## TO THE PROBLEM OF SCIENTIFIC TEXT INTEGRITY

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This paper focuses on some aspects of scientific text organization that adequately account for its integrity. It is based on the view of a text as a complex system including at least semantic and pragmatic subsystems. Cohesion text-forming role, its functioning, actualization, formal-logical and semantic means are examined. Scientific text integrity may serve an impetus to reconsider the language instruction paradigm and a textoriented approach to language teaching will eventually inculcate a standard of perfectly comprehensible and easily readable scientific paper composition.

Keywords: scientific text, integrity, cohesion, author's intention, addressee, semantic, pragmatic.

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## Introduction

There exists a striking unanimity in identifying the dominant tendency of the present time. Rapid development of IT, computers upgrading and the emergence of new gadgets that have realized the concept of "here and now", new means of virtual communication, and, last but not least, social networks have contributed to the boundless communication space.

The abundance of visual information seems to be pushing out the written text. Electronic media will undoubtedly continue to replace print media. However, the basics of good grammar, concise writing and clear communication will no doubt stand the test of time (Day, Sakaduski 2011).

Human language is, of course, uniquely human. Besides, more than anything else, grammar is what makes us human. Therefore, we can say that "man is not merely *Homo sapiens and Homo loquens*, he is *Homo grammaticus*, above all" (Volkova 2010: 5).

Academic research literature on text linguistics contains rather different opinions regarding the definition of text. However, the majority of scientists agree in identifying the main text features and characteristics, the dominant ones being coherence and cohesion (Валгина 2004; Гальперин 2007; Колшанский 2007; Кубрякова 2001; Лайонз 2003; Левицкий 2009; Папина 2002; Реферовская 2007).

Though cohesion as a text-forming category is part of text linguistics which as a separate linguistic field of research has its more than thirtyfive-year history, it is still underexplored and calls for more in-depth consideration (which, of course, is not intended to imply that no work has been done in this area).

The **object** of the present article is the scientific text cohesion, as it is essential not only for improving text comprehension and composition but also for the purposes of teaching English for specific purposes (ESP).

The **aim** is to modify the linguistic means of scientific text cohesion and examine its textforming role, as "text-linguistic features have not been the concern of traditional language teaching in schools" (Kaplan 2009: 2). Hence, it is instrumental for any ESP/EST learner to acquire, master and have control of some basic standard of scientific text formation to become genuinely independent and free in text comprehension and creation.

The **methods** used include contextual, descriptive-analytical and conceptual detachment of sense bearing passages.

The **study material** was taken from the Journal of Software Engineering Research and Development (2010, 2011) selected articles.

The text is best regarded as a semantic unit: a unit not of form but of meaning (Halliday1989: 2). It also should be noted that text strategies govern the creation of individual syntactic sentences (Enkvist 1997: 199). The principles of scientific text derive from its purposes, the basic ones being to educate, to inform, to record and to persuade (Day, Sakaduski 2011: 18).

The concept of cohesion is primarily a semantic one; it "refers to the relations of meaning that exist in the text and that define it as a text" (Connor 2002: 80). It also embraces intra-text connections that favor the logical sequence and text components interdependence.

Considering cohesion as a text-forming category, it is essential to focus on various connections and relations that constitute the basis of this process. As is known, it is the logic that studies the relations and they are interpreted as one of the forms of universal interrelationship of all objects, phenomena and processes in nature, society and cognition. The relations of objects are diverse, these are: cause-consequence, part-whole, interrelations between the parts of the whole, etc.

Being applied to the text this principle means that all the text constituents are interrelated in multiple ways.

It is essential to differentiate between content-factual, content-conceptual and content-subtext types of information to better comprehend characteristic features of various text types. The third type of information, i.e. content-conceptual is irrelevant to the scientific text. (Гальперин 2007: 26). Scientific text being a unity of structuralsematic fragments, it is possible to assume that cohesion is the basis of both semantic and compositional unity.

