

19th PCSF 2019
Professional Culture of the Specialist of the Future
COGNITION IN MODERN EDUCATION
(ON THE MATERIAL OF CHEMICAL TERMINOLOGY)

M. A. Odinkaya (a), O. A. Sheredkina (b)*
*Corresponding author

(a) Peter the Great St. Petersburg Polytechnic University (SPbPU), Polytechnicheskaya, 29, Saint-Petersburg, 195251, Russia, World.Maria@hotmail.com

(b) Peter the Great St. Petersburg Polytechnic University (SPbPU), Polytechnicheskaya, 29, Saint-Petersburg, 195251, Russia, oksanasher@yandex.ru

Abstract

The article is based on cognitive-communicative approach as the most relevant approach for the preparation of a modern graduate that is used in teaching foreign languages. It realizes the significantly deeper understanding of lexical phenomena and the conscious choice of vocabulary. The article is focused on the method of forming lexical competence in the cognitive aspect among students of technical universities. An attempt was made to explore language as a means of learning, cognition, mental activity, that is, the activity of human consciousness. The concept of “cognitive-communicative approach to learning a foreign language” is revealed. Within the cognitive aspect the term anthropological map of lexical units is introduced as the main element of vocabulary studying. In terms of anthropolinguistic aspect the lexical unit is regarded as a semantic product of the subjective nature the understanding of which simplifies the process of vocabulary learning and mastering a foreign language. The cognitive approach based on anthropolinguistic method implies the involvement of students in educational activities and transferable skills formation as a basic ability formed in the context of the implementation of Federal state educational standard of higher education 3 ++. The expediency of using anthropological maps of lexical units in modern education is stated in the conclusion of the article.

© 2019 Published by Future Academy www.FutureAcademy.org.UK

Keywords: Cognitive-communicative approach, sociocultural approach, foreign language, anthropological method.



1. Introduction

In recent decades the development of the theory and methodology of professional education was connected with the communicative approach in conjunction with the cognitive approach. The cognitive-communicative approach in studying the vocabulary of the English-language towards students appears as necessity of the advance and fluent communication. Cognitive-communicative approach organically combines the features of the communicative one based largely on intuition and cognitive, that is focused on the acquisition of knowledge, approaches to learning a foreign language, as well as the study of language as a means of learning, cognition, mental activity, that is, the activity of human consciousness. The cognitive orientation of students is to develop a lot of skills in making associations in thematic. Not to lose the communicative ground, students need to accumulate that volume of vocabulary, which will help them in professional communication (Dutova, 2018). The resulting cognitive-communicative approach is the most relevant approach for the preparation of a modern graduate.

Teaching and learning vocabulary is important because it supports grammar, directs the conceptual system and it is an essential vehicle in the communicative and cultural processes; therefore, high school requires rethinking, from didactics, the lexicon as the backbone in production processes: comprehension, analysis and construction. This paper presents a didactics of lexicon from the lexicon understanding-analysis-construction Axis, based on research-derived from the lexicalist boom, the reception theory and the cognitive-communicative and sociocultural approach.

This work is aimed at developing activities for the treatment of spelling, supporting the evolution, tendencies and methodology of the teaching of spelling, as well as the fundamental elements concerning the cognitive-communicative and sociocultural approach, taking into account the characterization of the teaching-learning process of High School students.

Cognitive-communicative and sociocultural approach is proposed in response to this aspiration by revealing the link between cognitive and communicative processes and their dependence on the sociocultural context in which these processes take place.

The cognitive-communicative approach to learning is a theoretical justification of communicative methods of teaching foreign languages, that is, the solution of methodological issues such as selection, organization, sequence of a learning language and speech material and methods of its presentation and training taking into account the communicative needs of students. On the other hand, from the cognitive point of view, it provides a conscious assimilation of knowledge and information of the language, country studies, satisfying and developing the cognitive needs of the student, mastering the foreign language.

The high school training is educational in nature and reflects in general features of the real process of cognition, which constitutes the form of student's activities. The results of knowledge are embodied in the knowledge that is acquired by students and recorded in verbal form. Each word of a foreign language contains the elements of knowledge in its structure. Language and its units, in particular, lexical units, become a reliable means of acquired knowledge fixation (Odinokaya, Panysheva, & Bondarevskaya 2018).

