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COMPARATIVE ANALYSIS OF THE SEMANTIC STRUCTURE OF THE HIGH-FREQUENCY WORD UNIT (ON THE MATERIAL OF SCIENTIFIC AND TECHNICAL DISCOURSE FIELD "AUTOMATION OF HEAT AND POWER PROCESSES")

Summary. The comparative analysis results of the word unit semantic structure, which is one of the most frequent words in the texts of the technical discourse field "Automation of heat and power processes", is presented in the article. The semantic structure elements are compared at the levels of both language and speech, i.e. the definitions fixed in the Webster's normative dictionary, and lexical-semantic variants functioning in the text corpus.

Key words: contextual analysis, dictionary definition, frequency of usage, subject field, word token.

Problem statement. The content of standard/nonstandard dictionaries and their continuous alteration is one of the main problems of lexicography which is directly connected with the study of semantic structure of a word ant its realization in speech including writing, i.e. in text corpora. Thus, using text corpus linguists can describe functioning of separate language phenomena as well as develop fruitful cooperation between the two main trends of modern linguistics: corpus (lexicographical) and theoretical (applied) since the latter gives the results of the practical analysis which are necessary for formation and development of lexicographical resources. First of all, it concerns such an aspect, common both for lexicography and theoretical (applied) linguistics, as semantic characteristics of text units, i.e. realization in speech (text) of the semantic structure of the words given in dictionaries.

Proceeding from all mentioned above, the research of semantic word structures carried out on the basis of real text corpora is of current importance and timely, and its results can be used in lexicography.

Publication analysis. First of all, it is necessary to mention one of the most complicated in respect of theory issue, it concerns the semantic structure of a word. It is complicated, mainly, because of various and often contradictory interpretations which can be met in the linguistic literature. This issue was discussed by the classics of linguistics A. A. Ufimtseva [1], M. V. Nikitin [2], M. D. Stepanova [3], I. V. Arnold [4] and others who gave quite ambiguous definitions of the semantic word structure. They characterize it en different ways: the system of minimum lexical units (lexical semantic variants); a set of word meanings having a definite scheme of meaningful links; a set of meanings underlying their common and particular aspects; a set of semantic characteristics, etc.

Considering these definitions one cannot but agree with K. S. Gorbachevich and F. P. Sorokoletov [5] who suppose that developing the exact methods in semasiology and lexicography, i.e. formation of "measuring tools" of lexical-semantic word meaning, has not started yet or is on the lowest level, that is why the researchers have to rely mostly on the context.

Nevertheless, the authors believe that I. V. Arnold's point of view is the most acceptable to use in the present research since her definition indicates on the complex system of interconnection and interdependence of lexical semantic variants (LSVs) inside the semantic structure based, on the one hand, on opposition of individual lexical-semantic variants to each other and, on the other hand, gives the description of the semantic word structure as some generalized model based on definite commonness of LSVs including in it if to take into account their connotation [4, 73].

Purpose and tasks of the article. The purpose of the present article is to consider the lexical semantic variants of one of the most frequent terms *unit* which are met in text corpus "Automation of heat and power processes" (AHPP) and compare this list with the nomenclature of definitions given in the normative Webster's Third New International Dictionary [6] and then find concurrent/not concurrent LSVs.

To describe LSVs of the word *unit,* which function in AHPP text corpus, it was necessary to solve the following particular problems:

– to determine the most frequent units of AHPP text corpus, a probabilistic-statistical model (frequency dictionary) of this specialty was formed;

– after stating the fact that the word *unit* is in the list of the most frequent text units, lexical-semantic variants of the word *unit* realized in AHPP texts were considered, for this purpose the method of contextual analysis was used.

– with the view of comparative analysis performance the semantic model of the word *unit,* which includes all LSVs, was taken from the normative Webster's Third New International Dictionary [6].

Description of research results. The text corpus having been the ground of the formed probabilistic-statistical model was com-

piled on the base of the texts of the technical specialty "Automation of heat and power processes" (AHPP) taken from scientific journals of Great Britain and the USA: Power, Power Engineering, Process Engineering. The total volume of AHPP text corpus includes 200 thousand word tokens.