Thus, semantics of different units is closely correlated to fully present the bulk of information.

The dominant rule is the logical transition of thought from the known to the unknown, from the given to the new. The information rendered is being gradually accumulated and the author's concept in the form of conclusion inevitably bringing about information facts segmentation. Text composition cohesion manifests itself in simultaneous segmentation and connection of semantic fragments within the text framework. It is also aimed at focusing the reader's attention on theme development stages that correspond to the main steps of scientific research presented in the order of narrative fragments.

## Linguistic and communicativepragmatic means of cohesion

The choice of proper linguistic means of cohesion that ensure communication are determined by extra-linguistic reasons, that are here treated as communicative-pragmatic ones. They comprise author's intention, text pragmatic orientation and presupposition. Linguistic means could be divided into several groups: lexical means, syntactic-grammatical means, symbolic-graphical means, and logical- semantic means. Communicative-pragmatic factors are the determining ones in text production; they dictate the choice of definite linguistic means, transforming a scientific report into an integrated unity. In scientific text components of cohesion complex vary depending on the field of science reference of the text. For example, symbolic-graphical means, that visually back up and arrange the text information are more pertinent to exact and natural sciences.

Author's communicative intention is kind of first impulse in the choice of linguistic means of scientific information rendering. Author's intention is the succession of solving separate communication tasks that in the long run stipulates the communication act finalization, i.e. the creation of a scientific article. This text structure consistently meets the recipient's communicative competence.

The author's intention is revealed in the choice of a certain objective situation as a scientific article denotation, in attributing a spacetime perspective to the text with simultaneous visualization of the totality of the relationship between text fragments; in evaluating the information rendered.

Pragmatic orientation of the scientific text has a functional substantiation: the major relational communication concept is that of the author and the recipient, mediated by the scientific research subject. Hence, the use of functional, i.e. linguistic means governed by the criterion of communication success and effectiveness is an important step of text cohesion. The pragmatic text cohesion is primarily reflected in relatively accurate scientific article text segmentation and its visual graphic design. Condensation of text information is realized through the introduction of nomenclature and symbolic data, thus the text is fully information-packed at minimal text expense.

Presupposition is also a text-forming factor, pertaining to cohesion. Presupposition may be viewed as a set of conditions affecting the use of a certain statement and predetermining its success. It is based on the linguistic competence of speech act participants, their common thesaurus and social experience, making up a considerable part of scientific communication background knowledge. Presupposition plays perhaps the dominant role in a scientific text as an adequate understanding of the rendered scientific information is impossible without special knowledge. Occupation of both an author and a recipient provides them with some set of linguistic means to be freely used: terms, abbreviations, acknowledged scientists' family names, etc. Texts employing such means are intuitively identified with certain non-linguistic situations. For example, while describing the experiment both an author and a recipient assume a standard procedure of conducting it. Background knowledge matching facilitates mutual understanding of communication participants, while mismatching has to be taken into account by an author and adequate explanation should be provided.

Scientific text presupposition may be textual and general scientific one.Textual presupposition is not part of recipient's semiotic background, it is created within the framework of a definite text (being accumulated along with the amount of information), thus forming the basis for future inferences and conclusions. It is generally realized in text pragmatic orientation which manifests itself in some descriptiverepresentational devices, such as new terms listing, reference to the literature sources with more in-depth discussion of a scientific problem and symbolic-graphic means usage.

As opposed to textual, general scientific presupposition is part of recipient's background knowledge and assists in eliminating a possible polysemy of linguistic means that are used while describing various stages of scientific research. General scientific presupposition is aimed at recipient's social orientation.

The following linguistic means play an important part in the mechanism of scientific text cohesion formation: articles, conjunctive adverbs, adverbs, parenthesis, deictic units, prepositions and verbs that are predominantly used in scientific style. They are instrumental in anticipating the idea and retaining the information in the reader's short term memory. Linguistic means may be subdivided into the following constituents groups: prospective, deictic, adversative, referential and summarizing.

