TÍTULO: La educación científica como una forma de transformar un proyecto antropológico en capital humano.

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RESUMEN: Sobre la base de los cambios en el contenido del proyecto antropológico desde los clásicos hasta el presente, se analiza la demanda de la sociedad de la calidad y especificidad del aprendizaje. Acorde a los desafíos básicos del paisaje social y cultural contemporáneo, el aprendizaje más productivo debe considerarse como educación científica. Los autores conceptualizaron la afirmación de que la educación científica produce el tipo necesario de pensamiento y actividad que promueve el desarrollo del capital cultural, intelectual y humano.

PALABRAS CLAVES: proyecto antropológico, educación científica, capital humano, capital cultural, capital intelectual.

TITLE: Science education as a way of transforming an anthropological project into human capital.

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ABSTRACT: On the basis of changes in the content of the anthropological project from the classics to the present, the society's request for quality and specificity of learning is analyzed. According to the basic challenges of contemporary social and cultural landscape, the most productive learning should be considered as science education. The authors conceptualized the statement that science education produces the necessary type of thinking and activity that promotes the development of cultural, intellectual and human capital.

KEY WORDS: anthropological project, science education, human capital, cultural capital, intellectual capital.

INTRODUCTION.

In contemporary discursive practices, defining the present is most often done through crisis and risk prediction. Humanity's global problems, such as population growth on the planet, famine and war, the irreversibility of natural resources, environmental and garbage problems, are mainly caused by accelerated development of science and technology (Ursul & Ursul, 2015, p. 111-112). In other words, they have an anthropogenic factor. Therefore, there is a need to find out whether such a crisis situation is natural and inevitable, or perhaps to imagine a qualitatively different ideological complex that will create a new type of human activity in the world.

The answer about the future of people in the context of today's global problems can be in such different ways. The pessimistic scenario creates the inevitability of a total disaster, like a zombie apocalypse or a man-made collapse. The optimum scenario is the reorientation of cause-and-effect production: if science had caused a global problem, so we should use the effectiveness of scientific development to solve it. The moderate option involves the formation of a prudent strategy to limit the growth of economic and production indicators, which will maintain the fragile balance of the terrestrial ecosystem (Krichevskiy, 2015, p. 123, 127; Soroka & Syntichenko, 2018).

The modern world is united by close ties of communication, collaboration, production and consumption. If the world is to some extent globalized and unified, the problems and consequences of civilizational development are universal, then the ways of solving them must also be complex (Bazaluk, et. al., 2018).

Discussions on the priority of the social, economic, natural or human sciences are irrelevant. Only their integrated use creates the methodology needed to solve complex problems. Therefore, we consider a moderate option not to solve the problem, but to delay it. And as the pessimistic scenario is horrible and unacceptable, it remains for humanity to look for ways to implement the optimistic scenario. Nature in general, as well as human nature, is a phenomenon that requires sustainable development for its existence. In order to achieve it, a measure of transformation is needed that ensures the stability of quantitative and qualitative indicators. So, what should be an anthropological project that harmonizes human relations with the world and society, what kind of educational approaches could correspond the mentioned challenges?

DEVELOPMENT.

The traditional anthropological project, produced by Western European philosophy, cultivates the mind as the leading driving force for the existence and explication of human essence. The rational factors were considered to be decisive in the knowledge, functioning of the society and its institutions, objectification of meaning and communication.

The highest level of embodiment of rationality is knowledge, which is reflected in the traditions of education and everyday life, technologies of production and distribution of goods. Accordingly, morality, aesthetics, the doctrine of values − all these theories are rationally determined. And based on such rational prescriptions, the only restriction on the mind is the mind itself. That is, the purpose and driving force of cognitive activity is not the person in the aggregate of his specific traits and

aspirations, but the objectified process of cognition. Knowledge for the sake of knowledge, not for the sake of human life. At the turn of the 19th and 20th centuries, there is a humanitarian or anthropological turn. The substantive foundations of being human and the world do not withstand the crushing criticism of voluntarism in all its further modifications. Accordingly, the nature of communication between man and the world acquires a wider range of interaction, not limited to the priority of rational.

The new worldviews of non-classical philosophy shape the world as unstable and unpredictable. Therefore, the role of responsibility and awareness of one's own actions and their consequences becomes a constant companion to any human activity, especially scientific and industrial. And naturally, the attention of researchers to the problems of education and humanization of society is increasing significantly. The priority of rationality is replaced by the priority of the values of life, individuality and freedom.

The uniqueness and categoricality of evaluations and judgments is a wrong way. And along with the pluralization of worldviews and values, the criterion of verification of truth and error, reality and simulation, value and speculation is blurred. There are new challenges and threats that accumulate in the ideology of consumerism and consumption, the pursuit of pleasure and the obsessive conceptualization of happiness as an indicator of the meaningfulness of life (Klepko, 2017).

