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General Human Cultural Development as a Necessary Element for the Formation of Scientific Ecoparadigm

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Abstract—The problems generated by the modern civilization development of humanity are of a complex nature. This means that their manifestations become elements of the external and internal environment for subjects, multiplying many times in their minds and the results of their activities, leading to various disorders: diseases, accidents, conflicts, etc. At the same time, humanity has developed a culture, as a fairly perfect tool for solving problems and avoiding errors. Postnon-classical understanding of culture involves analyzing the components each of its forms of representation and extracting the most significant information for the existence of humanity, which is presented in the form of ideas and cultural values and determines the level of the general human cultural development.

Keywords—general cultural development; ecoparadigm; values; education; cognition; learning; morality; spirituality

I. INTRODUCTION

Ecology (from Greek oikos - home, residence and logos — science, teaching), the science of the relationship between alive organisms and the communities they form between themselves and the environment. The term "ecology" was proposed in 1866 by E. Gekkel... Since the 70s of the XX century, human ecology, or social ecology, has been formed, studying the regularities of interaction between society and the environment, as well as practical problems of its protection... in the widest sense, as the "ecologization" of modern science [1]. Transformation of civilizational and cultural processes requires creative solutions in new areas of human activity, arising based on cultural formation processes and new theoretical solutions that require science formation ¹.

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It is obvious that the way of existence of humanity as a conscious form of life is connected with the change of its form — that is, information processes. While the fixation of forms associated with the possibility of the existence of consciousness requires real representations and energy-efficient ways of implementing these processes. Thus, the integrity and comprehension (as a way of realization) of the energy-material-information state is a condition of human life and is presented as the philosophical basis of culture.

II. CULTURAL HUMAN SELF-DETERMINATION: DEVELOPMENT, NEURO-SCIENCE AND SPIRITUALITY

By following the basic provisions of neuropedagogy, emotional, volitional, cognitive and even spiritual and moral development of a person is associated in time with the "maturation" and development of brain structures. Studies in anthropology, psychophysiology, and neuropsychology and, of course, pedagogy confirm the existence of age periodization in the process of human education.

At the same time, for any teacher, it is obvious that neuropedagogy is a necessary, but not sufficient element of the description of the educational process. It is generally recognized that the properties of nervous processes (excitation force, inhibition force and mobility of the nervous system, I.P. Pavlov) determine the type of higher nervous activity, which, in turn, is closely related to one or another type of temperament. In the study, the Strelau Temperamental Questionnaire ² revealed "the relative

² The standard approach in considering the influence of culture on the psychophysiological characteristics consists of taking into account the

¹ Science formation/interpretation (a term introduced by V.S. Mes'kov, N.R. Sabanina). By science formation/interpretation, we will understand the standard procedure for the transdisciplinary approach to the application of one science methods for solving problems in other ones. In the case of relations between science and culture, we have expanded the possibility of applying this procedure, where the initial provisions were formulated not in the language of science, but in the languages of the forms

of culture representations. Such a procedure, if it is adequate, allows us to use all the expressive possibilities of the scientific method for the explication, interpretation and (on this basis) to obtain solutions not only to scientific problems by scientific means. Cultural formation. Unlike science formations, in which the results obtained in one form of culture or another, are transferred to the scientific representation, culture formations are characterized by the opposite process — the results obtained in science can be transferred to culture. They can set the formation of both a new form of culture and influence the entire civilizational environment as a whole.

independence of the temperament structure from the peculiarities of culture, which (in the opinion of the authors of the study) indicates the predominant natural determination of the temperamental characteristics of individuality" [2]. It is thought that the proposed conclusion contains the way to further research. What kind of attitude, however, can be traced beyond the "dominant" one? Is there any other determinacy in the formation of personality properties other than the peculiarities of the nervous system and temperament? What is the share of knowledge, meanings, ideas, and values of the culture in these processes?

Answering this question, let's pay attention to one more observation noted in the modern psychophysiological literature: "Properties of the nervous system are manifested, first of all, and mainly, in the dynamic aspect of behavior (speed, tempo, tension, variability, etc.) and to a lesser extent are found in the substantive aspects of activity (motives, motives, goals, knowledge, etc.)" [3]. Why? There is a fundamental failure here, a boundary. However, this boundary is surmountable for a person. The question is, how? In addition, perhaps, the correctly understood mechanism of culture is the way to overcome it.