2. Problem Statement

The dominating problem of cognitive psychology is the one connected with organization and structuring of knowledge in the memory (consciousness) of the subject, including the correlation of verbal and figurative components in the processes of mnemonic and mental activities (Odinokaya, Petrov, & Zibrov, 2018). The data of cognitive psychology, cognitive linguistics and cognitive didactics are all used in foreign and domestic methods of teaching foreign languages. The development of communicative competence is the general objective of the teaching of the Mother Tongue. It is fundamental for this, to achieve the understanding of oral and written texts. However, there are shortcomings in the treatment of conscious activities, as well as poor development of strategies with a cognitive-communicative and sociocultural approach that allow the achievement of this purpose.

In the national linguodidactics the problems of cognitive-communicative approach to learning of different activities of foreign languages were discussed in several theses, monographs, scientific articles and research papers of such domestic researches as Kolesnikov and Tareva (2018), Shamov (2004), Shutenko, Shutenko, Sitarov, and Romaniuk (2017), Tarabaeva, Alefirenko, and Chumak-Zhun (2017), Tatarinova, Kuklina, Cheremisina, and Shamova (2017), etc., and foreign researches such as Banteurt and Arturo (2017), Diaz (2017), Fabre, Pastrana de la Paz, Rodriguez, Fragela, and Manchon Barrabi (2018), Hadri (2015), Quintana Herrera (2015), Portal-Camellon, Fragoso-Avila, and Ramos-Negrin (2016), Proenza, Carralero, Dominguez, and Escalona (2016), Tekesbaikyzy (2017), Vasconcellos, Espindola, and Gysel (2017), etc. There are many investigations carried out in this regard, but there are still difficulties that have not been solved. Realizing that the cognitive approach extends to broader and deeper aspects of cognition, we believe, however, that, according to the logics of our study, we need to emphasize the relationship of the cognitive component of the approach we have chosen, mainly with the study of vocabulary.

3. Research Questions

The traditional work on the lexical aspect of the speech does not give the positive results, which are determined by the requirements of the FSES (Shamov, 2004). A serious drawback in teaching vocabulary should be considered, as well as the inability of students to predict the lexical material in the construction of their own statements or its perception in the speech of others. As a result, the speech characteristics of the statements of weak students who are not able to saturate the statement with lexical units on a given topic are lost. The provision on the need to identify the cognitive structures of the studied language phenomenon and the organization of speech training activities on the basis of these structures is essential.

4. Purpose of the Study

In accordance with the principles of content building of training in the framework of the communicative approach the learning process is not limited to the traditional memorization of lexical units, but involves the use of them for the implementation of a communicative task, or a given real

situation. In order to bridge the gap between the educational language and the language of everyday communication, it is necessary to consider its phenomena in the dynamics of their cognitive use.

Considering linguistic phenomena and forms in terms of the cognitive approach the correlation between cognitive structures and linguistic units is established, the structures of knowledge representation are also studied and the role of language in the human cognitive activity in the processes of conceptualization and categorization of human experience is explained. The cognitive approach in learning the vocabulary of a foreign language contributes to the formation of skills in which the language is used correctly in everyday life. In terms of this approach students begin to notice certain constructions, analogues between lexical units and their regularities in practical use.

5. Research Methods

In recent years researchers recognize that the cognitive function of the language is basic and consider communicative and cognitive functions as interrelated, equal and complementary essential characteristics of the language. The researchers note that communication is impossible regardless cognition and is, on the one hand, the ultimate goal of the latter, based on the huge importance that speech communication has for the life and the essence of a person as a member of society.

The cognitive competence is understood as the ability to cognition, i.e. to self-completion of knowledge by students both while studying at university and in professional activities. The additional argument in favor of our choice is also a clear indication of the need of cognitive competence formation in the program on the foreign language for non-linguistic universities (Odinokaya, Petrov, & Zibrov, 2018). The main result of the actualization of the cognitive component in education will be the independent acquisition of the students' new experience in the development of the foreign language, the need for self-education, knowledge of techniques and means of assimilation of educational material.