Modern culture creates an anthropological project of a successful, motivated, permanently happy and healthy person as a role model. But the rejection of rationality in favor of the emotional-volitional determinants is hardly a worthy alternative. First and foremost, in the face of the threat of the reality being replaced by real, simulacra characters that devastate individuality and its daily practices.

Development of information and communication technologies, virtualization and digitization of reality, robotization of production and other spheres of life, religious extremism and terrorism are the

basic, but not all significant factors of modern life, for which mankind has to elaborate behavioral strategies (Khrystenko, 2016).

The millennial cultivation of rationality is bearing fruit. On the one hand, scientific and technological progress is rapidly increasing and accelerating. On the other hand, the comfortable environment, produced by the progress of technology, provides the preconditions for cultivating the aesthetized emotionality of pleasure. And in this dichotomy of rational and voluntary-emotional, the most appropriate way is to moderate the way that combines the two extremes into an effective model of human interaction with the world. So, if we consider science to be the cause of global problems for humanity, then science must be the key to solving them, and if the rationality of scientific knowledge denies the importance of the emotional-volitional component of human nature, then the educational and research activities combine these components. Therefore, we suppose it advisable to involve science education in the formation of a modern anthropological project.

The science education shapes the autonomy and validity of thought processes, forms a holistic worldview along with the criticality of reflection and the need to be responsible for the results of its activities (Czyz & Svyrydenko, 2019).

In European culture, there is a long tradition of understanding education as a process of assimilation-transfer of knowledge, which is the model and criterion of truth. A kind of Scholastic tradition of education, tightly regulated and labeled, remains the most widespread worldwide. Peter Sloterdijk poetically states in this regard: "The whole world is a school, and all people are just pupils. We are residents of a building, where everything depends on learning" (Sloterdijk, 2009, p. 551).

However, modern education is also experiencing a transitive state, noting that it has different distinct control projects: rationalistic, hedonistic and simulation. The pluralism of anthropogenic projects has significantly increased the pluralism of possible technical versions that are more efficient. In the face of information excess, even noise, an individual receives such a wide range of possibilities of self-

realization, identification and creativity, that there is a need to streamline this multitude of perspectives and to learn to make conscious choices and think critically.

Science education involves the introduction of such principles of the organization of educational activities that stimulate independence and critical thinking:

1. Problematic learning. Science education does not broadcast ready-to-use samples of "correct knowledge". Main pathos is about updating a problematic situation that requires finding the right solutions. This principle is not limited to heuristic, that is, the discovery of what is already known. A non-standard approach to solving a problem is quite possible.

2. Complexity. Science education is focused on integrating the methodologies of the individual sciences into the study of a single problem field. This approach does not "multiply the essence" but multiplies the idea and understanding of the essence of the phenomenon under study. In addition, science education is based on the principles of unity of theoretical and practical dimension of knowledge.

3. Communication. In science education the group method of teaching is widely used, when it is investigated during the course of the directorate, the tasks are discussed, and the possible ways of its extension are tested. Collaborative creativity stimulates interest in learning, develops emotional and social intelligence, expands the range of communication abilities.

4. Independence. Absence of a ready-made model for imitation develops originality and autonomy of thinking and corresponding abilities in analytical activity, rhetorical and research skills.

Therefore, the demand for activity and independence in contemporary education by society is very significant. Sloterdijk considers this request a motif of the present: "You have to change your life! − so sounds the imperative, which rises above the alternative of hypothetical and categorical imperatives. This kind of absolute imperative is the usual meta-ethical order. He is the key word in the second person singular revolution" (Sloterdijk, 2009, p.47).

Another researcher, Bronwyn Bevan, analyzes the concept of "making" as a form of rapidly developing educational practice. Its content is to design, construct, test and inspect various objects (Bevan, 2017). This procedure is suitable for the use of both high and simple technologies and combines various scientific disciplines as well as creativity and art. The introduction of this educational technology allows us to realize an individual and creative approach in science education and to optimize the research competences of learners. In addition, "making" contributes to the development of design thinking, which expands the range of STEM education opportunities. The author insists that not only the mathematical and technical sciences make effective use of design, digital and computational procedures, but also the natural sciences also have the potential for a similar teaching methodology (Bevan, 2017).

