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TYPOLOGICAL FEATURES OF WORD-FORMATION IN COMPUTING, THE INTERNET AND PROGRAMMING IN THE FIRST DECADE OF THE XXI CENTURY

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The main sources of new items in the terminological system on computing, the Internet and programming taking place during the first decade of the XXI century are investigated, and the phenomenon of their specific features are analyzed.

Key words: word-building, computing, the Internet, programming, the XX century.

The 20th century will be named the age of the Internet. This invention was possible due to the strike development of computer technologies. Together with the rapid progress of computer sciences proper terminology developed and formed. Linguists have calculated that fifteen years ago Ukrainian terminology on computing numbered only about 3000 lexical units [1]. For comparison, at present there are 14000 of them [2].

The science which studies the creation of new words is derivatology. A great contribution to the subject of English word-formation study was made by A. I. Smirnitsky, I. V. Arnold, N. N. Rayevska, R. S. Ginzburg, O. D. Meshkov and others. The appearance of monographic works about word-building system of the Modern English language made the development of derivatology an independent part of linguistics.

Categories and types of word-formation in each language present a separate system with its own patterns of vocabulary items, its specific types and its own way of distinguishing them. Most linguists in special chapters and manuals devoted to

English word-formation consider affixation, conversion and compounding to be the chief processes of English word-formation (Ginzburg, Meshkov, Marchand).

Apart from these, there is a number of minor ways of forming words such as back-formation, sound interchange, distinctive stress, onomatopoeia, blending, clipping, acronymy.

Technical revolution corrects our life, and consequently modifies our speech. A computer with its vocabulary has entered our houses. Words which were used only by programmers not long ago, now are used extensively by teenagers. There is an active process of term-expansion and structural (morphological) changes of words in language. They coined an enormous number of neologisms, so-called 'amotivational' morphemes with black-out etymology; *emoticon, genlock, hakspek, digerati, netiquette* – are among them.

The purpose of the research is to examine the ways of modern word-formation in computing, Internet and programming and to single out its typological features for the last ten years.

The purpose is achieved by fulfilling the following tasks:

- to analyze affixation as the one of the ways of word-building of computer vocabulary, to choose main types of prefixes and suffixes and to show their usage in computing, Internet and programming;
- to investigate compounding as the way of forming computer terms;
- to explore shortening and its peculiarities in terminological system's enriching;
- to single out the most productive ways of nowadays word-building in computing.

The object of the research is simple, derived and compound words that entered the English computer vocabulary during the last ten years. The source of the material of the research was the special terminological dictionary [2] listing the words peculiar to the investigated branch of science; works, books, articles and webzines of different native and foreign linguists, which form the theoretical basis of research.

Scientific topicality of the theme of this research is defined by its entering the wide sphere of modern functional and dynamic linguistics, which is presented with different directions, foremost term-expansive.

To separate problems of Modern English word-formation in computing, Internet and programming have been devoted some articles and theses. In O. Meshkov's monograph 'Word-formation of Modern English' [3], what was confirmed in numerous works on this problem (Adams, Jespersen, Marchand), there was reported that the basic method of nowaday English word-building is affixation.

Affixation is generally defined as the formation of words by adding derivational affixes to different types of bases. Derived words formed by affixation may be the result of one or several applications of word-formation rule and thus the stems of words making up a word-cluster enter derivational relations of different degrees [4, p. 113]. The zero degree of derivation is ascribed to simple words, i.e. words whose stem is homonymous with a word-form and often with a root-morpheme (e.g. *add, digit, code, corpora,* etc.). 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, corporeal,* etc.) [5]. Derived words formed by two consecutive stages of coining possess the second degree of derivation (e.g. *additional, digitally, codification, corporeality* etc.) [5], etc.