The cognitive-communicative approach to learning foreign languages refers to a set of techniques, methods of teaching aimed at mastering the language through the optimal use of the features of mental activity by identifying cognitive structures and the organization of intensive purposeful activity with a predominance of communication-significant exercises aimed at recreating lexical phenomena.

The cognitive focus of ongoing research involves the study of vocabulary in the anthropolinguistic aspect. Anthropolinguistic method defines lexical material as the product of human mental activity (Griniov-Grinevich, 2005). The process of perception of the objective reality is mediated by the developing physiological abilities of man. In phylogenesis the human cognition evolves, repeating the ontogenetic model of thinking formation from the general idea about the material world to the scientific level of knowledge. A single vector of development of human thinking involves certain variations of historical and geographical plans. The symbiosis of human cognitive activity and extralinguistic factors are realized in lexicographical articles, which are the basic sources of knowledge about lexical material.

Anthropolinguistic method examines the process of the vocabulary formation in two chronological aspects, as an integrated synchronous-diachronic study allows us to understand the nature of language deeply and comprehensively, considering it in the context of the language modernity and history, thus, realizing modern "tendency to explanation" (Zaliznjak, 2001). The restoration of synchronic language pictures of the world as separate episodes of the process of foreign language formation, in particular, the

English language, does not give an idea of cause-and-effect relations between the semantic meanings of individual lexical units and their groups, respectively.

The implementation of anthropolinguistic research justifies the involvement of students in activities aimed at understanding the semantic content of the studied vocabulary. Students are encouraged to become familiar with anthropolinguistic maps of lexical units (Figure 01) that denote chemical vessels. Anthropolinguistic maps of a lexeme is compiled on the basis of lexicographical data presented in the English explanatory dictionary Oxford English Dictionary. Semantic meanings of lexemes are presented in chronological order and mediated by cognitive processes of derivational character. Each semantic meaning equivalent to a certain concept implements a continuous process of associative transformations from the basic one, that is, the primary meaning to derived or secondary meanings. Anthropolinguistic map is provided with symbols that identify both the directions of semantic transformations and their types.

Reading anthropolinguistic maps involves independent work of students on the explanation of the associative links between the concepts of lexical units. The student builds the general chronological picture of the lexeme, and analyses the process of term formation relevant to the chemical nomenclature.

The subject of the research is ten lexical units included in at least one meaning in the semantic field CHEMICAL VESSELS. As an example, consider the anthropolinguistic map of the lexeme gourd, presented at all stages of the English language formation, and, thus, implementing a complete picture of the evolution of human cognitive activity in phylogenesis. The gourd lexeme consists of six concepts that implement derivational processes in the diachronic aspect. The basis for the formation of intra-lexical associative links is the primary concept that identifies the object as *large fleshy fruit of the trailing or climbing plants, 1303*.

The usage of the fruit as a vessel for liquids arisen in the early stages of human evolution was realised in the semantic meaning fruit, which when dried and hollowed out, is used as a vessel. The inclusion of two differential concepts in one sememe dating from the early fourteenth century states the fact of the simultaneous borrowing of lexemes in two different meanings. Thus, the metonymic transformation of the type *fruit* → *capacity* is defined as the early semantic phenomenon of meaning formation automatically borrowed into the Middle English due to imports of this vegetable from Asia to Europe.

