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METHODOLOGICAL PROBLEMS OF THE COMPLEMENTARY SEMANTIC APPROACH IN TEACHING GENERAL EDUCATION SUBJECTS

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Abstract

The article examines the patterns and principles of organizing the educational process in a general education school as the methodological problems of the complementary semantic approach in education, which implements the ideas of humanization and humanitarization of education. The complementary semantic approach is defined and the perspectives of the development of education in accordance with modern-day reality are identified. Owing to the fact that it combines the languages of science and art, the complementary semantic approach aims for generating different types of thinking (objective, symbolic, imaginative, creative) the synthesis of which would allow developing the independence of thinking and the skills of social adaptation and collective problem-solving. The principles of the educational process that realize all the aforementioned patterns are determined and substantiated and include spatial modeling of the educational process, mutual complementarity and intersection of science and art, interdisciplinary recursiveness, image-sign visualization, alternative solutions, associative links.

Keywords

Complementary semantic approach – Image – Idea – Associative thinking – Methodology – Art

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Introduction

The modern world and, hence, education currently experience acute problems related to the prognosed emergence of no less than a new civilization the forthcoming of which was indicated by scientists over the several past decades[1]. In these conditions, the system of education that has always been subject to the political, ideological, and social ideas of the time needs a fundamental reorganization. The study of all the aforementioned factors affecting education has allowed outlining the major vectors of its development that would make it possible to solve both the methodological (approaches, patterns, principles) and practical (forms, methods, technologies) problems of education in the new conditions.

The upcoming paradigm of education has to overcome the preceding systemic constructs and methodological guidelines to introduce "the heuristic potential of the imperatives of the future"[2]. If a constructive basis is formed by humanization and humanitarization[3], the education system will be able to ensure the formation of the ecology of human culture in the new era most effectively.

The term "ecology of culture" introduced into the scientific thesaurus by D.S. Likhachev as analogous to the ecology of nature faced some objections at first but was accepted after some reflection and firmly entered the world scientific and journalistic terminology[4]. "The ecology of culture and the ecology of nature together make up a single whole"[5]. The ecology of culture involves the preservation of human culture, which comprises the entire man-made world – the entirety of human cultural heritage, as well as the conditions of existence and interaction of cultures.

We assume that, from the point of pedagogics, the ecology of culture calls for the formation of the culture of thinking, the culture of perception, the culture of attitudes, and the culture of relationships. Therefore, the ecology of culture may be considered a factor that improves competence, professionalism, abilities in education and social activities[6], and a person's interaction with the world of culture and art in general.

Considering that ecology is a science founded on the idea of the world as an organic whole[7], as interrelationships and mutual influences constantly occurring in the world, and as the spheres and ways of interaction, modern scientists increasingly indicate that humanization and humanitarization should become the constructive basis of education. This factor becomes one of the significant conditions of human existence: "the 21st century is going to be a century of humanitarian sciences or will not come into being at all", – warned the French ethnographer, anthropologist, sociologist, and culturologist C. Levi-Strauss

[1] A.V. Voloshinov, Matematika i iskusstvo (Moscow: Prosveshchenie, 2000) y E. Toffler, Tretia volna (Moscow: AST, 2002).
[2] L. N. Kharchenko, "Teoretiko-metodologicheskie problemy sovremennogo estestvennonauchnogo obrazovaniia (postanovka problemy issledovaniia)", Uspekhi sovremennogo estestvoznaniia num 1 (2002): 26-43. Retrieved from: http://natural-sciences.ru/ru/article/view?id=13880
[3] I. E. Kashekova y T. V. Temirov, "Kontseptualnye osnovy gumanitarizatsii obrazovaniia na osnove kulturologicheskogo podkhoda", Gumanitarnoe prostranstvo. Mezhdunarodnyi almanakh Vol: 2 num 1 (2013): 31-45.
[4] D. S. Likhachev, Zametki ob istokakh iskusstva. Izbrannye trudy po russkoi i mirovoi kulture (Saint Petersburg: Saint Petersburg University of Humanities and Social Sciences, 2006).
[5] D. S. Likhachev, Zametki ob istokakh iskusstva…
[6] L. N. Kharchenko, "Teoretiko-metodologicheskie problem…
[7] A. V. Lichutin, Ontologiia rekursivnykh struktur: Ph.D. dissertation (Archangelsk, 2006).

(preface to Catherine Helen Berndt's book "Women's changing ceremonies in Northern Australia"). The opportunity to put the idea of humanization and humanitarization of education into practice is provided by the complementary semantic approach developed by us.