Having analyzed the results obtained in the course of our investigation we came to the certain general conclusions about the affixation. Such prefixes as *anti-, auto-, back-, bi-, micro-, de-, e-, digi-, hyper-, macro-* proved to be the most productive computer prefixes:

anti-: anti-aliasing, anti-leakage, antireflection, antistatic, anti-twitter, antivirus;

auto-: auto-answer, autoassociator, auto-baud, auto-bracketing, autochanger, auto-configure, autocorrect, autocorrelation, autodetect, autodecremental, autodial, autodimensioning;

back-: background, back-end, backhitching, backlighting, backpack, backplane, backpropogation, backshell;

bi-: bicubic, bilayer, bilevel, bilinear, bipolar, binominal;

de-: decomposition, demapping, demounting, demultiplexer, dependence, dequeue, deselect, destructor;

digi-: digicash, digispeak;

hyper-: hyperchart, hupercube, hyperdiagram, hyperdocument, hyperlink, hypermedia, Hypertalk;

macro-: macroassembler, macrocell, macrogenerator, macroprocessor;

micro-: microarchitecture, microbilling, microcash, microbfowser, microcell, microchip, microcentury, microcircuit, microcode, microcommerce, microcomputer, microcontroller.

It should be also mentioned that prefix *'e-'* is one of the highly-productive means of coining new computer terms, and in addition to it we can say that it is one of the latest appeared means, as all the derivatives built with the help of *'e-'* are classified as neologisms.

Similar features are possessed by the prefixes *'cyber-', 'virtual-',* that are prefixed to a wide range of existing words to form new. Internet-related shades of existing concepts.

The most productive computer suffixes are

a) noun-forming suffixes:

-er: adapter, amplifier, analyzer, Assembler, autoloader, beeper, blaster, carrier, copier, counter, compiler, cracker, decoder, dispatcher, driver, eraser, exploder, hacker, header, interpreter, intruder, lamer, limiter, loader, loaner, manager, mailer, microcontroller, modeler, parameter, printer, server, stacker, transceiver, transmitter, user, etc.;

-ion: abbreviation, abstraction, acceleration, accumulation, action, activation, addition, administration, aggregation, animation, application, approximation, association, authorization, automation, emulation, expression, extension, fragmentation, generalization, intrusion, isolation, invalidation, limitation, location, notification, operation, prevention, protection, quantization,

recognition, reservation, segmentation, selection, station, synchronization, tabulation, transaction, transposition, etc.;

-ing: accounting, addressing, aligning, altering, archiving, , ascending, auditing, authoring, switching, auto repeating, banding, docking, printing, processing, balancing, blending, blooming, cleansing, coding, collating, decoding, executing, feathering, fetching, filling, filtering, fixing, formatting, ghosting, imaging, indexing, locking, looping, lurking, mailing, mapping, masquerading, posting, printing, processing, programming, recording, scaling, scanning, settings, sharing, signaling, splitting, storing, stripping, testing, triggering, videoconferencing, etc.;

-ability: acceptability, accessibility, accountability, addressability, availability, capability, compatibility, etc.;

b) adjective-forming suffixes:

-ed: abandoned, abbreviated, added, aligned, anchored, animated, application-oriented, assigned, authorized, coupled, extended, inverted, keyed, managed, triggered, etc.;

-able: acceptable, addressable, adjustable, alterable, available, avoidable, dockable, downloadable, exchangeable, flexible, portable, etc.;

c) verb-forming suffixes:

-ize: alphabetize, computerize, digitize, magnetize, synthesize.

In computing, suffix *-ware* refers to programs executed by a computer. It is commonly used to form with *-ware* terms for classes of software (freeware, shareware, malware, spyware, adware, groupware, etc.) what allows to refer it to suffixoids. It possesses weak word-building but clear lexical computer-related meaning [6]. The same situation is with prefix *-e.* It gives Internet-related shades of existing concepts (e-auction, e-book, e-business, e-cash, e-catalog, e-commerce, e-consulting, e-culture, e-entertainment, e-exchange, e-form, e-government, e-infrastructure, e-intermediary, e-learning, e-mail, e-market, e-payment, e-shop, e-vote). Therefore it could be named as prefixoid.