Historically, this transition has been associated with the spiritual formation of humans, which does not arise in itself but is the result of the existence of humans in culture. Religion has a special role in understanding the relations between the "body" and the "spirit". Today, "God" as a concept and the existence of the Soul is often associated with the processes of brain activity and the structure of human thinking, in particular in cognitive science. The religious and scientific component of the systematization of this type of knowledge is a subject of theology. In addition, these phenomena are studied within the framework of social sciences, philosophy, and even modeled to create programs of artificial intelligence — spiritual intelligence [4].

If we try to determine what the cause is and what is the consequence of the development of brain structures (either gene, or consciousness, or human activity), we will face the fact that there is a constant, spatio-temporal "inversion" of the biological conditionality of the cultural-medium. Traditionally, for domestic pedagogy, this phenomenon is associated with the development of human speech and thinking. Discoveries in the field of the neurophysiology of prefrontal cortex functions reveal some models of consciousness organization³ and description of possibilities and limitations of modeling future events by a person. New ways of behaving, including tools, form specific forms of culture. The complete act of knowledge passed by the person creates essentially new product: an external subject or process in culture (artifact) and the consciousness of the person (value). The whole vision of this process defines the post-non-classical text of culture. Cognizant of this, a person mastering the activity at new levels of self-consciousness, i.e. he carries out the self-transcendence.

III. PARADIGM CHOICE FOR EXPLANATION THE PROCESS OF HUMAN FORMATION

Despite many achievements of science, the formation of humans from a monkey in the process of evolution is still not confirmed by the fact, but only a hypothesis. In addition, the way of life appearance from inanimate (abiogenesis) remains unknown. Science does not provide a satisfactory answer to these questions, which leads us to the need for a paradigmatic rethinking of the foundations laid in an attempt to explain them.

Significant for the study is the religious interpretation of the appearance of humans — a key event in the history of humanity. "If Christian anthropology considers three elements of the human being: spirit, soul and body (or spirit and psychophysical whole), then in the Old Testament the same idea is expressed differently. The soul (Jewish n`ephesh) is connected to the flesh (Jewish ¬uacbasar) and animated by the spirit of life (Jewish r`uach). In both schemes, the most important is the duality of human, who is a combination of natural, elemental and God-given beginnings" [5]. It is noteworthy that in the Old Testament, the third element — "spirit" often corresponds to the later term "life force". By means of the form of life can join a more powerful "life force", how it finds "spirit"? It is thought that this is the most important issue of human education.

Let us understand by spirituality, acceptance of some ideal (system of values) and acting by following it as a manifestation of integrity. Morality, then, is the contradiction of its "image of the Self" to this understanding of spirituality.

The cognition of humans is also directed outwardly, which ensures his ability to survive in the outside world ... but not only! Human abilities also lie in creating the world in which he exists. Moreover one can see a distinct tendency to the fact that the development of the human traits is aimed at mastering the ability to expand their capabilities of existence in time and space.

The description of the categories of time and space is important for the formation of ecosophy. It is known that the perception of time and space is connected with the activity of two different brain hemispheres. Moreover, spatial and temporal characteristics of the living environment are fixed by the most ancient parts of the brain and regulate the human activity automatically, practically not involving the consciousness, which can be defined as "non-reflexive forms of consciousness". This confirms Bernard Stigler's idea of the concept of "Automatic society" (2015) that there is "...a structural conjugation of the evolution of the brain and the evolution of equipment, a conjugation that Stigler calls " instrumental maieutics" - a mirror effect, as a result of which one, looking at himself in the other, is deformed and formed in this process. This maieutics works (operates) because of the stereotype, the instrument itself forms not a genetic memory, but its absolutely different type... For the non man-made life, the whole sum of epigenetic events (individual memory) is lost with death. In the case of a human being, life saves and accumulates these events... Epigenesis (events of an individual's life) has a powerful influence on the reproduction of the species. Stigler already

characteristics of temperament in various cultures - Strelau Temperamental Questionnaire.