The complementary semantic approach includes two fundamental levels presented by the terms "complementarity" and "semantics". Complementarity provides interrelation and mutual complementarity between the educational process components and the semantic level discloses the semantic and symbolic essence of the information being acquired allowing it to be interpreted variably from different perspectives of the artistic and expressive symbol.

Problem statement

The methodology of education, especially the humanitarian sciences, is currently producing apparent failures making the Russian analysts focus on the ancient ideas of the world order and attempt to find the ways to reevaluate them from the position of modern society[8], which presents an issue of vital importance.

Questions related to the era of changes and the reorganization of education in accordance with the reality of the 21st century activating the civilizational transformations force the pedagogical community to solve methodological and practical problems. The methodological problems of education include the patterns, principles, and provisions determining the conceptual foundations of the educational process organization and the preferable forms and methods of work that can lead to achieving the educational goal. The most significant problems include the questions: 1) what are the scientific and theoretical prerequisites for the development of education; 2) how can the general education process be optimized to become a part of the holistic system of education of a person who realizes the cultural traditions of their people and the civilizational requirements of the time. The present article is aimed at finding and substantiating the ways to solve these problems.

Study objectives

The identification and substantiation of the approaches, patterns, and principles of education will allow answering the question of what are the conditions necessary for the harmonization of the rational and logical and the artistic and figurative thinking, for the development of students' intellect, memory, outlook, and creative potential, fostering the emotional and value attitude towards the outside world, for the development of the ecology of culture, and what opportunities for the formation of these conditions are present.

Study goal

The present study focuses on identifying the methodological foundations of the complementary semantic approach in education as the one most optimal and meeting the requirements of the time and modern child psychology; the patterns and principles of its realization in teaching general education subjects and outlining the vectors of resolving them to optimize the general education process.

[8] A. Vitiazev, Russkii kulturnyi kod i ego evoliutsiia. Proza.Ru. Retrieved from: https://proza.ru/2016/10/01/664

Methods

Being the system of general principles, ways of their implementation, and methods of theoretical substantiation of the educational process, the methodology of education is based on a researcher's worldview determining the general approaches to the formation of content, form, and techniques of teaching conditioned by the educational process patterns.

In our study, the methodological problems are formulated from the point of the complementary semantic approach, which includes a set of ideas, principles, and methods that can serve as a basis for resolving the problems of modern education.

Resolving the methodological problems of the complementary semantic approach in education involves the analysis of characteristics of its components, identifying the fundamental principles of its realization in the educational process, studying the universal methods of learning and the ways of practical implementation of new knowledge. In the present study, we are departing from the descriptive form of methodology and referring to its prescriptive form describing not so much the theoretical prerequisites as the opportunities to solve constructive tasks related to the implementation of the complementary semantic approach in pedagogical practice.

Complementarity interpreted as supplementing turns out to be promising as it comprises the strongest aspects of pedagogical approaches that have proven themselves in practice[9]:

- the educational process design is based on the patterns of development of a holistic world of a person (the axiological approach);

- understanding each educational subject not as a separate area of knowledge but as one of the interrelated elements of human culture revealing a holistic image of culture in its continuous development (the culturological approach);

- studying in action (the activity approach);

- a child's development is promoted in accordance with their individual characteristics (the personality-oriented approach);

- the spatial perspective on the educational process, recognition of the openness of the educational system and the organizing meaning of accidents (the synergetic approach);

- identifying a variety of components in the studied pedagogical phenomena and their relations to one another (the systemic approach);

- including a fundamental educational subject in the content of education (the metasubjective approach).

[9] I. E. Kashekova; E. N. Piriazeva y M. S. Podobed, "Didakticheskie vozmozhnosti komplementarno-semanticheskogo podkhoda v obuchenii budushchikh graficheskikh dizainerov", Electronic journal "Pedagogika iskusstva" num 3 (2020). Retrieved from: http://www.art-education.ru/electronic-journal

A different meaning of the word “complementarity” refers to it as “an interaction producing a new meaning” which is realized based on interaction of science and art in the educational process.

The semantic level of the proposed approach discloses the semantic and symbolic essence of the information being acquired allowing for the varying interpretations of all kinds of aspects of an artistic and expressive symbol.

Thus, the hierarchical structure of functional levels of the complementary semantic approach allows concluding on its versatility in the implementation of the fundamental pedagogical resources necessary for the implementation of the new educational paradigm.

The patterns of education were studied in Russian pedagogical science by many researchers who proposed various classifications but never reached a common standpoint on the issue. Moreover, the differentiation of these concepts in pedagogics is not always clear[10]. Following the pedagogical interpretation of these terms provided by V.A. Slastenin, I.F. Isaev, and E.Sh. Shiianov, we are going to view the “patterns” as general tendencies in the development and functioning of the pedagogical system while the pedagogical “principles” are going to be interpreted as the optimal ways of action in the respective educational conditions[11].

