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**COGNITIVE-COMMUNICATIVE TECHNOLOGY OF  
BILINGUAL EDUCATION AS CONDITION OF FORMATION OF  
ECOLOGICAL COMPETENCE**

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*Abstract*

In the article the stages of realization of the author's technology of the parallel formation of ecological and foreign-language environmentally oriented communicative competencies in the conditions of training in the university are disclosed. At the initial stage, the work is integrated to ensure a holistic presentation of the thematic module material and simultaneous enrichment of the vocabulary in the native language. The theoretical material is presented in the form of an integrated structural scheme. At the second stage, the functional and semantic basis of environmental information is transmitted in a foreign language. Functional use of foreign thematic language on the basis of hierarchically organized cognitive structure ensures its storage in long-term memory. In the third stage, an important condition for the organization of the educational process is to ensure the repeatability of vocabulary with the development of grammatical skills of speaking in English. Within the framework of the ecological theme, the frequency of the semantic types of sentences-utterances that are activated in the speech of students is revealed. At the final stage, based on the analysis of texts on the environmental topic under discussion, a typology of speech situations, typology of dialogues and monologues, which are units of formation of ecological communicative competence, are revealed. Thus, each module assumes a set of types of work on enriching the vocabulary on an environmental theme, an eco-vocabulary grammatical system of speech, developing skills in dialogical and polylogic communication, creating a meaningful, reasoned, logically consistent monological speech on an environmental topic.

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**Keywords:** Cognitive-communicative technology, bilingual education, CCTBE, ecological competence of students, foreign communicative competence of students.



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## **1. Introduction**

Environmental competence and ecologically-oriented activities should become integral parts of the life of each of our contemporaries. A huge achievement of the Kazakhstani school is the approbation of the educational subject "Ecology and Sustainable Development" in the 12th experimental class in 2014, which gave a positive result (Nazarbayeva, Syzdykova, Shaykheslyamova, & Abdugalina, 2014; Shaykheslyamova, Dlimbetova, Bulatbayeva, Syzdykova, & Isakhanov, 2014). However, in terms of measures to create functional literacy of the schoolchild, environmental competence does not find its well-deserved place among other competencies. There is no dispute that environmental competence can be considered in the composition of personal, civil, social, technological, managerial competencies. However, the global problem of the preservation of mankind puts forward ecological competence as the fundamental one, without which the listed competences will be untenable.

## **2. Problem Statement**

The cognitive-communicative technology of bilingual education (here and after – CCTBE) of non-linguistic disciplines has been tested experimentally and corresponds to the language situation in the educational organizations of Kazakhstan to the maximum extent, when both students and teachers do not have a sufficient knowledge of a foreign language (Bulatbayeva, 2014; Fahrutdinova, 2016). This technology, increasing the level of proficiency in a professional foreign language, ensures a high level of mastering the standard of education on an activity basis. However, it is used for environmental problems for the first time.

We set the task to determine how this technology expands the possibilities of forming an active life position of young people in solving environmental problems, especially in mastering the technique of using the acquired knowledge in practical foreign language activity, in particular, in promoting environmental norms of behavior.

## **3. Research Questions**

The posed problem raises the following research questions: to what extent is this technology effective in the formation of a foreign-language environmental competence? How to determine sufficient and effective lexical and grammatical material that is used within the topic? How to achieve informative dialogue and monologue on the environmental issue? What are the criteria for determining the level of foreign competence in the context of the environmental topic being studied?

## **4. Purpose of the Study**

To verify the effectiveness of cognitive-communicative technology of bilingual education in the formation of environmentally-oriented foreign-language competence of students is the purpose of the study. This is relevant in the context of the language situation in Kazakhstan, when the work in the universities becomes more active not only on the functional mastering of the content of the academic discipline, but also on the formation of a professional English language, which is used in parallel with the native language of students.

## 5. Research Methods

To achieve this goal, the following methods were used: content analysis (used in the analysis of training materials and in the selection of educational texts on the given topic); statistical method (selection of vocabulary and lexicalized grammatical material taking into account the frequency of functioning in the subject, a quantitative analysis of the results); method of observation; method of experiment.

### 5.1. On the organization of the educational process.

The first step is the preparation of the training-methodic complex of the discipline, in which the distribution of themes and hours is modular. Within the framework of each module, the material is divided according to the typology of the lessons, integrating the teaching methodology of a non-linguistic subject and the methodology of teaching the language. Unlike the simple distribution of modules according to sections, the entire material of each module from the first sessions is given integrally on a cognitive basis. The tactical steps of mastering a foreign language are taken into account. Therefore, each module assumes a set of types of work on the enrichment of vocabulary on an environmental theme, eco-vocabulary grammatical system of speech, the development of skills of dialogical and polylogical communication, the creation of a meaningful, reasoned, logically consistent monologue speech on an environmental theme.

