, whereas the native suffixes such as *-ship, -ful, -ness*, and *-hood* are indifferent to these kinds of distinctions. Thus, most of the Latinate suffixes are vowel-initial whereas the native suffixes tend to be consonant-initial. Most of the Latinate prefixes are secondarily stressed, whereas the native prefixes (such as *en-, be-, a-*) tend to be unstressed. Native roots are mostly monosyllabic (or disyllabic with an unstressed second syllable, as in *water*), while Latinate roots are mostly polysyllabic or occur as bound morphs (*investig-* illustrates both polysyllabicity and boundness). With regard to the combinability of suffixes it must be mentioned that the Latinate affixes are not combined with native affixes (e.g.*-less-ity*), but the native suffixes are combined with non-native affixes (*-ive-ness*).

Computer terms made by means of native suffixes are *morphing* (special effect used in multimedia and games in which one image gradually turns into another), *scanning* (action of examining and producing data from the shape of an object or drawing), *browser* (software program that is used to display and navigate though WWW pages stored in HTML format on the internet or on a private intranet). Such terms as *maskable* (which can be masked), *sequential* (arranged in an ordered manner), *spherization* (special effect provided by a computer graphics program that converts an image into a sphere, or "wraps" the image over a spherical shape) can be referred to words made by means of borrowed suffixes.

While analyzing computer terms it must be stated that the most productive noun forming computer suffixes are:

-er: *handler, adder, identifier, insider, jumper, inverter, keyer, leader, linker, ascender, browser, pager, pointer, profiler, programmer, provider, repeater, sender, specifier, spooler, logger, spellchecker, streamer, subscriber, transceiver, transducer, verifier, viewer, writer, marker, resolver, verifier*, etc. *er* is considered to be a noun forming suffix because all the

forms derived from it are nouns. This suffix is closely related to *-ee* as its derivatives signify entities which are considered to be participants in an event (e.g. *programmer, writer, provider,* etc.). There are also nouns denoting entities associated with an activity such as *steamer, pager, browser*, etc.

-ing: *sharing, signaling, splitting, storing, stripping, testing, triggering, randomizing, quiescing, encoding, networking, operating, paging, numbering, setting, computing, accepting, blocking, channelizing, entering, flashing, framing, folding, holding, receiving, inscribing, heading, hashing, operating, listing, intercepting, keying, brushing, building, monitoring, naming, nesting, updating, packing, rendering, restructuring, sampling, searching, sequencing, sorting, tunning,* etc.

-or: *accelerator, administrator, bisector, calculator, navigator, operator, processor, creator, transistor, compressor, concentrator, annunciator, collator, connector,* etc.

-ion: *presentation, prevention, proposition, ramification, reduction, quantization, recognition, selection, specification, simplification, representation, protection, reservation, segmentation, transaction, synchronization, transformation, compression, verification, transposition, configuration, compression, allocation, documentation, equalization, inclusion, informatization, initialization, installation, interaction, justification, interruption, tabulation,* etc.

The suffixes *-ion* (and its allomorphs *-sion* and *-tion)* and *-or* are noun-forming suffixes combined with verbal stems. The opposition between them serves to distinguish between two subclasses of nouns: abstract nouns and agent nouns, e.g. *accumulation - accumulator; action - actor; vibration - vibrator,* etc. The abstract noun in this case may mean action, state or result of action remaining within the same subclass. Here we have an opposition between animate and inanimate nouns which are different not only semantically but also grammatically. The animate nouns may be substituted by *he* or *she*, while the inanimate nouns are substituted by *it.*

It must be stated that the most common adjective forming computer suffixes are:

-able: *acceptable, addressable, adjustable, alterable, available, avoidable, dockable, applicable, removable, readable, solvable, portable, flexible, exchangeable, loadable, executable, programmable, unallowable, variable, transportable,* etc.

The suffix *–able* can be combined with noun stems and verbal stems like in *addressable, removable.* It is especially frequent in the verbal stem *(bearable).* Sometimes it is even attached to phrases in which composition and affixation are simultaneously producing compound-derivatives *(unbrushoffable, ungetatable).*

The most common words with the suffix *-ed* are:

-ed: *advanced, applied, directed, embedded, fixed, animated, balanced, adjusted, extended, linked, limited, loaded, locked, marked, mixed, protected, required, self-contained, shared, truncated, owned, perforated, suspended,* etc.

The most frequently used verbal suffixes in computing are the following:

-ize: *alphabetize, computerize, digitize, magnetize, synthesize, maximize, minimize, stylize, optimize, crystallize, customize, initialize, spherize, prioritize, quantize, staticize,* etc.