According to V.A. Slastenin, the most *stable pattern* among the various characteristics and classifications of the educational process patterns refers to a person’s development in the process of internalizing social experience, general human culture, and spiritual values[12].

A Polish researcher V. Okon examines the patterns in the formation of students’ ideas and systemic knowledge in association with their natural and social environment[13].

O.S. Grebeniuk and T.B. Grebeniuk examine patterns in more detail and in closer proximity to the pedagogical practice[14]. The researchers propose the following option of classification containing four developmental relations:

- the relation of cognitive operation patterns (analysis, synthesis, comparison, generalization) to the content of tasks and questions;
- the relation of the characteristics of thinking (flexibility, criticality, independence, creativity) to the nature of question and tasks;
- the relation of learning motivation to the format and content of education;
- the relation of the emotional sphere to the inclusion of special exercises in the educational process.

[10] V. A. Slastenin; I. F. Isaev y E. N. Shiianov, Obshchaia pedagogika: Ucheb. posobie dlia stud. vyssh. ucheb. zavedenii (Moscow: Vlados, 2002).
[11] V. A. Slastenin; I. F. Isaev y E. N. Shiianov, Obshchaia pedagogika…
[12] V. A. Slastenin; I. F. Isaev y E. N. Shiianov, Obshchaia pedagogika…
[13] V. Okon, Osnovy problemnogo obucheniia (Moscow: Prosveshchenie, 1968).
[14] O. S. Grebeniuk y T. B. Grebeniuk, Teoriia obucheniia: uchebnik i praktikum dlia akademicheskogo bakalavriata (Moscow: Iurait Publishing House, 2018).

The study of educational process patterns does not typically go beyond the search for a general direction of the work of educational systems, which is determined by the educational goal. Since the complementary semantic approach sets the goal of humanization and humanitarization of education in the broadest sense, *the following educational process modeling factors can be viewed as the educational process patterns:*

- The constructive factor – the spatial and integrative nature of the educational process design; the organization of coordination measures for the cooperative activity of the teaching staff;

- The sociocultural factor – the culturological direction of the content of education, the dialogism of its presentation; the integration of environmental influences and interrelations; teachers' professionalism, creative potential, technological culture, communicativeness, and orientation on cooperated activities;

- The didactic factor – the unity of thinking and perception, the idea and the image; the combinatory nature of tasks and exercises; the variability of educational and practical activity types;

- The semantic factor – the interrelation and mutual complementarity of the natural and artificial languages and the languages of science (the system of notions, signs, and symbols) and art (images, signs, and symbols) used for presenting, processing, and storing information;

- The motivational factor – the unity of the rational and logical and the emotional and symbolic perception; contingently productive activity; integrativeness and emotional attractiveness of educational content, theoretical and practical assignments.

Owing to the fact that it combines the languages of science and art, the complementary semantic approach aims for generating different types of thinking (objective, symbolic, imaginative, creative) the synthesis of which would allow developing the independence of thinking and the skills of social adaptation and collective problem-solving.

The fundamental components of the educational process within the complementary semantic approach include the subject and theoretical aspect, the content and semantic aspect, and the operational and reflexive aspect presented in the model through students' theoretical, content and semantic, and practical activity (Figure 1)[15].

[15] I. E. Kashekova y E. A. Kononova, "Cognitive Factors of "Art+" Cross-Cultural Pedagogical Technology", International Journal of Innovative Technology and Exploring Engineering Vol: 9 num 1 (2019).