#### 5.1.1. The first stage of work on the CCTBE.

At the initial stage, the work is integrated to ensure a holistic presentation of the thematic module material and simultaneous enrichment of the vocabulary in the native language. At first all nuclear material is mastered in the native language. Theoretical material of any volume can be structured and presented in the form of an integrated structural scheme. However, depending on the complexity of the material, the level of students, this material can be represented in the manner of a "matryoshka" in two or three sessions. Students learn about the semantic fragments of the new material, become involved in the process of discussing the knowledge component. The instructor takes the position of the interlocutor, presenting an opportunity from the initial stage to actively answer key questions on the topic, based on an advanced prepared functional-semantic table (for each micro-topic, key words and phrases are given). Thus, the learners already at the stage of acquaintance with the topic are able to explain the essence of concepts, to uncover the genus-species relations between phenomena, to appeal to the opinion of scientists, to compare and contrast some objects and phenomena, etc. Conceptual apparatus on the subject is formed in a natural way, and vocabulary serves the needs to express some idea.

So, for example, let's describe the practical work on the environmental theme "*What will I do to save the Earth?*". This topic is universal, and can become a material for open lectures and seminars, which are attended by students of all specialties. The key micro-themes that ensure the integrity of the thematic field will be: What is the conservation of the Earth? What forms of denial of environmental problems exist? What are the consequences of negating environmental problems? What are the actions of an environmentally literate person? What worries globally-minded people? This cognitive structure of awareness of one's own activity forms the ecological literacy of a person and is relatively sufficient for the formation of one's own ecological position in life. Each micro theme involves solving speech problems:

1. To disclose the concept of "conservation of the Earth" (key vocabulary: conservation of the Earth, participation, each of us, duty to oneself / descendants / Earth, nature, environment, air, water, soil, to resist, to defend, to teach, to guide, to advise; civil responsibility, spiritual and moral way of life);

2. To give an interpretation of the types of indifferent attitude to the preservation of the Earth (key vocabulary: dull pessimism, ecological catastrophe, nuclear war, the world is doomed, blind technological optimism, development of new technologies for the prevention of environmental problems, wishful thinking, nothing to worry about, happy, not to change the habitual way of life, to hope for saving technologies, fatalism, belief in the inevitability of fate, extrapolation to infinity, the inability to quickly change the world, the lack of faith in positive result of individual actions, rationalist view, believing in improving the environment as a result of expectations of immediate gratification and the desire for quick results, the desire to get the expected minimum effort, to be like an ostrich burying his head in the sand);

3. To tell about the consequences of denial of environmental problems and general inaction (key vocabulary: to engage in activities that distract us from environmental problems, inevitable catastrophe, lack of fresh water, polluted soil, polluted atmosphere, death of all life, wars of different continents);

4. To characterize the actions of an environmentally active person (key vocabulary: to assess one's understanding of the preservation of the Earth and all living things on Earth, to feel part of the surrounding nature, to be environmentally informed, to abandon the worldview of spendthrifts, adhere to the worldview of sustainable development of the Earth, bring the lifestyle into line with environmental requirements, to take care of the Earth, the presence of a specific place for protection, the presence of a sense of place, a feeling of unity and gratitude to some area of the Earth; a simple way of life, reduce consumption of resources, the amount of waste and pollution, the line between needs and desires, to avoid unnecessary things, to lead a reasonable lifestyle, to overcome technical barriers separating people and nature, become independent of large centralized water, energy and food supplies, use organic fertilizers and advanced technologies for the cultivation of land, get more energy from renewable sources - sun, wind, water or biomass, to save energy and money, to establish a direct contact with nature; to change their own habits, to become a true citizen of the Earth, make people watch their own behavior, prevent environmental sins; to avoid indifference, overcome indifference; to participate in solving environmental problems at the local and national levels, to organize themselves, to join the local party of environmentalists, to join national and global environmental organizations, to cooperate with other ideological associates, to elect leaders supporting the idea of an environmentally sustainable Earth, to influence local politics and the economy from the position of ecology; live on the principle of "think globally, act locally," the thoughtless actions of many billions of people; acts aimed at protecting the environment; to combat large-scale contamination, to take non-violent measures to prevent brutal cruelty towards life, to start acting, to expand knowledge);

5. Wise statements about ecology: 'We, the generation that faces the next century, can add the solemn injunction "If we don't do the impossible, we shall be faced with the unthinkable.'" (Kelly, Paige, & Gilliat, 1992).