The prospective constituents function is to match and coordinate text fragments simultaneously focusing the recipient on the follow-up information. They comprise numerous parenthetical words and comment clauses (*first*, *first of all, as a starting point, etc.*), adverbs and conjunctive adverbs (*then, further, soon, accordingly, etc.*), prepositions (*before, below, throughout, etc.*) verbs and phrasal verbs, of space-time orientation semantically directed into the future (*begin, start, continue, proceed, go on, etc.*).

Prospective constituents assist the recipient to visualize the succeeding scientific description in full, preparing to comprehend the scientific information facts. Such constituents unite different text fragments into an integrated whole.

The function of the deictic constituents, as their name implies, is to point out various features of the scientific research object in the course of a thorough description of a sub-theme.

This group includes demonstrative pronouns (*this*, *that*, *both*, *etc.*), adjectives (*such*, *each*, *other*, *etc.*), some parenthetical words and comment clauses (*in fact*, *in particular*, *for example*, *etc.*), adverbs (*only*, *fortunately*, *similarly*, *etc.*), verbs with acquiring or rendering knowledge meaning (*demonstrate*, *exemplify*, *etc.*).

Adversative cohesion constituents are presented mainly by a number of conjunctions and adverbs (*but, since, however, conversely, etc.*) and also by a set phrase "in contrast to". Their function is to compare separate information facts, introduce and substantiate a scientific assumption through adding the argument that contradicts or places constraints on the value of such an opinion. Too often the adversative cohesion constituents pre-echoe the author's main concept which later becomes the theme of a scientific article.

Referential cohesion constituents perform a retrospective function of referring to the proceeding meaningful-factual information. These constituents comprise some adverbs (*previously*, *recently*, *already*, *again*, *above*, *throughout*, *etc.*) and verbs of retrospective meaning (*return*, *refer*, *go back*, *etc.*).

Summarizing cohesion constituents are presented by parenthesis and adverbs (*thus, so, finally, etc.*) and verbs with generalizing meaning (*result, conclude, sum up, etc.*). Their function is to summarize meaningful-factual information leading it up to meaningful-conceptual one either in a separate text fragment or in the whole text.

Some syntactic-grammatical means make for the scientific text cohesion. These are integrated tense system, syntactic parallelism, inversion and interrogative sentences. The scientific text integrated tense system performs several functions at a time, harmonizing the text continuum, uniting separate notional text passages into a coherent whole, partitioning the text into notional passages.

Complex relations between tense forms and extra linguistic reality of reported scientific research facts specify the scientific text. Tense system expresses the logic relation of time sequence, precedence and synchronism. In English scientific text syntactic parallelism generally embraces a text passage, a number of paragraphs. To create a comprehensible and logical narration the author commonly resorts to similar type and structure paragraphs, hence different sub-themes acquire almost identic forms of representation. Syntactic structures parallelism, being typical of scientific text, performs the functions of recitation of a number of equipollent author's logical judgments, development and refinement of his ideas in the course of scientific evidence and also creation of the text's rhythmical organization.

The main purpose of sentences with inversion is to attract the recipient's attention to the scientific information fact, thus singling it out from the row of sentences. By means of such attention trigger the scientific narrative monotony is being eliminated which in the long run stipulates the comparison of notional text passages and grading the factual information according to its significance.

Interrogative sentence, one of syntacticgrammatical means of cohesion, has definite semantic relations with the text that follows. Alongside sentences with inversion, it is the main recipient's attention trigger requiring an answer to the information in question, thus opening up the perspective for further information facts narrative and binding them into one and undivided text. Interrogative sentences frequently are the notional center either of a substantial text passage or of the whole text.

Symbols and graphics, the means of scientific text external organization, are also pragmatically conditioned notional components of a scientific text. Symbolic and graphic organization of the text comprise: tables, graphs, diagrams, drawings, photographs, symbols, nomenclature data, different font, discharge. All the above means perform a single pragmatic function of facilitating the recipient's adequate comprehension of scientific information by ultimate condensation of linguistic expression.