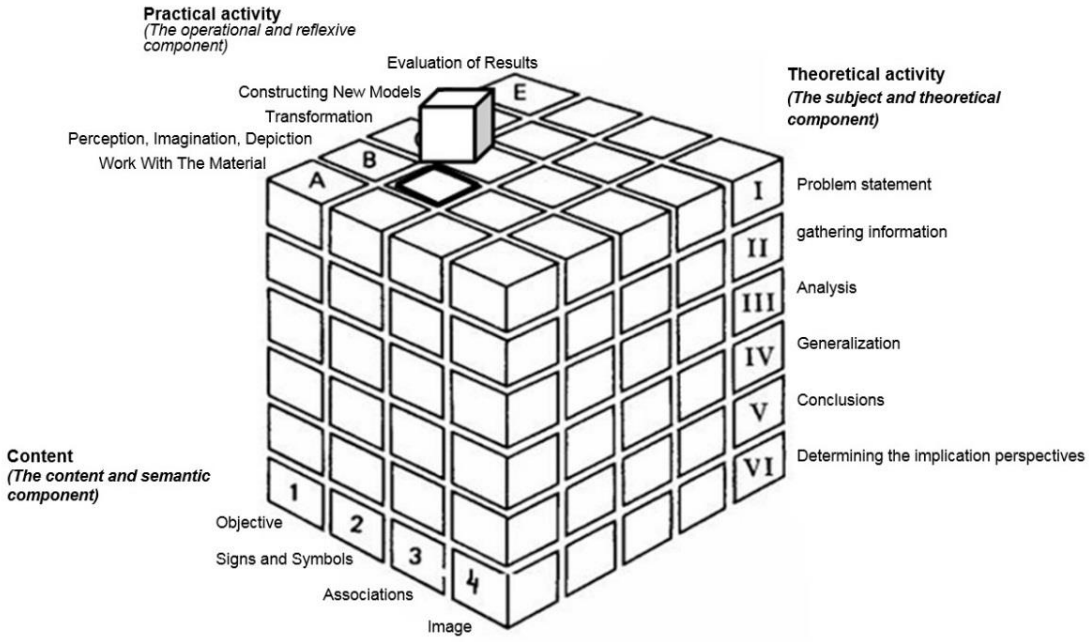

Figure 1
Modeling the content and method of conducting a lesson through the cubic model

The cubic model presents a three-dimensional matrix, the intersection point of three vectors (theoretical, content, and practical) defines the aspects of the utilized components.

Characteristic of the complementary semantic approach components

The subject and theoretical component defines the importance of cognitive activity in education and human life as a metaactivity; directs the educational process towards a systemic nature, scientific accuracy, and the activation of exploration and research activities. It includes the stages of problem statement, gathering information, information analysis, summarization and establishing the main ideas and provisions, and conclusions.

The content and semantic component includes the content of education and the ways of presenting it that improve the emotional expressiveness of new knowledge and help allocate its meaning and personal significance. The role of such instruments is played by signs and symbols, association, and artistic images.

The operational and reflexive (practical) component is aimed at attaining, consolidating, and applying knowledge in performing a certain activity. Activity concentrates the opportunities to: 1) understand theoretical material by practicing it; 2) perceive scientific ideas and adapt them in one's imagination; 3) combine and creatively transform scientific ideas into images, depict ideas in a symbolic form; 4) create new models and structures, translate ideas and images from one modality to another; 5) objectively evaluate the results.

Initial principles of the complementary semantic approach realization in educational process organization

The educational process principles that realize the aforementioned patterns and determine the effectiveness of the modern educational process designed based on the

complementary semantic approach include: spatial modeling of the educational process, mutual complementarity and intersection of science and art, interdisciplinary recursiveness, image-sign visualization, alternative solutions, associative links.

The principle of spatial modeling of the educational process is constructed based on Y.M. Lotman's statement on "the spatial modeling of concepts that are not spatial in their nature as they are"[16]. Perceiving these concepts invokes a viewer's psychological reaction and the emergence of associations. In art, space has a metaphorical or iconically-spatial nature. Y.M. Lotman rightfully noted that "the image of the universe is easier to express in dance than in words; easier to draw, model, or build than logically explicate"[17]. Similar to the way it happens in art, spatial modeling in education allows expressing various meanings and evoking different emotions (Figure 2).

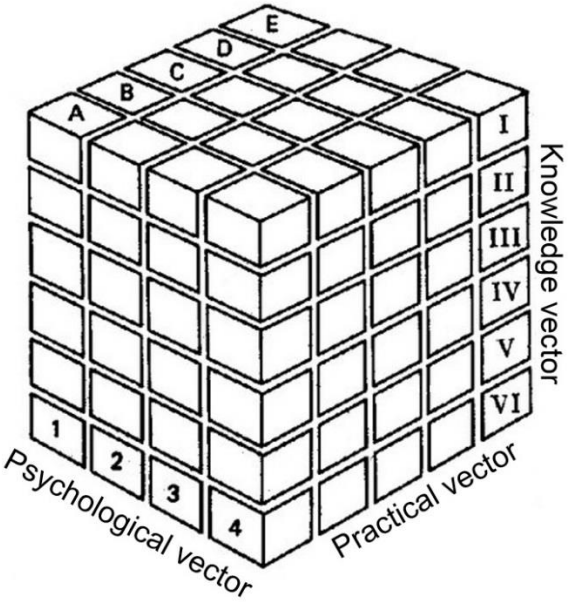

Figure 2
Spatial model of the educational process

The spatial model of the educational process accounts for the studies of psychologists on the influence of external spatial vectors (vertical, horizontal, and sagittal) on a person's internal (psychological) space[18]. While a vertical establishes hierarchy, the vertical vector presents a coordinate of psychological struggle, the conflict between top and bottom, rise and fall, low and high, the ground and the sky, knowledge and ignorance, etc. The energy it primarily represents is the energy of overcoming. Meanwhile, conflict is known to be the key element of any plot from a children's fairy tale to a serious "adult" literary work.