³ Levels of cognitive organization and regulation of behavior - the Grand Design model (Velichkovsky B.M.).

speaks about epiphylogenesis — a new attitude of an organism to the environment, a new state of matter. It is in this case that "what" invents "whom" [6]. The tool creates a human being. Discussing in the terminology of the post-nonclassical concept of culture, everything that was used and constructed by a human being was the previous condition of the appearance of consciousness. Further, "Following the grammar of Jacques Derrida, B. Stigler postulates the impossibility of (direct) origin of humans from nature. Nature as a source is given to a human only conditioned by technique; technical consciousness precedes creative thinking and represents anticipation without creative consciousness (where anticipation means the realization of an opportunity not defined by a biological program). This technical anticipation is read in elementary labor gestures, but, more importantly, anticipation means the constitution of time through exteriorization, which, however, is not contrasted with interiorness. The external does not precede the internal as well as the internal does not precede the external: both make up the complexity of the Primary" [6]. Hence, the information reality can set a fundamentally different spatial and temporal dimension and possibilities of the conscious form of life. Expansion of possibilities and increase of "life force" are the primary meaning of human existence, on the harmony, in the achievement of which the very continuation of Life depends. Brain structure determines all basic meanings of human life and activity. However, the brain itself does not exist and emerges as an evolutionary acquisition of the form of life, which, thanks to this, acquires a more perfect ability to operate with energy, matter and information (EMI). At the same time, moving away from the dichotomy of ontological and epistemological interpretations, the integrity of the representation of EMIobjects will be determined as a necessary condition for the implementation of a conscious form of life.

The human trinity must be ensured by a special way of life. Life is as a constant inversion of causality and meanings of the physical and spiritual, material and informational. The majority of religions in the world have imprinted the corresponding spiritual practices that turn the body into the service of the human will, and the spirit that creates a renewed divine, spiritual body.

Modern transdisciplinary researches have made a significant contribution to the understanding of the processes of individual moral development, which determines his or her general cultural development [7]. In the field of neurosciences, a fundamental discovery was the discovery of the integrating function of the frontal lobes of the brain, its main role in the ability to set goals, personal selfdetermination, and an achievable level of communication (E.A. Goldberg, B.M. Velichkovsky, etc.). In neuro-, psycholinguistics, psychology, and psychology, the essential result was the understanding of language and speech as an information process that defines the vectors of development of both the individual and society (J. Piaget, N. Chomsky, L.Shcherba, and others). In social and economic sciences the connection of emotional and volitional development of the child to school with his future success in public life and, even, the level of income caused by the development of his intellect has been revealed [8]. In the field of philosophy and cultural studies, the consideration of the spiritual and moral development of humans is also associated with the development of values manifested in culture. Moreover, the formation of thinking is closely connected with understanding (based on the mastered systems of values) and the possibility of joint construction of coherent post-nonclassical texts in culture.

The generalizing result for education in this transdisciplinary field was a new approach to the philosophy of education based on comprehension of the results obtained in transdisciplinary fields of research: cognitive science and cognitive phenomenology [9] [10]. Such a vision of human education sets the basis for the formation of a new body-cognitive-value paradigm of education - as a set of models and methodologies of education, which have arisen in science based on the latest advances in various fields of research, setting the integrity of biological, social and spiritual nature of human in the context of the complex model of cognition [11] [12].

To fix the results of cognitive activity, let us choose integral indicators that determine the behavior of both a single individual and entire communities of different levels of interaction. In our study of the general cultural development of a person, such indicators are the values underlying human behavior.

IV. GENERAL CULTURAL DEVELOPMENT AS A CORRELATED FORMATION OF STUDENTS' EDUCATIONAL ACTIVITY

Returning to the study of general cultural development (GCD) and the formation of educational activity, the link between emotional and volitional, cognitive and spiritual development of a person is now becoming clearer and clearer, which we understand as a consistent mastering of the values of three levels: I, II, III (see "Table I") [13].