Prajakt Pande and Sanjay Chandrasekharan agree with this opinion, describing Multiple External Representations (MERs) as the leading science, math, and engineering teaching technique (Pande & Chandrasekharan, 2016). This is explained by the need to identify those processes that occur in the phenomena under study. For thinking activity, this technique is constitutive in that it extrapolates the essence into the visual image, as well as enhances the cognitive possibilities of making analogies and establishing connections. MERs are also effective in developing design thinking and design. Thus, science education expands the understanding of the possibilities of human adaptation to the world, the nature and content of such interaction. So, Jonathan Ventura and Jo-Anne Bichard investigate anthropology projections on space design technology: they use the concept of "social design" to demonstrate how anthropological ideas affect strategies for arranging the space of a person's life (Ventura & Bichard, 2017). Accordingly, in this concept, a person is not regarded as a hostage to the social order, but on the contrary, as an actor and a figure, is capable of changing, if not the whole of society as a whole, at least its local living space.

Creating an anthropomorphic space of social being in the modern sense is not a problem, but a task: "The importance of design anthropology, in our eyes, lies not only as a holistic approach highlighting design outcomes, but also its role in the work of material and cultural anthropologists. Unlike anthropologists rooted in the discipline, we feel that it is important to think and write about these areas whilst embedded within the art and design school. Furthermore, we need not only designers to be committed to research and theoretical thinking, but anthropologists to acknowledge the field of design as crucial to our understanding of contemporary material and visual worlds" (Ventura & Bichard, 2017, p.11).

So, from the global to the local, from the abstract-theoretical to the clearly-specific level of realization of human activity, there is a place for creativity and originality (Pavlova, 2018). Certainly, creativity is an area of freedom and the potential risks associated with its realization, but also, the ability to behave in risk situations is exposed to management. So, some of contemporary researchers study the importance of risk in science education and relevant fields of knowledge and production (Schenk, et. al., 2019). At risk, the authors see the uncertainty of the future. They explore the complex dialectic of subjective and objective, individual and social choices, predicting the potential consequences, linking knowledge and values. The authors propose a model of the concept of risk from the standpoint of science education, which may be useful for planning, implementing and evaluating teaching activities (Schenk, et. al., 2019, p.7)

In the global context, the ability to manage risks is very useful for peacebuilding. Birgit Bräuchler explores the problem of peace as a phenomenon created by a relevant cultural context (Bräuchler, 2018). The author talks about the crisis of the modern liberal paradigm of peace as a union of democracy, economic development and peace: "The liberal peace paradigm propagates a natural alliance of democracy, market economy and peace and considers state building and the restoration of

law and order to be essential parts of a society's transition from mass violence to peace" (Bräuchler, 2018, p.3).

This crisis is manifested in the collision of the concepts of local and universal. The author sees a way out of this as a change in priorities from culture to anthropology, and the introduction of new research methods in the practices of peacebuilding. She mentions that "The Alternative Dispute Resolution (ADR) movement, which emerged from the 1970s onwards, was inspired by anthropological work on indigenous conflict resolution strategies, including mediation, facilitation, arbitration and compromise, and aimed to open up more accessible and efficient alternatives to official trials" (Bräuchler, 2018, p.6), but such skills in modern society are needed not only by specialists in the field of international relations, they will be useful in everyday life, in daily activities. These competences make it possible to move away from the formalism and stereotypes of traditional perceptions and evaluations, and to widen the range of possibilities for interaction and understanding.

Regarding the stereotypical perception and evaluation, it is noteworthy fact with respect to scientific education. It is known that as a specific phenomenon, scientific education originated in economically developed countries (the USA, Canada, the United Kingdom, etc.), but if we analyze the content of research work on science education, then English sources focus on the practical component of the implementation of education of this type. The non-English-speaking researchers pay more attention to the theoretical conceptualization of the phenomenon of science education. So, Karel Vojíř and Martin Rusek emphasize on the amount of research on science education by non-English speaking professionals (Vojíř & Rusek, 2019).

English-speaking researchers of science education are more focused on the practical component of teaching, such as textbooks. The authors note that textbook research mainly consists of an analysis of learning concepts and how concepts, non-textual elements in textbooks, visual representations, content of textbooks, or text are integrated (Vojíř & Rusek, 2019). Accordingly, the cultural traditions
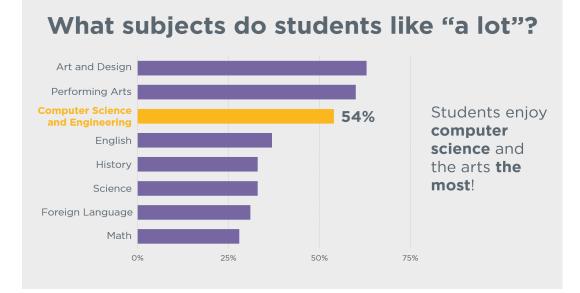
of the science education of the founding countries do not need a theoretical foundation, and for countries, where science education is an innovation, this research issue is relevant.