The sagittal direction presents a highly significant vector of perception. The sagittal plane is defined as a vector of width. The concepts of near and far and forward and backward are distinguished in the sagittal plane and although we rarely use the word "sagittal" its meaning is crucial for everyone. The sagittal coordinates are the ones of independence.

[16] Y. M. Lotman, Struktura khudozhestvennogo teksta (Saint Petersburg: "Iskusstvo SPb" Publishing House, 1998).
[17] Y. M. Lotman, Struktura khudozhestvennogo teksta…
[18] A. Ia. Brodetskii, Vnerechevoe obshchenie v zhizni i v iskusstve (Moscow: Vlados, 2000).

Relationships between equal people are established along the sagittal vector, therefore, it also presents a vector of communication. Moreover, objects are examined along the sagittal vector in terms of the difficulty of acquiring them. What is located further away is more difficult to reach. The arrangement of objects according to the sagittal vector is a favorite technique of the artist K. Petrov-Vodkin. Each of the objects or shapes in his still life and genre paintings that seem to be scattered across the surface of a painting are valuable by themselves, have their own character and are completely independent of one another.

In pedagogics, the sagittal plane substantially defines the zone of proximal development, i.e. the period of development, the actions a child is able to complete with the help of an adult.

The concepts left and right and symmetry and asymmetry, as well as comparison, are related to the horizontal vector. In art, the very perception of an object changes depending on the part of a painting or a scene (the left or the right) it is located in. Every person understands since their childhood that it is much easier to choose and take one of several objects if they are placed in a horizontal row compared to when they are placed on top of one another (vertically) or one in front of another (sagittally). The creative process is considered to be related to the horizontal plane, i.e. the ability to select[19].

The metaphor of “knowledge” as an upward movement, the process of overcoming difficulties; pedagogical support, coaching, the improvement of a student’s self-awareness, intellect, and status compose the vertical knowledge vector, which realizes the subject and theoretical component of the complementary semantic approach. The sagittal psychological vector demonstrated the depth and personal value of knowledge ensuring independent thinking. The horizontal practical vector is related to relying on a child’s experience, the ability to find the optimal ways to achieve a goal, to creative search, the ability to choose and perform a combinatorial activity.

In art, an author draws the attention of a viewer (reader, listener) to certain elements using the means of artistic expression accentuating its significance in the narrative of an art piece. In a similar fashion, a teacher can focus a student’s attention on the particularly important objects, events, or phenomena by modeling the psychological space of a lesson.

The principle of mutual complementarity and the intersection of science and art is the leading principle of implementing the complementary semantic approach in the educational process. Language diversity serves as a mechanism of its realization.

Language presents one of the crucial aspects of culture. Every language of **communication** is constructed based on a system composed of a wide range of signs supplemented by a set of syntactic, semantic, and pragmatic rules[20]. Scientific languages forming logical thinking mainly affect the human mind. N. Bor indicated that images of the languages of painting and music primarily influence a person’s emotions and not their mind. Since the linear discrete languages of science are opposite to the continuous and spatial languages of arts their integration may create a mutually exclusive oppositional pair that ensures the development of the educational system within the complementary semantic approach. The possibility of introducing an unlimited number of scientific and artistic languages for presenting the same knowledge is qualitatively new.

[19] A. Ia. Brodetskii, Vnerechevoe obshchenie v zhizni i v iskusstve…
[20] V. N. Ageev, Semiotika (Moscow: “Ves Mir” Publishing house, 2002).

The introduction of artistic languages and symbolic form of knowledge presentation in all spheres of education provides the opportunity of transfer and dense packing of information.[21] V.P. Zinchenko noted that "the growth of the volume of knowledge transforms into the increase of the amount of time needed for its verbal transmission and the exorbitant growth of spatial volumes of materialized forms of knowledge storage"[22]. For the first time, the scientist used the term "information packing density" in this context indicating that it is much higher for the symbolic form of information presentation compared to the verbal one.

The interdisciplinary recursiveness principle. Recursiveness presents specific algorithmically organized ways of transformation of information and organization of complex systems[23]. Recursion allows one to define and provide descriptions or depictions of an object, process, or phenomenon in their own self; thus, a situation when the object of learning is a part of its own self presents itself in the educational process.