-ate: *abbreviate, accumulate, activate, allocate, alternate, calculate, designate, determinate, locate, numerate, operate, propagate, regulate, rotate, terminate, validate, collate, abate, duplicate, enumerate, emulate, hyphenate, iterate, associate, simulate, tabulate,* etc.

In computing, the suffix *-ware* refers to programs executed by a computer. It is commonly used to form terms for classes of software *(freeware, adware, groupware, netware, firmware, spyware, shareware, courseware, abandonware, dateware, middleware*, etc.) which allows to refer it to suffixoids**.** It possesses weak word-building but clear lexical computer related meaning.

The same situation is with the prefix *-e*. It gives Internet related shades of existing concepts *(e-auction, e-book, e-business, e-cash, e-commerce, e-consulting, e-culture, e-entertainment, e-exchange, e-government, e-infrastructure, e-learning, e-mail, e-payment, e-shop, e-vote, e-signature, e-document)*. Thus, it could be named as prefixoid.

It should also be mentioned that the prefix *e-* is one of the highly productive means of coining new computer terms, and moreover it is one of the latest appeared means, as all the derivatives built with the help of *e-* are considered neologisms.

The same features are possessed by the prefixes *cyber- (cyberculture, cybercrime, cyberslacke, cyberspacer, cybercafe)* and *virtual- (virtual memory, virtual connection, virtual disk, virtual image)* that are prefixed to a wide range of existing words to form new Internet-related shades of existing concepts.

The majority of prefixes are characterized by their nonclasschanging nature. Their chief function is to change meanings of the stems. Thus, prefixes are classified into eight groups on a semantic basis.

1. Negative prefixes: a, dis, in, il, ir, im, non, un, e.g. *amoral* (non-moral), *illegal* (not legal), etc.

2. Reversative prefixes: de, dis, un, e.g. *decentralize* (give greater powers for self-government), *decompose* (separate into parts), *disunite* (become separate), *unwrap* (open). These prefixes are also considered to be negative ones. Here they are separated because of their meaning.

3. Pejorative prefixes: mal, mis, pseudo, e.g. *maltreat* (treat badly), *misconduct* (bad behaviour), *pseudoscience* (false science).

4. Prefixes of degree or size: arch, extra, hyper, macro, micro, mini, out, over, sub, super, sur, ultra, under**,** e.g. *extrastrong* (very strong), *hyperactive* (extremely active), *macro library* (very large library), *microcomputer* (very small computer), *minielection* (smallscale election), *outlive* (live longer than), *overweight* (weighing more than normal), *subheading* (secondary heading), *superfreeze* (freeze to a very low temperature), etc.

5. Prefixes of orientation and attitude: anti, contra, counter, pro, e.g. *antinuclear*, *contraflow* (the arrangement for the traffic to go on both directions on one side of the road), *prostudent* (on the side of the student), etc.

6. Locative prefixes: extra, fore, inter, intra, tele, trans**,** e.g. *extraordinary* (more than ordinary), *interpersonal* (concerning relations between people), *telecommunication* (communication by telephone, radio, television, etc.), *transworld* (across the world), etc.

7. Prefixes of time and order: ex, fore, post, pre, re, e.g. *exprofessor* (former professor), *foreknowledge* (knowledge before happening), *preprepared* (prepared beforehand), *reconsider* (consider again), etc.

8. Number prefixes**:** bi, multi (poly-), semi (hemi), tri, uni (mono), e.g. *bilingual* (concerning two languages), *multipurpose* (more than one purpose), *hemisphere* (a half of the earth on either side of equator), etc.

9. Miscellaneous prefixes: auto, neo, pan, vice, e.g. *autobiography* (biography written by oneself), *panEuropean* (the whole of Europe), *vicechairman* (deputy chairman), etc.

Such prefixes as *anti-, auto-, back-, bi-, micro-, de-, e-, digi-, hyper-, macro-, re-, in-, inter-, un-, multi-* are considered to be the most frequently used ones. The prefix *anti* means *against, preventing*. E.g.:

anti-*: anti-aliasing, anti-leakage, antireflection, antistatic, anti-twitter, antivirus, antialias, antijamming,* etc.

The prefix *auto-* means "something that is done by oneself".

auto-: *auto-answer, autoassociator, auto-baud, auto-bracketing, autochanger, auto-configure, auto save, auto scaling, auto repeat, autocorrect, autocorrelation, autodetect, autodecremental, autodial, auto call, autopoll, autocode, autoload, autothread, autoreview, autorestart,* etc.