The biggest quantity of words in English are short one or two syllable and longer ones are considered to be alien [3, 155]. The process of shortening is very inherent to English in whole and to computer vocabulary in particular.

We stated shortening to be the most productive way in computing, Internet and programming. 87,7% of investigated shortenings to have appeared among the computer terms during the last ten years proved to be the neologisms [7] (the most popular, which are used every day are the shortenings such as: *WWW* (World Wide Web), *http* (hypertext transfer protocol, used on the World Wide Web), *PDA* (personal digital assistant), *CD* (compact disc), *ROM* (Read-Only Memory), *RAM* (Random Access Memory), *USB* (Universal Serial Bus), etc. Bortnychuk E. N. [8, p. 168] as well as Meshkov O. D. [3, p. 157] has mentioned that shortenings are produced in two different ways. Clipping is the first way to make a new word from a syllable (rarer, two) of the original word [8, p. 163] *(e.g. animat* (artificial autonomous agent) is made from 'animate', *applet* (applied software) - from 'application', *asynch* (transfer mode, used in digital communications) - from 'asynchronous') [9]. The second way of shortening is to make a new word from the initial letters of a word group. This type is called initial shortenings or abbreviations. According to our estimation of productivity abbreviation proved to be richer sources than clipping (85% vs. 15% of all the investigated shortenings). In spite of their multitude, abbreviations possess some oddity and blurred etymology. Many linguists point out that shortening is the most subjective and artificial method of word-formation.

Broadly speaking, some subjectivity and playfulness is inherent in word-formation of the programmers' vocabulary. Probably the way of thinking of technically-minded people had an impact upon it. Especially often this playfulness takes the form of so-called frankenwords.

Frankenword is a word formed by combining two (or more) parts of other words. This term was coined in the mid-nineties in the context of 'observation of the growing number of neologisms formed by cannibalizing chunks of existing words' [10]. The term was subsequently adopted in linguistics, where

such words are often referred to as *blends,* from the idea of 'blending' or 'mixing' words together. Blends appeared in all aspects of informative intercourse, with terms like *Internet* (Inter'national+net) - global net, *netiquette* (Internet+e'tiquette') – the rules of good Internet behavior, *emoticon* (‘emot’ion+icon) - combinations of symbols, that people attach to their messages in order to express feelings [9].

In the first half of 20 century the number of blends was small account [11]. Now there is an active process of increasing of words, which are formed according to this relatively new model. Blends are highly active in forming stylistic layers in computer vocabulary. For example [9]:

Blog (web+logarithm) - is a personal online journal that is frequently updated and intended for general public consumption. New computer users, for example, are called *newbies* (new+boy), whilst people who are afraid of using computers are called *technophobes* (technology+phobia).

Genlock (generator+lock) - is a system which allows the synchronization of two or more video sources, such as cameras. *Hakspek* (hacker+ speak) - is a shorthand method of spelling found on many British academic bulletin boards and chat_systems. *Digerati* (digital+literati) - people who are knowledgeable about digital technologies such as computer programming and design.

Summing up, it is possible to state that the usage of blends turns the natural language into a new language called "Webspeak" with its own rules, patterns and rather peculiar syntax and morphology.

Compounds, though certainly fewer in quantity than derived or root words, still represent one of the most typical and specific features of English word-structure [12].

Word-compounding occurs when a person attaches two or more stems together to make them work as one word. This means is highly productive in computing when it is the necessity to combine the description of the devices with their physical specifications, with the obtaining results, with the direction of passing data, etc.