Direct active communication on the basis of such a thematically presented set of interrelated semantic parts ensures the preservation of information in long-term memory and the fixation of key vocabulary on micro-topics.

### **5.1.2. The second stage of work on CCTBE.**

Given in the native language (or in the language of instruction) environmental material is presented in a foreign language. A new task is set before the students: the material suggested before they should now learn in a foreign language. The functional and semantic basis of environmental information - the "skeleton" of the monologic statement expected from the students - makes it easy to switch to a foreign language. A bilingual functional-semantic table serves as a support. Functional use of foreign thematic language on the basis of hierarchically organized cognitive structure ensures its storage in long-term memory. After all, the formation of environmental competence is a multi-step process of processing the external experience. Without constructing in the minds of students a certain pattern regarding the "subject of discussion", it is impossible to achieve mastering of the topic, as well as a coherent foreign language statement about it. In terms of ecology, this is important, since the global nature of the problem calls for the unification of the inhabitants of all countries, so ignorance of an environmentally oriented world language will be an obstacle to the participation of Kazakhstanis in international events. The presentation of cognitive structures of environmental problems and the determination on this basis of a list of potential verbal intentions made it possible to closely link the educational material and training activities with the strategy of forming an environmentally oriented communicative competence.

### **5.1.3. The third stage of work on the CCTBE.**

We have already described a new approach to the selection of functional grammatical material for the purpose of teaching professionally-oriented communication in a number of scientific works published before. The system of functional language tools as units of learning, effective for the development of foreign language vocational-oriented speech, were introduced: functional-semantic fields, syntaxes, semantic types of elementary utterances, stable formulas of communication, speech acts, information-semantic types of texts, communicative speech registers. These units have become new tools for the formation of multilingualism of students.

When selecting the grammatical material, we rely on the types of elementary utterances first presented by us in 2004 in the journal "Vestnik ENU" (Bulatbayeva, 2004). For linguodidactics, an important aspect is that semantic types of utterance serve any topic: no matter what a person says, he/she operates how it turns out, by a certain list of semantic types of elementary utterances. The basic principle of selection was the principle of the frequency of the use of certain semantic types of elementary statements within a particular topic. Let's imagine a specific selected lexicalized grammatical material. An important condition in the organization of the educational process is the maintenance of the repetition of vocabulary with the development of grammatical skills of speaking in English. Turning back to the microtemes of the first stage of work on CCTBE, we have got the following list of key judgments, selected on a scientific basis:

1. Micro theme "Preservation of the Earth". Judgments of students are to be built on the basis of such types of elementary statements as: "Subject and its qualitative characteristics" (Conservation of the Earth is the main goal of humanity, etc.), "Subject and its sign" (Water contaminated with industrial waste, Poisonous soil), "Subject and his social and ethical action" ("Green" is calling for defending / struggling / demanding ....);

2. Micro theme "Attitude to the preservation of the Earth". Judgments of students will be based on such types of elementary statements as: "Subject and its qualitative characteristics" (Dull pessimism is ..., Blind technological optimism means ...), "Subject and its social and ethical effect" (We do not change the usual way of life), "The subject and his state" (We are in inaction), "Expected action, state" (All this will lead to the death of the living);

3. Micro theme "Actions of an environmentally active person". Judgments of students will be based on such types of elementary statements as: "Subject and his physical action" (The youth plants greenery), "Subject and his social and ethical action" (An ecologically active person refuses the worldview of spendthrifts, cares for the Earth, operates according to environmental requirements, leads a reasonable way of life, refuses all unnecessary, calls for action), "The subject and his intellectual action" (An ecologically active person develops environmental laws, calculates reasonable consumption of resources), "Subject and his state" (an ecologically active person feels a part of nature), "Subject and his characteristics" (an ecologically active person is informed about environmental problems), etc.

Such selection of the grammatical material has been carried out in advance from the readymade texts, in order to prepare students as much as possible for a foreign-language communication on an ecological theme. At the same time, at this stage, we are not distracted from the environmental theme, but to eliminate the grammatical difficulties in the discussion in a foreign language we conduct a systematic work on the formulation of key ideas on the topic in the form of different statements-judgments. This is a necessary stage of consolidating the vocabulary and a smooth transition to the dialogic form of foreign-language communication.