A.V. Anisimov provided some examples of recursion in various areas of knowledge and art as well as in the formation of mental activity of people[24]. He disclosed the possibility of practical implementation of the idea of creating modeling recursive programs for the formation of artificial intelligence by using recursive methods in the analysis and formalization (recording with symbols) of scientific and artistic texts including the visual arts and music. The following strategies can be effectively utilized in the formation of students' intellect in the conditions of information overload: 1) using generalized, stylized images-signs for recording information; 2) using fractals and fractal constructions in modeling, describing, or depicting objects, processes, and phenomena for better understanding of their structure and meaning gradually increasing their complexity; 3) using parallel recursion when certain information (or function) requires referring to new information (or function). In this case, recursive challenges provide two motives for searching for new information (implementing a certain function). Parallel recursion can allow making a scientific or an artistic text particularly impressive[25]. In the educational process, the example of parallel recursion can be used in compressing information. A recursive system is able to continuously grow bigger and more complex by copying itself with the process of growth being organized and the subsystems maintaining a constant interaction. If we picture complementarity as puzzle pieces that create the desired image by matching and supplementing one another, it becomes apparent that the elements of theoretical knowledge and ways of practical activity gradually "attach" to the most general, initial knowledge possibly acquired from a child's personal experience. Each new "puzzle piece" is followed by several new ones added from different sides and the process goes on gradually expanding the picture of the world. Therefore, every new piece of knowledge simultaneously presents a key for the next element of knowledge with the new knowledge being built up spatially and not in a linear fashion and a single direction. Here we arrive at the two more conclusions: 4) each new piece of knowledge can be added to "from different sides", i.e. being examined from the points of different sciences and types of art; 5) the repetitive build-up of new "puzzle pieces" can change the initial system beyond recognition.

[21] V. P. Zinchenko, Psikhologicheskaia pedagogika. Materialy k kursu lektsii. Chast I. Zhivoe Znanie (Samara: Publishing house of the Samara State Pedagogical University, 1998); I. E. Kashekova y E. A. Kononova, "Cognitive Factors of "Art+"… y A. A. Kriulina, Ergodizain obrazovatelnogo prostranstva (Razmyshleniia psikhologa) (Moscow: PER SE, 2003).
[22] V. P. Zinchenko, Psikhologicheskaia pedagogika…
[23] A. V. Anisimov, Informatika. Tvorchestvo. Rekursiia (Kyiv: Naukova dumka, 1988)
[24] A. V. Anisimov, Informatika. Tvorchestvo. Rekursiia…
[25] A. V. Anisimov, Informatika. Tvorchestvo. Rekursiia…

The principle of associative links appears to be a theoretical rehabilitation of "the so-called "analogous thinking" which A.V. Lichutin viewed as a search for "deep parallels" between different phenomena"[26]. Analogous or associative thinking provides the opportunity to add new knowledge to the one already present in a person's memory and senses. Senses typically present an especially important factor in the formation of associations, the statement being true for visual, verbal, kinesthetic senses, smell, and taste. The priority of certain senses depends on a person's individual personality characteristics. Psychologists and physiologists note that visual memory dominates in most people and, therefore, visual images are especially important for them. For instance, such people memorize a text better if they highlight the keywords and draw diagrams or pictures. Modern education can implement mnemotechnics – specialized associative methods for the memorization of different information. Associative thinking and the ability to create associative links help consolidate the new knowledge in memory.

The creation of associations requires imagining connections between objects and phenomena. The ability to create associative series promotes the development of associative thinking, figurative memory, and creative imagination.

Associations present the coordinates of the psychological space. An artist concentrates a viewer's attention on specific elements highlighting their importance in the narrative of an art piece. Therefore, the respective art piece invokes specific associations and feelings. The vertical and horizontal dimensions promote thinking while the sagittal dimension reaching into the depth stimulates the emotional attitude towards the image. Using expressive images, metaphors, and associations, a teacher focuses students' attention on certain elements accentuating their importance in the educational information. The educational process semantics includes dialogue which is constructed**:**

- at the content level – between science and art, theory and practice;
- at the semantic level – between the oppositional pairs within a student's psychological space; between an idea and an image; between a thought and a feeling;

- at the communicative level – between the used languages and symbolic systems of presenting information; between the educational process participants.

Utilization of the associative thinking reserves characteristic of the complementary semantic approach contributes to "unfolding" and enriching visual information with new images. The importance of this approach for modern education is determined by its effectiveness both in classroom-based and distance learning.