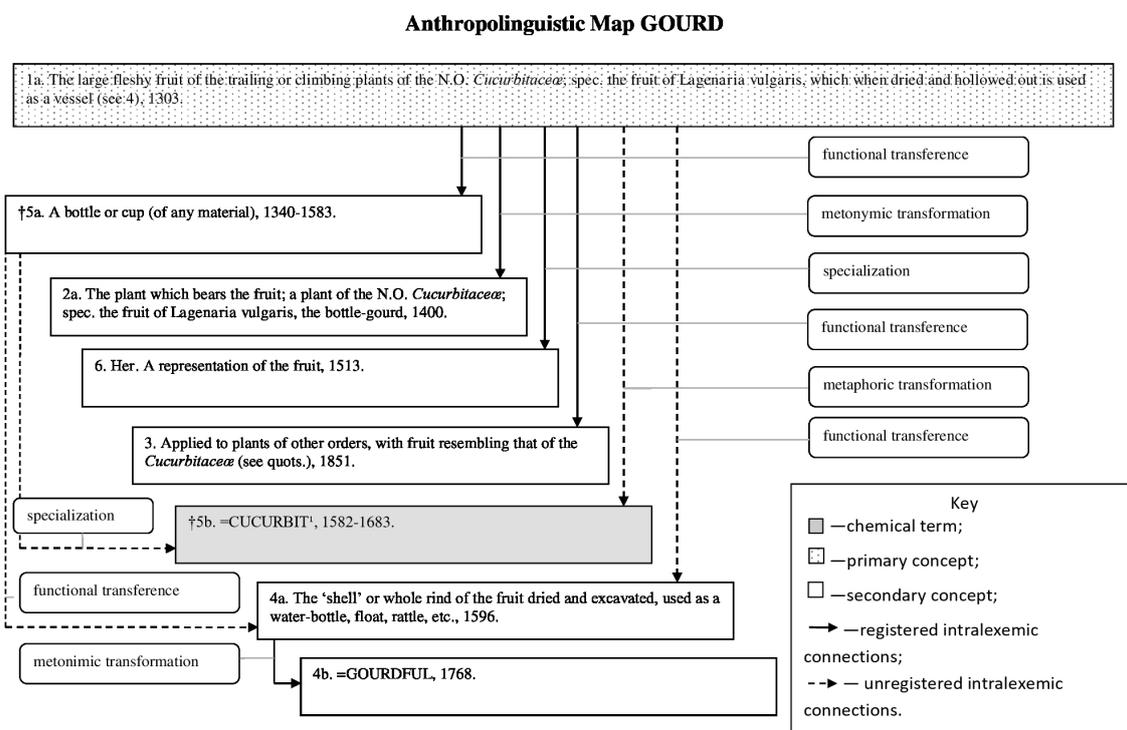


Figure 01. Anthropolinguistic map GOURD

6. Findings

The further expansion of knowledge about this novelty of Middle English people was the basis for metonymic transformation *fruit* → *plant*, implemented consequently in the concept the *plant, which bears the fruit, 1400*. If the primary cognitive model is the association of the whole object with its part, based on the analysis of the existing denotation, then the correlation *part* → *whole* is regarded as the secondary one. It assumes the initial operation of knowledge about the imported fruit only and the complete lack of knowledge about the plant.

The syncretism of gourd 2a, implemented in the polysemanticism of the concept, as *plant of the N. O. Cucurbitaceae; spec. the fruit of Lagenaria vulgaris, the bottle-gourd, 1400* is, on the one hand, a product of the transformation of the borrowed concept into the field of scientific knowledge about plants. That was the result of the acquaintance of the Englishmen with the plant itself. Thus, the concept gourd 2a that identifies the fruit is provided with a differential feature of appearance as the bottle-gourd, in contrast to the feature function relevant to the primary concept. On the other hand, the vagueness of the concept is explained by the protracted process of acquaintance of the British with the new denotation.

The status of "wonder" and, thus, the inability to make gourd the property of the masses, contributed to the fact that the British compared the new denotation with the objects of material reality in the value of *gourd 5a as bottle or cup (of any material), 1340*. The failure of the functional transference,

based on the complete identification of several objects, led to the change of the concept status to archaism by 1583.

By the end of the XVI century in the lexeme gourd the proto-term denoting a chemical vessel has expanded the semantic structure of the word. The formation of the terminological concept was due to the rapid flourishing of alchemy. According to Oxford English Dictionary *gourd 5b*, identified as an absolute synonym of cucurbit, i.e. *vessel or retort, originally gourd-shaped, used in distillation and other chemical (or alchemical) processes, or for keeping liquids etc., in; forming the lower part of an alembic, 1386* is the result of the specialization of the syncretic notion *gourd5a*, that is evidenced by extralinguistic factors.

This concept can also be a product of associative transformation *gourd 1a* or *gourd 2a* → *5b*. The external similarity of the fruit and the chemical vessel may state that the concept *gourd 5b* was formed by means of metaphorical transformation. The special concept *gourd 5b* has undergone the process of archaization following the cucurbit model, which is a natural tendency of transition of accumulated knowledge from alchemy as protoscience to chemistry as a science. The formation of scientific knowledge also contributed to changes in the material support of chemistry. Thus, the secondary reason of *gourd 5b* obsolescence in the Late New English period was the replacement of the new denotation identical to the device such as condenser, 1874.