	Steps of civiliza-tional	Civilization ring		Personal indicator of General Cultural Development					
	formations		Forms of culture representation (FCR)	Values of the I (first) level	Values of the II (second) level	Values of the III (third) level			
	СІ	1	Praculture (the original, oldest culture)	culture) Possession "The gifts of nature		Life			
	CII(3)	2	Language	Pre-language	Silence	Sincerity			
		3	Market (exchange)	Wants	Benefit	Honesty			
		4	Religion	Superstition	Sobornost	Faith			
se	CIII(6)	5	Law	Favors	Mercy	Iustice			
Tril		6	Management	I'm the boss	Order	Result			
		-							
	CIV(10)	7	Technology	Style	Standart	Reliability			
		8	Everyday life	Luxury	Orderliness	Comfort			
		9	Age	Respectability	Independence	Maturity			
		10	Art	Price	Accent	Harmony			
		11	Family	Love me	Balance of feelings	Mutual love			
	CV(15)	12	Household	Greediness	Abundance	Affluence			
		13	Lifestyle	Selfishness	Altruism	Beingness			
		14	Education	Interest	Certificate	Human capital			
		15	Science	I know for myself	Agreement	Truth			
		16	Economics	Wealth	Stability	Human dignity			
Empire	CVI(21)	17	Health	Appeal	Wellbeing	Self-realization			
		18	Politics	My authority	Prestige	Норе			
		19	War	Victory	Revenge	Humanism			
		20	Morality	Traditions	Decency	Honor (chastity)			
		21	Childhood	Curiosity	I'm an adult	Joy			
		22	Mass media	Sensation	Propaganda	Truthfulness			
		23	Tectology	Uncertainty	Variety	Productivity			
	CVII(28)	24	Logic	Laziness of thought	Formalism	Reasoning			
		25	Labor	Work	Duty	Creation			
		26	ICT	Entertainment	Performance	Unity			
		27	Game	Permissibility	Gambling	Freedom			
		28	Sex (Gender)	Sex	"man-woman" polarity	Genus feeling			
	CIIX(36) — Civil (legal)	29	Time	Lack of time	In course	Everything has its time			
		30	Synergy	Analysis synthesis	Consistency	Complexity			
		31	Active lifestyle	"To have time everywhere "	as you can"	right time and in the right direction"			
	society	32	The destiny of a human	I am cool	I am like others	I am a genius			
		33	Nationality	Fine	Majestic	Eternal			
		34	Ethics	Politeness	Collectivism	Conscience			
Republic		35	Aesthetics	Narcissism	Fashion	Beauty			
			Love	Amorousness	The feeling of the "second half" (fidelity)	Life theosis			
		37	Philosophy	Opinion	Law	Essence			
		38	Space	Void	Homeland	Universe			
1		39							
1	CIX (45) — Onen	40							
1	Information society	41							
1		42							
1		43		l					
1		44 T- 1							
	1	10 be	e continuea						

TABLE I. TABLE OF VALUES FOR EACH FORM OF CULTURAL REPRESENTATION

The first stage of the study we describe was the diagnosis of GCD participants in the educational process. For this purpose, we used the questionnaire "What do I appreciate"? It proposes to arrange in descending order of value — I, II, III, typical for different forms of culture. In the course of the study, we identify the following: 1 total GCD and 38 private

— for all forms of culture. Each of the 38 indicators is a criterion for building a personal trajectory of the general cultural development of a student. To this end, the handbooks for working with each level of mastering values for each form of culture have been developed.

A low total GCD indicator shows the degree of risk of violations of discipline and health, development and manifestation of asocial behavior. It has been revealed that comparative indicators by groups (see "Fig. 1" and "Fig. 2") correlate reliably with the average progress in groups.



Fig. 1. Group 1. Individual indicators of general cultural development.



Fig. 2. Group 2. Individual indicators of general cultural development.

The key to the questionnaire is "Table I" in which the tendency of development of the person and society by increments of packages of the forms of culture representations by steps of civilizational — cultural formations is planned. The list of values is not static but is constantly replenished and specified, as it is in the state of

development. It is on this list that the potential of cultural creation for everyone lies.

Studies of the formation of an educational activity (EA) are proposed to be determined by following these criteria (see "Table II"):

TABLE II. CRITERIA FOR THE FORMATION OF EDUCATIONAL ACTIVITIES

		Low			Middle	High		
1	Motivation	0 Forced (fear of low score)		6	Like others	12	Independently, creatively	18
2	Adoption of the learning objective (goal-setting)	0	Educational task not accepted	6	Acceptance of educational task 1 level (operational)	12	Acceptance of educational task 2 (semantic)	18
3	The solution of an educational task	0	Cheated	6	The task is partially completed 12		The task is complete 1	
4	Control	0	The task completed at the last minute or not completed.	6	The task completed late (up to 3 weeks)	12	Task completed on time	
5	Score	0	Up to 55 points	6	55-80		80-100	
6	Creative tasks	0	On-demand	3	Own initiative	6	Regularly	10

The results obtained in 2 groups of 7 students (all girls, aged 18-25 years) were studied (see "Fig. 3" and "Fig. 4"):



Fig. 3. Correlation between indicators: educational activities, general cultural development, control, acceptance of an educational task (group 1).



Fig. 4. Correlation between indicators: educational activities, general cultural development, control, acceptance of an educational task (group 2).

When the total percentage of GCD learning compared to the total educational attainment (EA) was correlated, correlation (k) was recorded:

in the first group + 0.1 (average GCD 57)

in the second group + 0.7 (average GCD 68).



Fig. 5. Correlation between general cultural development and educational activities.