The image-sign visualization principle. In modern culture, visuality has become an everyday norm, visual image has a decisive role in technology, science, and even in everyday life. The problem of creating and perceiving a visual image has become more relevant than ever before. Visualization is important and natural for a modern child since today's world presents itself to them in the form of a visual image-sign. Operating the images stored in human memory allows using analogous or associative thinking. An image is an embodiment of an idea. As A.F. Losev stated, "An "image" has absolutely nothing that could not be found in an "idea". An "image" <...> presents an *expressed* "idea" <...> and simply perceiving the "image" itself is enough <…> to grasp the "idea", too"[27].

[26] A. V. Lichutin, Ontologiia rekursivnykh struktur…
[27] A. F. Losev, Dialektika mifa (Moscow: Azbuka, 2016)

Therefore, any scientific or artistic idea can be expressed by the means of an image at least in very general terms. The image is immaterial by itself but it can be seen when materially embodied. Visual culture and visual literacy can be developed in school education exclusively through the subject of visual arts, however, the visual image and the semantics of symbols can and should be used in all school subjects since the symbolic form of presenting information is much denser than speech[28].

The introduction of the interdisciplinary concept of “image” into the content and methods of teaching is one of the dominant mechanisms of the pedagogical process constructed based on the complementary semantic approach. After all, an image presents both the external appearance of a real object, the image expressing the idea of it, the subjective evaluation, the metaphorical synthesis, the model of the existing, and the generalization expressed in a real or hypothetical fashion[29].

The power of an image is found in its interdisciplinary nature, it can be perceived both through feelings and the mind. The cognitive image of an object is where the real and the abstracted are integrated, the particulars or properties are specified, and new imaginary models that can be expressed both through the semiotic and linguistic and visual means are formed. The relevance of using the universal concept of “image” in education is supported by its widespread use both in art (artistic image) and science (symbolic sign systems, semiotic models)[30]. Moreover, an image introduces personal meaning into new information and ensures the connection and mutual complementarity of scientific and artistic knowledge of the world, i.e. the complementarity of the learning process. Psychologists signify that “a person explores the outside world with images and not the sum of knowledge. Knowledge organizes and arranges images into a system”[31]. New knowledge enters a child’s psychological space through the image and associations it invokes. In this case, it not only influences a student’s inner world but also constructs it.

The polysemy of the concept of “image” and the role of imaginative thinking in a person’s mental life can make it a key pedagogical mechanism of education.

The principle of alternative solutions appears in A.V. Lichutin’s approach of “circular closure” of knowledge, which relies on M. Heidegger’s phrase “clarifying rather than explaining”[32]. The principle of alternative solutions involves not a final explanation presented by a teacher as a set of axioms but an explanation and an impetus for exploration, combining, i.e. the stimulation of thinking and intuition, a search for an association, and, therefore, the development of creativity.

The principle of alternative solutions involves the search for new original versions of a solution to a problem, creating new models, constructs, and types of activity, translating ideas and meanings from one modality to another.

[28] V. P. Zinchenko, Psikhologicheskaia pedagogika…; I. E. Kashekova y E. A. Kononova, “Cognitive Factors of "Art+"… y A. A. Kriulina, Ergodizain obrazovatelnogo prostranstva...
[29] I. Kashekova, Interdisciplinary concept of “Image” in the Cross-cultural Pedagogical Technology of “ART+”. The European Proceedings of Social & Behavioural Sciences EpSBS. IFTE 2016: 2nd International Forum on Teacher Education. 2016.
[30] I. E. Kashekova, E.A. Kononova, “Cognitive Factors of "Art+"…
[31] V. P. Zinchenko, Psikhologicheskaia pedagogika…
[32] A. V. Lichutin, Ontologiia rekursivnykh struktur…

Results

The pedagogical process constructed based on the complementary semantic approach is characterized by: interaction and mutual complementarity; operating with signs and symbols; spatial designn; recursive build-up of new knowledge; the organizing role of associations and improvised images, striving for alternative problem solutions.

The mechanisms of realization of the complementary semantic approach are ensured by the interdisciplinary ways of creating a school student's semantic space by the means of a cross-cultural pedagogical technology "ART+". The technology creates the conditions necessary for the compressing and personally experiencing the educational information, as well as introducing the interdisciplinary concept of "image" into the content and methods of teaching all educational subjects[33]. The technology is aimed at resolving the problem of optimization of the general education process for it to become a part of a holistic system of continuous education of a person realizing the cultural tradition of their people and the civilizational requirements of the time.