The process of specialization of the concept is registered in heraldry. The term *gourd 6*, that identifies the element of the arms of the English nobility, came into English in the early sixteenth century as representation of the fruit. The basis for the formation of the concept *gourd 4a* is the functional transference from *gourd 1a*. While maintaining the early functionality the scope of its usage has been extended to 'shell' or whole rind of the fruit dried and excavated, used as a water-bottle, float, rattle, etc., 1596. The functional component of the concept depended on the geography of this denotation prevalence. Despite the great variety of objects designated by the concept *gourd 4a*, the denotation that identifies the vessel for water, which is reflected in the metonymic transformation *vessel* → *measure of liquid* (*gourd 4b*) has entered the English vocabulary.

The primary concept is also the basis for the quantitative increase of denotations determined by the lexeme *gourd*. In the XIX century the technology of hollow vessels manufacturing of pumpkins was moved to similar vegetables that is reflected in the meaning *gourd 3* as applied to plants of other orders, with fruits resembling Cucurbitaceæ.

The data of the anthropolinguistic map *gourd* confirms the general tendency of concept evolution from vague representations of a person about the world to terms. The formation of the chemical proto-term, which is the object of this research within the lexeme *gourd* is based on the borrowing of the syncretic concept, subjected to specification due to a deeper knowledge of the nature of denotation in the Middle English Period. The limited status of denotation contributed to the identification of *gourd* with any vessels for liquids and the obsolescence of the concept. Finally, the proto-term *gourd 5b*, formed by means of metaphoric transformation, or specialization, has become an archaism.

7. Conclusion

The study of educational vocabulary in the anthropolinguistic aspect involves a combination of active cognition, that is, the direct acquisition of knowledge about the object in the course of reading of

anthropological maps, and its passive variety, that is, the evolution of cognition about the objective reality in phylogenesis. The widespread inability of students to predict the lexical material in the construction of their own statements or its perception in the speech of others in the classroom indicates the need for the development of anthropological maps on terminology.

Thus, the reading and interpretation of anthropological maps can be used as an additional means of learning foreign languages, contributing to clarity in the perception and organic assimilation of learning vocabulary by students, showing the educational topic in a bright and interesting perspective, significantly increasing the level of independent mental work of students. It will definitely help to memorize educational vocabulary in the right way and contribute to the effectiveness of foreign language learning.