This indicates that the connection between GCD and EA has certain dynamics. A weak correlation indicates that diligent students performing all tasks on time will not necessarily have a high level of culture, moreover, it will be in a certain range: 50-70%. The dynamics of GCD and EA dependence increase in this range will grow as the GCD increases. Previous studies have shown that "...high learning rates correlate with high variability in heart rate (i.e., maximum adaptability of physiological systems to stress, including stress), with a GCD of about 70%" [14]. At the same time, with an increase in the level of general cultural development of more than 70%, we will again see a sharp decline in the correlation with this model of learning activity to k 0.15 (see "Fig. 5").

The hypothesis is that this level of GCD is a landmark for the transition to a fundamentally different educational strategy based on creative thinking: the transition from reproductive to productive pedagogy. This is confirmed by the fact that in group 2 with an average GCD of 68.4%, the number and regularity of creative tasks was much higher than in group 1 (cf. GCD — 51.7%). Moreover, the correlation between the GCD and the performed creative tasks was 0.6.

To clarify the reasons for the formation of such dynamics it was necessary to perform two more operations:

Firstly, to determine the extent to which the indicators of this study are hypothetically the closest to each other, namely: EA and task performance Control. Group 1 - k 0.7; Group 2 - k 0.84. Such a significant correlation indicates both the accuracy of the hypothesis and the fact that the formation of educational activities is associated with a high level of emotional and volitional development, and generally confirms the accuracy of the applied EA model.

Second, it seems that the GCD should have a direct link to the ability to accept the learning objective. Refusal from work in the classroom and homework indicates that the learning objective is not accepted. The first level of acceptance is the operational implementation of the necessary training activities, as well as the use of information on the topic. The second (semantic and value) level consists of a creative approach and personal interest in learning and is characterized by non-situative learning activities (not by task). The motivation and meanings we put into learning depend on our system of values. These levels of GCD assimilation, by following the general cultural development model and, accordingly, the diagnostic methodology, can be correlated with the values of I, II and III orders (see "Table III").

TABLE III. THE DYNAMICS OF THE CORRELATION BETWEEN THE LEVEL OF GCD AND THE ADOPTION OF A LEARNING TASK

	Group 1.				Group 2.			
%, general cultural development	Overall	> 50	50-70	< 70	Overall	> 50	50-70	< 70
general cultural development / acceptance of an educational task	0,07	-	0,5	-1	0,2	-	0,5	- 0,9

In this case, the dynamics of the correlation between the adoption of the learning task and the GCD level is also clearly expressed. The general (average) indicator of this interdependence is revealed as follows:

For the middle level of the GCD, the acceptance of the study task by the student is far from guaranteed. 50/50, depend on the teacher's skill, to help him or her find inner motivation. Further, we can see that "receiving training under the program" conflicts with the value system of the III order. Despite the small sample, 7 people in 2 different groups each, this practical result can be considered as theoretically confirmed. According to research in the field of creative theory, it is possible in a situation of meta transition of the thinking system from the operational and subject level of problem-solving to the reflexive and personal level [15]. At this moment, the educational activity passes from the external to the internal plan (see "Fig. 6"): the planning and implementation of educational activity are increasingly determined by the existential goal-setting of the subject. Such learning activities can now be defined as a cognitive process that becomes more oriented towards solving the life tasks of an individual and his or her community and obtaining tools for such decisions. Next, one should master the ability to act based on one's reasoning, decision making, and value system [16]. The period of growing up of modern boys and girls has significantly lengthened up to 18-21 years and it is not accidental. Mastering the system of modern culture requires a great maturity of personality.



Fig. 6. Learning cycle.

V. CONCLUSION

Post-non-classical understanding of culture implies a component analysis each of its forms of representation and extraction of the most significant information for the existence of humanity. In particular, this information is presented in the form of ideas and values of the culture. General cultural development is a necessary step towards the harmonization of relations between the external (civilizational) and internal (individual) environment of human and humanity existence [17].

A specific form of culture, which determines the nature of the formation of human consciousness, is "Education". At the stage of cultural formation there is a form of culture, the content and value of which will be, respectively, the cognition and creation of post-non-classical texts of culture, which determine the holistic way of existence of humanity. Such integrity of life should be provided by a special way of



life as a constant inversion of causality and physical, spiritual, material and informational meanings [18] [19].

Formation of the ability to cognize and create is a necessary stage of the educational process [20]. The threshold indicator of the need to build personalized cognitive trajectories in education is the general cultural development, which by following the proposed methodology for determining it is 70%.

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