#### **5.1.4. The fourth stage of work on the CCTBE.**

It is an orientation towards the creation of dialogue and monologic speech within the framework of an ecological theme, taking into account typical life situations (in the spheres of environmentally oriented communication). The data of environmental problems in various aspects require the systematization and analysis of the texts serving them for linguistic purposes. As is known, any ecological theme can have a certain part of standardized communication in the sphere of professional activity. Based on the analysis of texts on environmental topics, one can identify the typology of speech situations, the typology of dialogues and monologues. It is important for teachers to have skills of transferring natural situations to laboratory conditions (within the framework of our technology, there are usually 4-6 planned situations in which the key micro topics of the topic under study for discussion). Within each environmental theme, it is possible to make a minimum of speech situations, which are a list of potential typical situations, the most frequent in people's communication within a particular environmental theme and are the basis for selecting typical roles of interlocutors, material on the ethics of communication. Moreover, types of speech situations are chosen with taking into account the type of relationship between the interlocutors, the age of the interlocutors, the official or unofficial atmosphere of communication. *The minimum of typical roles of communicants* is a list of potential social roles of a person in communication within the framework of ecological topics taken from a bank of compiled environmental problems. *The minimum of structurally-substantial schemes* of dialogues and monologues are also important tools for activating the dialogical speech of students in the discussion of the ecological problem. *The minimum of structurally-substantial schemes of dialogue* is a list of typical schemes for the development of a dialogue, which represent speech

intentions (intentions) of interlocutors as the implementation of strategy and tactics of communicants and are the basis for the psychological training of a language personality and the inculcation of a culture of communication. *The minimum of structurally-substantial monologue schemes* is a list of typical schemes for unfolding the topic, which refer to micro topics as the realization of the speaker's strategy and are the basis for the development of socially oriented monologic speech.

The number of ecological problems allow us to identify certain types of texts. A systematic analysis of all academic texts has been conducted, on the basis of which educational dialogues and monologues of a certain structure are grouped. So, the environmental problem itself dictates the need for the students to develop speech of informative, motivational, argumentative, instructive character.

## 6. Findings

In the context of the language situation in Kazakhstan universities it is important to prepare students for solving global environmental problems, ensure their participation in international events, and increase their responsibility for their planet. It has been found that non-speaking English is a significant barrier in this regard. To remove this barrier, we use the cognitive-communicative technology of bilingual education. The implementation of technology became possible with considerable preliminary work before the educational process. The studied material on the environmental theme has been structured by us on a cognitive basis. Vocabulary and grammatical material are selected on the basis of the list of necessary speech intentions within the topic. The content of the dialogue is selected taking into account the importance of discussing key issues on the topic. The effectiveness of the technology has been achieved through the primary assimilation of the material in the native language, then in English, and the entire educational process has been built on a communicative basis. Students within four hours of classes are able to conduct a discussion of the topic in English. Modular sessions conducted on environmental issues in the PSH-11 group in the specialty "Psychology" in March 2018 proved that it is not difficult to formulate an ecologically oriented foreign language communicative competence within the framework of a specific environmental problem. At the same time, students expressed a desire to actively join the environmental movement. At present, on the basis of the Faculty of Social Sciences of the Gumilyov Eurasian National University, a group of environmental activists has been created, 90% of them are a group of students of the PSH-11. These 18 students continue to improve their English speech and can now actively participate in the process of discussing environmental problems. The basis for the further activity of this group of environmental activists was the concept about the ecological passport of the university elaborated by doctor of pedagogical sciences, professor Dlimbetova (2018) and the idea of organizing the volunteer student movement by Abenova & Merino (2018).

## 7. Conclusion

The ecological competence of young people is sufficiently formed on the basis of cognitive-communicative technology of bilingual education. Its preferential characteristics in the formation of environmental competence are as follows:

- provides the formation of a conceptual apparatus for the environmental problem in question and widens the horizons of students;

- involves students in the environmental problems of the region, region, country and world;
- defines the totality of students' speech tasks within the environmental theme;
- strengthens attention of students to key aspects of a specific environmental problem;
- develops logic of reasoning, content and evidence of environmentally oriented speech;
- forms and improves foreign language competence in the framework of communication on an environmental theme, which is important for the active participation of students in international environmental movements and events.

The proposed cognitive-communicative technology of bilingual education provides both the formation of students' ecological consciousness and forms an active personality capable of participating in a discussion of environmental problems, calling for an active environmental movement, explaining people's actions that are not in line with environmental norms, and disclosing ways of solving environmental problems.

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