References

- Banteurt, R., & Arturo, A. (2017). La construcción del discurso para la investigación: una red de actos estratégicos. *Dilemas Contemporáneos: Educación, Política y Valores*, 4(3), 1-16.
- Diaz, M. M. O. (2017). Notes for a didactics of lexicon. *Atenas*, 1(37), 62-76.
- Dutova, L. (2018). Strategies of approaching the English lexicon in technical specialties. In R. Ungureanu & M. Mocanu (Eds.), *Fifth international conference on adult education (CIEA): Education for values -continuity and context* (pp. 461-464), Iasi, Romania: IEEE.
- Fabre, Z. M., Pastrana de la Paz, M. M., Rodriguez, Y. R., Fragela, N. M., & Manchon Barrabi, A. D. L. A. (2018). Textual comprehension and its treatment in Primary Education. *Dilemas Contemporáneos-Educación Política Y Valores*, 3, 3. Retrieved from <https://www.dilemascontemporaneoseducacionpoliticaayvalores.com/en/edicion-2013/year-v-publication-no-3-may-2018/>
- Grin'ov-Grinevich, S. V. (2005). *Osnovy antropologicheskoi lingvistiky: k leksicheskim osnovaniyam razvitiya mysleniya cheloveka. [The basics of anthropologists: the lexical bases of the evolution of human thinking]*. Moscow: Kompaniya Sputnik+ [in Rus.].
- Hadri, A. (2015). Shaping the way to facilitate teaching and learning of English Grammar a cognitive +communicative approach. *Folia linguistica et litteraria*, 12, 85-107.
- Kolesnikov, A. A., & Tareva, E. G. (2018). High school learners' creativity development by means of L12 situational-cooperative writing. *Yazik I kultura - language and culture*, 43, 165-184. <https://doi.org/10.17223/19996195/43/11>
- Odinokaya, M. A., Petrov, M. A., & Zibrov, A. D. (2018). Potential opportunities of information and communication technologies for professional-pedagogical self-realization of students in the process of university training. In L. Cristea, A. Antonietti, Dr. Arch & R. Holman (Eds.), *SGEM International Multidisciplinary Scientific Conference on Social Sciences and Arts*, 5, 3.5 (pp. 629-636), Albena, Bulgaria: STEF92 Technology Ltd. <https://dx.doi.org/10.5593/sgemsocial2018/3.5>
- Odinokaya, M. A., Panysheva, T. Y., & Bondarevskaya, A. V. (2018). The content development of English for special purpose course with the use of multimedia presentations, In L. Cristea, A. Antonietti, Dr. Arch & R. Holman (Eds.) *SGEM International Multidisciplinary Scientific Conference on Social Sciences and Arts*, 5, 3.5 (pp. 835-842), Albena, Bulgaria: STEF92 Technology Ltd. <https://doi.org/10.5593/sgemsocial2018/3.5>
- Portal-Camellon, A., Fragoso-Avila, J. E., & Ramos-Negrin, M. (2016). Teacher preparation approach from the cognitive, communicative and sociocultural language. *Revistaraximhai*, 12(5), 15-25.
- Proenza, L. L., Carralero, A. T., Dominguez, Y. P., & Escalona, A. E. (2016). Activities focused to strengthen the work with spelling in the 7th grade students in "July 26th" Urban Secondary School, Majibacoa, Las Tunas. *Dilemas contemporáneos-educación política y valores*, 3, 10. Retrieved from <https://www.dilemascontemporaneoseducacionpoliticaayvalores.com/en/edicion-2013/year-iii-publication-no-3-may-2016/>
- Quintana Herrera, Y. (2015). Of written texts comprehension on the mental retardation students. *ATENAS*, 4(32), 139-152.

- Shamov, A. N. (2004) *Lingvodidakticheskie osnovy kognitivnogo podhoda v organizacii obuchenija leksike na urokah nem. jaz. [Linguo-didactic bases of cognitive approach in the organization of teaching vocabulary in German lessons]* [Monograph], Nizhny Novgorod, Russia: PEI Linguistics University of Nizhny Novgorod. [in Rus.].
- Shutenko, A., Shutenko, E., Sitarov, V., & Romaniuk, L. (2017). Psychological possibilities and functions of modern information technologies as the means for students' self-realization in university training, *International journal of pharmaceutical research and allied sciences*, 6, 1, 130-144.
- Tarabaeva, V. B., Alefirenko, N. F., & Chumak-Zhun, I. I. (2017). Poetic text in the light of cognitive-discursive research. *Quid-investigacionciencia y tecnologia*, 1, 2762-2766.
- Tatarinova, M. N., Kuklina, S. S., Cheremisinova, R. A., & Shamova, N. V. (2017). Methodical typology emotionally valuable foreign-language text. *Yazyk I kultura-language and culture*, 39, 262-282, <https://doi.org/10.17223/19996195/39/19>
- Tekesbaikyzy, Z. Z. (2017). Modeling of professional foreign language communication (by the example of agrobusiness area). In F Uslu (Ed.), *4th international conference on education and social sciences (INTCESS 2017)* (pp. 518-522). Istanbul: International Organization Center of Academic Research.
- Vasconcellos, M. L., Espindola, E., & Gysel, E. (2017). Interdisciplinarity in translation teaching: competence-based education, translation task-based approach, context-based text typology. *Cadernos de Tradução*, 37(2), 177-207. <https://doi.org/10.5007/2175-7968.2017v37n2p177>
- Zaliznjak, A. A. (2001). Semanticheskaja derivacija v sinhronii i diahronii: proekt «kataloga semanticheskikh perehodov». [Semantic derivation in synchrony and diachrony: the project "catalogue of semantic transitions"], *Questions of linguistics*, 2, 13. [in Rus.].