The prefix *de-* occurs in many neologisms, such as *decentralise, decontaminate*. This prefix attaches to verbs and nouns to form reversative or privative verbs: *decolonize, deflea, decaffeinate, depollute, dethrone, deselect*.

de-: *decomposition, demapping, demounting, demultiplexer, deselect, destructor, defragmentation, degenerate, debug, decode, decompression, decryption, delimit, demodulator, deinstallation, detach, decollate, deleave,* etc.

Semantically closely related to *un-* and *de-*, the prefix *dis-* forms reversative verbs from foreign verbal bases: *disassemble, disassociate, discharge, disconnect, disproof, disqualify.* Apart from deriving reversative verbs, this suffix uniquely offers the possibility to negate the base verb in much the same way as clausal negation does: *disagree* (not to agree), *disobey* (not to obey), etc.

dis-: *dispatch, display, dissector, disconnect, dispose, disarm, disable,* etc.

There are a number of prefixes that quantify over their base words meaning, e.g. *small* (micro- *microcircuit*), *large* (macro- *macroassembler*), *to excess* (hyper- **hypercube**), *two* (bi-*bisector*), etc.

hyper-: *hyperchart, hypercube, hyperdiagram, hyperdocument, hyperlink, hypermedia, hypertalk, hypertext,* etc.

macro-: *macroassembler, macrocell, macrogenerator, macroprocessor, macroinstruc-*

tion, macro call, macro recording, macro expansion, macro language, macro program-ming, macro library, etc.

micro-: *microarchitecture, microsoft, microcash, microbrowser, microcell, microchip, microfile, microprocessor, microphone, microcentury, microcircuit, microcentury microc-ode, microcomputer, microcontroller, microfloppy, microsequence,* etc.
bi-: bicubic, bilayer, bilevel, bilinear, bipolar, binominal, bisector, bistable, bicondition, etc.

There are numerous locative prefixes such as *circum* (around) in *circumscribe, count-er-* (against) in *counterexample, back* in *backwards,* etc.

back-: *backshell, backslash, background, back-end, backlighting, backpack, backspace, backsearch, backbone, backdrop, backlog, backplane, backslant,* etc.

The prefix *re-* is also frequently used in computing, it expresses the meaning of repeat-ed action.

re-: *recreate, regenerate, rearrange, restart, redial, reset, redo, retry, restore, revert, reassign, rebuild, recall, recompose, refresh, reload, relocate, reorder, replace, resolve, resize, refile, reproduce, rewind, reconstitute,* etc.

The locative prefix *inter-* is also used in computer terms.

inter-: interaction, interactive, interactor, interface, interconnecting, interlock, inter-leave, interstate, interstage, intertoll, internetworking, internet, interpolation, etc.

The negative prefix *un-* can be found in computer terms. It may be used in the patterns:
un- + an adjective stem: *unavailable, unallowable, unremovable, undecidable.*
un- + Part. II stem: *unbalanced, unauthorized, undefined, unformatted, unexpected unlimited, unprotected, unrecognized, unspecified, unsupported, untitled, unused*
c) *un-* + a verbal stem with the meanings "to reverse the action as the effect of..." and "to release from": *unassign, undelete, undo, unerase, unzip, unload, unlock, unpack.*

Conclusion
In conclusion, it must be mentioned that science and technology development has brought about the need to name new concepts, ideas which are specific to a certain field or discipline. Thus, a number of terms which designate concepts specific to subject fields must be created. A lot of new terms from different areas, including telecommunications, IT and computer science are created in the English language. Affixation as a word-forming means in computing has its specific role in this process. It is considered to be one of the most frequently used word-forming means in computing. Affixes are classified not only according to their semantic features but also according to their position. A lot of new words are formed by means of suffixes and prefixes. Affixation as a word-forming means will help to create a lot of neologisms which will penetrate into the general layers of the vocab-ulary of the English language and enrich its word stock.

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Աձանցումը համակարգչային տերմիններում

Սույն հոդվածում քննության է առնվում աձանցումը` որպես համակարգչային տերմիններ կազմող բառակազմական միջոց: Աձանցումը կարևոր դեր ունի համակարգչային տերմինների ստեղծման գործընթացում: Քննելով աձանցումը որպես համակարգչային տերմիններ կազմող բառակազմական միջոց` պետք է ասել, որ այն կարող է մեծ դեր ունենալ համակարգչային նոր տերմինների ձևավորման և լեզվի բառապաշարի հարստացման գործընթացում:

Аффиксация - средство образования компьютерных терминов

Данная статья исследует аффиксацию как словообразовательное средство для компьютерных терминов. Аффиксация занимает особое место в сфере компьютерных терминов. Компьютерные термины образуются как с помощью аффиксов, так и без них. Анализируя аффиксацию как словообразовательное средство, можно сказать, что она является самым продуктивным средством для образования компьютерных терминов.