It was determined that the absolute frequency of the word *unit* is 670 word tokens, and this fact makes it possible to put this word into the high frequency zone of the model.

First of all, let us consider the LSV definitions of the word *unit* given in the normative Webster's Third New International Dictionary [6]. The semantic structure of the word *unit* is one of the most complicated and ramified lists of definitions met in normative dictionaries, and it has 18 LSVs in Webster's dictionary. The first definition in the dictionary is an etymologically initial meaning of the noun *unit*:

1) the first natural number; a number that is the least whole number and is expressed by the number 1;

2) a single thing (as a magnitude or number) that constitutes an undivided whole;

3) a number that divides every element of a set of number;

4) a determinate quantity (as a length, time, heat, value or housing) adopted as 5) a standard of measurement for other quantities of the same kind;

6) a fractional part of the width of a printing character (as 1/18 of ordering Roman capital M) used in measuring the set of a piece of type and being of the same width for all types of the same point size and proportionally wider or narrower for larger or smaller point size;

7) an amount of work used in education in calculating student credits;

8) an amount of a biologically active agent to produce a specific result under strictly controlled conditions;

9) one percent per ton of a fertilizing ingredient;

10) a single thing or person or group that is a constituent and isolable member of some inclusive whole; a member of an aggregate that is the least part to have clearly definable separate existence and that normally forms a basic element of organization within the aggregate;

11) one of the commonly more or less repetitive sections combined in assembling a manufactured article;

12) a part of a military establishment that has a prescribed organization;

13) a piece or complex of apparatus serving to perform one particular function;

14) a combination of two or more securities offered at a single price;

15) a course or part of a course in an elementary or secondary school focusing on a central theme and making use of resources from numerous subject area and the pupils own experience;

16) bargaining unit;

17) a fraction of an annual pension or a retirement income benefit earned as a result of each years service prior to retirement;

18) a subdivision of girl scout camp comprised of girls counselors who live together and plan their own activities in a manner comparable to a girl Scout troop;

19) a molecule or portion of a molecule esp. as combined in a larger molecule.

As it was stated in the task list, after the semantic structure of the word *unit* functioning at the level of the language system, lexical-semantic variants of the word *unit* fixed in the text corpus ATP were analyzed, i.e. at the speech level. The lexical-semantic variants were arranged in the order of decreasing the frequency of usage in the texts. The demonstration of the lexical-semantic variants will be accompanied by appropriate examples.

1. Installation, device, boiler

If you have grown tired of climbing-up ladders or stairs to check on the operator of the in-duct flow switches that monitor operation of a cooling ***unit****, here's an easy way to estimate the flow switches entirely.*

2. Use in the meaning of "device" as a substitute word, when it is necessary to avoid repetition of the term calling this device (turbine, simulator, boiler, etc.)

Once the fixed-temperature element has been alarmed, this detector ***unit*** *must be replaced.*

3. Block, node, aggregate

Regular modification has kept the ***unit*** *essentially identical to the actual control room equipment.*

4. A computer

The two new ***units*** *currently being installed at IVA's training center will use four processors in order to ensure sufficient computational capacity for the future*

5. Generator

Gas-turbine vibration signatures particularly those from ***units*** *with two or more independent rotors contain a large number of spectral components, spinning a wide frequency range.*

6. Complex, system

Each computer's control system ***units*** *(CSU) includes an arithmetic unit analog and digital scanners a programmer-maintenance panel, power supplies, the interface with the digital and analog cabinets and peripheral equipment and a 32.000-word core memory.*

7. Unit of measurement

With a low-cost modification to the basic recorder they provide printed values that can be read directly in engineering ***units*** *(tons per hour, degrees Celsius, gallons per minute, kVa, etc.).*

8. Machine

A database manager to examine operating variables for safe levies, initial alarms, and convert to engineering ***units****.*

9. Paragraph, point

Commercial ***units*** *selling at a price comparable to relatively fast stylus-type recorders have the ability to store several thousand bits of data and can play it back in a flicker free CRJ display in the event of an out-of-limits signal.*

Analysis of the definitions of the word *unit* taken from the Webster's normative dictionary, and their comparison with the data of the contextual analysis conducted on the ATP texts, make it possible to distinguish the lexical-semantic variants of the word *unit*, common/uncommon for both semantic structures. Comparing these two semantic structures of *unit*, we can say that dictionary definition (1) of the Webster's dictionary, which as already noted represents etymologically original meaning of the word *unit* – the first natural number; the number that is the smallest integer number and is expressed by the number 1 – is not supported by the context of the ATP text corpus.