There are following subtypes of neutral compounds depending on the structure of the constituent stems [8, p. 148]:

noun + noun model is high-productive. It is possible to single out in computer vocabulary the thematic groups of names related to:

- the computer organization (so called architecture):

e.g. keyboard, daughterboard, motherboard, displayboard, laptop, key-top, key-escrow, brain-computer, videodisk, dot-matrix, testbed, letterbox, mailbox, mailslot, trapdoor, timecode, frontpage, etc.;

- functioning of computer:

e.g. keyword, matchword, database, entry-level, loophole, loopback, error-diffusion, framework, bandwidth, etc.;

- Internet-born vocabulary:

e.g. network. Web-log, juke-box, blog-ring, rollerblade, benchmark, blade-server, teamware, waveform, band-step, etc.;

adjective + noun:

e.g. Bluetooth, blacklist, greylist, whitelist, hot-key, deadlock, full-motion, backslant, shortcut, live-insertion, broadband, real-time, etc.;

noun + adjective:

e.g. error-tolerant, fault-tolerant, location-dependent/independent, errore-prone, memory-resident, machine-dependent/independent, line-interactive, etc.;

verb + particle:

e.g. drop-down, pull-down, builtin, add-on, etc.

noun + particle:

e.g. backoff, logoff top-down, etc.

numeral + noun:

e.g. two-phase, three-tier, etc.

Syntactic compounds are those whose components are placed in the order that resembles the order of words in free phrases. They are arranged according to the rules of syntax of Modern English: e.g. *silicon-on-insulator, denial-of-service, analog-to-digital, left-to-right, off-the-shelf, out-of-band, out-of-order, out-of-process, peer-to-peer, line-by-line, bit-by-bit, byte-by-byte, block-by-block, test-*

and-set, plug-and-play, look-and-feel, push-and-shove, all-in-one, on-the-fly, event-cue-driven, make-before-break, post-it-style, disk-to-disk-to-tape, top-of-the-range, out-of-order, out-of-process, out-of-band, etc. The syntactic compounds are the most numerous type of this model of word-formation.

Having analyzed the results obtained in our paper, we arranged them in the following sequence of productivity of word-building means in the field of computing, Internet and programming. Blending proved to be the most productive one (100% of productivity), followed by shortening (87,7% of productivity). Affixation is still highly productive (68,7%) and compounding (65,3%) runs after it.

There are many prospects of further investigation of this theme. It touches upon the problem of active penetration of computer vocabulary into the general vocabulary of the English language. And due to this there is the influence of processes that are going on in computer vocabulary upon the general processes of the English language development.

Summing up, we can state that the process of quantitative increasing of words, built according to comparatively new patterns or new ways of word-building is taking place in Modern English.

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ТИПОЛОГІЧНІ ОСОБЛИВОСТІ СЛОВОТВОРУ В ТЕРМІНОСИСТЕМІ ОБЧИСЛЮВАЛЬНОЇ ТЕХНІКИ, ІНТЕРНЕТУ ТА ПРОГРАМУВАННЯ ПЕРШОГО ДЕСЯТИЛІТТЯ XXI СТОЛІТТЯ

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Досліджено засоби словотвору, найпритаманніші терміносистемі галузі обчислювальної техніки, Інтернету і програмування першого десятиліття XXI століття, та проаналізовано їхню специфіку.

Ключові слова: словотвір, обчислювальна техніка, Інтернет, програмування, XXI століття.

ТИПОЛОГИЧЕСКИЕ ОСОБЕННОСТИ СЛОВООБРАЗОВАНИЯ В ТЕРМИНОСИСТЕМЕ ВЫЧИСЛИТЕЛЬНОЙ ТЕХНИКИ, ИНТЕРНЕТА И ПРОГРАММИРОВАНИЯ ПЕРВОГО ДЕСЯТИЛЕТИЯ XXI СТОЛЕТИЯ

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Исследованы средства словообразования, наиболее свойственные терминосистеме отрасли вычислительной техники, Интернета и программирования первого десятилетия XXI столетия, а также проанализирована их специфика.

Ключевые слова: словообразование, вычислительная техника, Интернет, программирование, XXI столетие.

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