As is known, all scientific text organization and its composition is subordinated to the problem of scientific information furnishing based on the principle of optimal amount of information in each text passage. Hence, invariant model presupposes the following text composition division: title, abstract, introduction, main part and conclusion. Their functional task is to describe a definite aspect. a certain stage of scientific research .Both the title and annotation present a thematic core of the text which is the information center of the consistent line of reasoning about the object of scientific description. It is being consistently developed in the introduction and the main part by bringing in and interpreting different sub-themes of scientific research. Summing up of the conducted research results with emphasis on content-conceptual information is made in conclusion. Stages of text development from thematic core are necessary for rendering content-conceptual information in its logic succession from unknown to known, from simple to complex. These compositional parts realize the author's communicative intention and have close linear hierarchical semantic relationship. Cohesion realizes the coordination of these relationships between the compositional parts.

Segmentability is known to be a universal text feature and the most important prerequisite of efficient communication. I. Galperin (Гальперин 2007) considers segmentability as one of text-forming regularities that is closely related to pragmatics, i.e. its definite readerorientation.

Pragmatically oriented media, for example, set word combinations, considerably add to adequate transfer and perception of information. In different pragmatically oriented scientific text fragments (introduction, main part, containing description, reasoning, dispute elements, developing a hypothesis, refutation and conclusion) such word combinations may be markers of the change in pragmatic orientation of a text fragment, e.g. to sum up a point, the basic idea, to present an explanation, in conclusion, etc. as well as markers of the ensuing subject development, e.g. to take up a discussion, to make a remark, a guiding principle, to apply a method. These word combinations both focus the reader's attention on the offered object of research and facilitate the logical content development.

#### Conclusions

Hence it is possible to infer:

- The main function of text cohesion is to provide a connection between the text elements, introducing a hierarchy of its constituent parts, depending on the author's intentions, which ultimately leads to the integration of a text. Merging the notions of different larger-than-sentence unities, parts of the work content, semantic cohesion neutralizes these relatively semantically independent larger-than-sentence unities and subjects them to the summit theme that pervades the text.
- 2. Cohesion actualization is inextricably linked to its participation in the communication process, i.e. transmission of certain information from the addresser to the addressee. Thus, the text may be defined as a message consisting of a series of expressions united by different types of lexical, grammatical and logical relationships within the communicative intention sender - addressee.
- 3. The integration of text passages largely depend on lexical, grammatical and logic cohesion means.
- Examined cohesion mechanisms focus the reader on the subject development stages within a given text.
- Both formal-logical and semantic cohesion reflect the basic principles of structural and semantic text organization.

6. Basic means of cohesion realization in the text are lexical, syntactic, graphic and logical-semantic ones depending on the author's intentions.

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# MOKSLINIO TEKSTO VIENTISUMO PROBLEMOS APŽVALGA

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Straipsnis skirtas įvairių mokslinio teksto pragmatinių-semantinių ypatybių analizei. Aptariamas tekstą formuojančios kohezijos vaidmuo ir nagrinėjami kohezijos mechanizmai, kurių tikslas – bendros tematinės linijos plėtojimas, siekiant sukoncentruoti skaitytojo dėmesį teksto rėmuose. Išskiriamos pagrindinės kohezijos išraiškos priemonės, t. y. leksikos, sintaksės ir loginės-semantinės priemonės, kurios yra vartojamos tekste priklausomai nuo autoriaus ketinimų. Kohezijos realizavimo priemonių įvairovė gali tapti ir anglų kalbos dėstymo pagrindu, padedant suvokti tekstą kaip visumą ir optimizuojant studentų rašomosios kalbos mokymosi įgūdžiams ugdyti, pavyzdžiui, rašant mokslinį tekstą.

Reikšminiai žodžiai: mokslinis tekstas, teksto visuma, kohezija, adresatas, semantika, pragmatika.

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