The complementary semantic approach provides the opportunity to construct the content and methods of modern education based on cultural codes the value and importance of which for education lies in the fact that, in their essence, they present a carcass a person's view of the world is founded on. Continuous renovation and development of education are ensured by the opposition of science and art since "No isomorphism is found between the texts created by the means of symbolic systems and verbal texts since the former ones are based on signs extended in time and/or space and the latter are based on discrete signs"[34].

Conclusion

Following the aforementioned, if examined from the point of the specific scientific methodology of knowledge and reorganization of the educational process, the complementary semantic approach comprises interrelated aspects: the culturological, the axiological, the semantic, the technological (constructive), and the personality and creative. All these aspects are complementary and in their mutual interrelation create the conditions necessary for the understanding of every educational subject as not a separate area of knowledge but one of the interconnected components of the general human culture disclosing the holistic image of culture in its continuous development.

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[33] I. Kashekova, Interdisciplinary concept of "Image"… y I. E. Kashekova, E.A. Kononova, "Cognitive Factors of "Art+"…

[34] V. N. Ageev, Semiotika…

References

Ageev, V. N. Semiotika. Moscow: “Ves Mir” Publishing house. 2002.

Anisimov, A. V. Informatika. Tvorchestvo. Rekursiia. Kyiv: Naukova dumka. 1988.

Brodetskii, A. Ia. Vnerechevoe obshchenie v zhizni i v iskusstve. Moscow: Vlados. 2000.

Vitiazev, A. Russkii kulturnyi kod i ego evoliutsiia. Proza.Ru. Retrieved from: https://proza.ru/2016/10/01/664

Voloshinov, A. V. Matematika i iskusstvo. Moscow: Prosveshchenie. 2000.

Grebeniuk, O. S. y Grebeniuk, T. B. Teoriia obucheniia: uchebnik i praktikum dlia akademicheskogo bakalavriata. Moscow: Iurait Publishing House. 2018.

Zinchenko, V. P. Psikhologicheskaia pedagogika. Materialy k kursu lektsii. Chast I. Zhivoe Znanie. Samara: Publishing house of the Samara State Pedagogical University. 1998.

Kashekova, I. E. y Temirov, T. V. “Kontseptualnye osnovy gumanitarizatsii obrazovaniia na osnove kulturologicheskogo podkhoda. Gumanitarnoe prostranstvo”. Mezhdunarodnyi almanakh Vol: 2 num 1 (2013): 31-45.

Kashekova, I. E.; Piriazeva, E. N. y Podobed, M. S. “Didakticheskie vozmozhnosti komplementarno-semanticheskogo podkhoda v obuchenii budushchikh graficheskikh dizainerov. Electronic journal “Pedagogika iskusstva” num 3 (2020). Retrieved from: http://www.art-education.ru/electronic-journal

Kashekova, I. Interdisciplinary concept of “Image” in the Cross-cultural Pedagogical Technology of “ART+”. The European Proceedings of Social & Behavioural Sciences EpSBS. IFTE 2016: 2nd International Forum on Teacher Education. 2016.

Kashekova, I. E. y Kononova, E. A. “Cognitive Factors of "Art+" Cross-Cultural Pedagogical Technology”. International Journal of Innovative Technology and Exploring Engineering Vol: 9 num 1 (2019).

Kriulina, A. A. Ergodizain obrazovatelnogo prostranstva (Razmyshleniia psikhologa). Moscow: PER SE. 2003.

Likhachev, D. S. Zametki ob istokakh iskusstva. Izbrannye trudy po russkoi i mirovoi kulture. Saint Petersburg: Saint Petersburg University of Humanities and Social Sciences. 2006.

Lichutin, A. V. Ontologiia rekursivnykh struktur: Ph.D. dissertation. Archangelsk. 2006.

Losev, A. F. Dialektika mifa. Moscow: Azbuka. 2016.

Lotman, Y. M. Struktura khudozhestvennogo teksta. Saint Petersburg: “Iskusstvo SPb” Publishing House. 1998.

Okon, V. Osnovy problemnogo obucheniia. Moscow: Prosveshchenie. 1968.

Slastenin, V. A.; Isaev, I. F. y Shiianov, E. N. Obshchaia pedagogika: Ucheb. posobie dlia stud. vyssh. ucheb. zavedenii. Moscow: Vlados. 2002.

Toffler, E. Tretia volna. Moscow: AST. 2002.

Kharchenko, L. N. “Teoretiko-metodologicheskie problemy sovremennogo estestvennonauchnogo obrazovaniia (postanovka problemy issledovaniia)”. Uspekhi sovremennogo estestvoznaniia num 1 (2002): 26-43. Retrieved from: http://natural-sciences.ru/ru/article/view?id=13880

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