Definition (2) of the Webster's dictionary – the value or number representing an indivisible whole – largely coincides with definition (1) and can be considered as a variant-meaning of the invariant "a single undivided whole", combining meanings (1) and (2). Using the logical operation of generalizing the concept, it is possible to define the relation between the invariant "a single undivided whole" and its variants-meanings (1) and (2) as relations of the general and the particular. This allows us to conclude about synsemantic

character of the given LSV functioning in the ATP texts. For example, *To be able to represent more than two conditions with binary logic, several bits can be linked in such a way as to provide a more usable logic* ***unit*** *called a word.*

The analysis shows that the meanings of the word *unit* described by dictionary definitions (3), (5), (6), (7) and (8) of the Webster's dictionary, behave according to the regularity of lexical compatibility, which is uncharacteristic for the technical field ATP. Therefore, they are not fixed in the texts of this subject area.

Definition (4) of the Webster's dictionary – "a determinate quantity (as a length, time, heat, value or housing) adopted as a standard of measurement for other quantities of the same kind taken as a unit of measurement for another quantity of the same type" – largely coincides with the meaning of dictionary definition (1). However, the observed differences both in the content and in the form give the grounds to consider them the independent LSVs that are a part of the semantic structure of the word *unit*. The rather that the dictionary definition of the Webster's dictionary is completely appropriate to LSV7 of the semantic structure of *unit* in the texts ATP, as demonstrated in the context, e.g. *For example, the user may choose to print the output cycle parameters in either English or metric* ***units***.

Significant interest in terms of using in the texts of the technical field ATP is represented by correlation of the following definitions of the Webster's dictionary: (9) – a single thing or person or group that is a constituent and isolable member of some inclusive whole; a member of an aggregate that is the least part to have clearly definable separate existence and that normally forms a basic element of organization within the aggregate; (10) – one of the commonly more or less repetitive sections combined in assembling a manufactured article; and (12) – a part or complex of apparatuses designed to perform a separate function. Thus, dictionary function (12) could be considered as an invariant combining meanings (9), (10) and (12) as a variant. Meanings (9) and (10) in this case can be considered as special cases of more general meaning denoted by LSV (9), which is therefore synsemantic.

However, industry dictionaries consider these variants-meanings as different LSVs, which is also confirmed by the context of the studied text corpus ATP, and we can also consider them as different LSVs. So, 1) dictionary definition (9) of the Webster's dictionary coincides in meaning with LSV1 of the semantic structure of the word *unit* of the ATP specialty; 2) dictionary definition (10) of the Webster's dictionary, in its turn, is correlated with LSV2, LSB4, LSB5 and LSB8 of the semantic structure of *unit* in the ATP corup; 3) dictionary definition (12) of the Webster's dictionary correlates with LSV9, LSB10 and LSB11 of the semantic structure of *unit* of the ATP corup. For example:

1) *Some computer downtime has been necessary during software updates and modifications, but none of this downtime has resulted in a boiler-control problem or has affected availability of the* ***unit*** *(*LSV1 of the corpus ATP*).*

2) *The central* ***unit*** *contains adequate hardware and software to process the engine data it collects, performs multiple fault analysis, and issues reports on such things as engine condition, efficiency loss, heat rate, or expected time to failure* (LSV2 of the corpus ATP).

3) *Designed to meet the zero-discharge commitment, this system includes a 156-gpm vapor-compression brine concentrator and a 1200-gpm reverse-osmosis* ***unit****, providing 95% overall recovery of water* (LSV10 of the corpus ATP).

In principle, dictionary definitions (9), (10) and (12) of Webster's are so close that they could be combined in a single one, however, as already mentioned, for technical texts, detailing of the semantic structure of a word is often determined by the need of using the additional semantic tints for more accurate understanding of the context. Therefore, although LSV1, LSV2, LSV4, LSV5, LSV8, LSV10, LSV11 in the ATP texts largely coincide, they can be used separately, which is confirmed by this data of implementation of these LSVs in speech (texts).

The regularity of lexical compatibility of the meanings expressed by dictionary definitions (11), (13), (14), (15), (16), (17) and (18) of the word *unit* are not characteristic for the specialty ATP.

Conclusions and prospects for the further research. The analysis of the LSVs of the semantic structure of the word *unit* in the Webster's normative dictionary with the using of the lexical transformation method and verifying the implementation of this semantic structure by means of the contextual analysis carried out on the material of the ATP text corpus allows to come to the following conclusions.

1. The significant reduction of the semantic structure of the word *unit* in the ATP texts is not observed. In the analyzed corpus up to nine lexical-semantic variants of the word *unit* are registered.

2. Of the eighteen LSBs that make up the semantic structure of the word *unit* fixed in the Webster's normative dictionary only four LSVs are realized in the texts of the specialty ATP:

UNIT (4) – a determinate quantity adopted as a standard of measurement for other quantities of the same kind – unit of measurement;

UNIT (9) – a single thing or group that is a constituent an isolable member of some more inclusive whole – aggregate, device;

UNIT (10) – one of the commonly more or less repetitive sections combined in assembling a manufactures article – node, block;

UNIT (12) – a piece or complex of apparatus serving to perform one particular function (a part or apparatus designed to perform a single function).

1. The remaining LSBs that make up the semantic structure of the word *unit* in the technical discourse field ATP represent new semantic tones potentially embedded in the semantic structure of this word in the common language and not reflected in the dictionary entry in Webster's. E.g. in the technical field ATP texts such meanings as: a computer; the use of *unit* as a word-substitute, when it is necessary to avoid repeating of the term that denotes a device; complex, system (usually in plural form); a car; item, point.

2. The hierarchies of LSVs in the semantic structure in the Webster's dictionary and in the texts ATP do not coincide.

A further study will be devoted to the analysis of semantic structures on the linguistic and speech levels of other most frequent text units functioning in the text corpus that are referred to the areas of scientific and technical discourse.

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Почтарук Г. Я., Зайцева О. Ю., Моіссєва О. О., Сиротенко Т. В. Порівняльний аналіз семантичної структури високочастотного слова unit (на матеріалі текстів області науково-технічного дискурсу «Автоматизація теплоенергетичних процесів»)

Анотація. У статті представлені результати порівняльного аналізу семантичної структури слова unit, яке є одним з найбільш частотних одиниць у текстах області технічного дискурсу «Автоматизація теплоенергетичних процесів». Елементи семантичних структур порівнюються на рівні мови і мовлення – дефініції, зафіксовані у нормативному словнику Webster's, і лексико-семантичні варіанти, що функціонують у текстовому корпусі.

Ключові слова: контекстуальний аналіз, предметна область, словникова дефініція, слововживання, частотність вживання.

Почтарук Г. Я., Зайцева О. Ю., Моисеева Е. А., Сиротенко Т. В. Сравнительный анализ семантической структуры высокочастотного слова unit (на материале текстов области научно-технического дискурса «Автоматизация теплоэнергетических процессов»)

Аннотация. В статье представлены результаты сравнительного анализа семантической структуры слова unit, которое является одним из самых частотных единиц в текстах области технического дискурса «Автоматизация теплоэнергетических процессов». Элементы семантических структур сравниваются на уровне языка и речи – дефиниции, зафиксированные в нормативном словаре Webster's, и лексико-семантические варианты, функционирующие в текстовом корпусе.

Ключевые слова: контекстуальный анализ, предметная область, словарная дефиниция, словоупотребление, частотность употребления.