In any case, the basic vocation of science education is the formation in the person of the student subject of the researcher, who in the course of independent intellectual search, clarifies the process of concept formation and reveals the essence of the phenomenon denoted by the concept. The combination of theoretical education of theoretical logic and empirical experience, rationalism of argumentation and irrationalism of creativity testifies in favor of its efficiency and demand in modern society; for example, Richard Brock updates the problem of tacit in science education. The author calls intuition and insight important components of cognitive activity (Brock, 2015). Therefore, for the development of thinking is important not only the verbalization of knowledge, but also the techniques of using intuition and insight in research.

Integration of individual disciplines into special courses and differentiation of application of research methodology form a holistic picture of the world, which avoids fragmentation of knowledge in traditional education. A synthetic approach to knowledge of the objects and processes of the world contributes to their understanding as a complex dialectical unity. In other words, it forms a certain approach to the perception and analytics of objects of the world.

A team of researchers (Emily A. Dare, Elizabeth A. Ring-Whalen & Gillian H. Roehrig) apply a phenomenological lens to study how conceptualizations of STEM education are taught by science teachers in the United States (Dare, et. al., 2019). The authors insist that in order to fully integrate the courses of various disciplines in STEM education, it is necessary to create a theoretical justification for this area with the involvement of practitioners. After all, a focused and highly specialized approach to the study of the world accumulates the fact of information, in space and volume, which is difficult to communicate and develop.

In addition, there is a widespread belief that the extraordinary array of scientific information and the availability of non-intellectual, entertaining activities negate students' cognitive interest. The most popular subjects in the list of subjects are art and computer science lessons (Computer Science Education Stats, 2019):

It should be noted, that art is a value in itself, and also receives attention from society. To methodologically correct such a situation, Jon-Chao Hong, Chun-Hsing Chang, Chi-Ruei Tsai & Kai-Hsin Tai distinguish the situational and individual interest of students in learning (Hong, et. al., 2019). The authors are convinced that students' participation in the annual PowerTech STEAM competitions fosters a sustained interest in learning based on competition and motivation for the result. Publicity and an environment of like-minded people is a powerful driver of science education.

Capital is usually associated with property in some material form, but the information society greatly changes the meaning of this concept, or broadens its conceptual meaning; for example, Pierre Bourdieu refers to cultural capital as "knowledge that enables a person to understand and evaluate different types of cultural relations and cultural products. These are intangible benefits that enhance social mobility that elites pass on to their children through education and education" (Bourdieu P.,

1986, p.6). The carrier of culture is human, so it is logical that the concept of "human capital" emerges, the meaning of which is understood as investment in education as a guarantee of economic growth not only for individuals or social groups, but for society as a whole. The mobility turn at society offers academic mobility and academic migration concepts for understanding such kind of challenges (Svyrydenko & Kyvliuk, 2017).

Human capital is not only education, but also motivation, experience, health and the ability to train an individual employee and team. Based on a retrospective analysis, some authors draw the following conclusions: "The main outcome from investment in people is the change that is manifested at the individual level in the form of improved performance, and at the organizational level in the form of improved productivity and profitability or at societal level in the form of returns that benefit the entire society" (Nafukho, et. al., 2010. p. 549). The authors are convinced that the productive direction of the study of this topic will be the explication of the problem of human capital at the individual, organizational, public and international levels.

The contemporary researcher Pui Chi Tse considers the modern problem of human capital a natural consequence of the development of the knowledge economy (Tse, 2010). That is why, investments in education are important at the current stage of society development: "The ability to face challenges in the workplace, negotiate and resolve conflicts in the working relationship, the ability to handle difficult people, the capacity to face stressful situations, and the willingness to admit mistakes, are all essential competencies in personal capital that contribute to the success and wealth of the corporate organization. These abilities go beyond knowledge and they cannot be taught through formal education" (Tse, 2010. p.17).

Continuous investment in human capital in the form of counseling is needed, says the author: "Therefore, raising human capital would mean raising both physical and mental health levels of personnel. Good health can be regarded as a form of capital that has the potential to pay returns to

individuals in the form of increased lifetime earnings. The promotion of personal mental health, such as emotional health and social competencies, is one of the major arenas in counseling" (Tse, 2010. p.22).

This position is shared by Corine Boon, Rory Eckardt, David P. Lepak and Paul Boselie who analyzed the problem of human capital from the micro-level of psychology to the macro-level of the economy (Boon, 2018). The integration of these two study planes will allow for a more accurate and effective technique for working on human capital development in organizations. This task is necessary in the light of such arguments: "The basic idea was that human capital has the potential to be a source of competitive advantage because: (1) a firm's stock of human capital can be a key determinant of the quality of outputs and/or efficiency of operations (i.e. human capital resources are valuable); (2) human capital resources are heterogeneously distributed among firms (i.e. human capital resources can be rare); and (3) factors such as specificity, social complexity and causal ambiguity can hinder the flow of and replication of human capital resources (i.e. human capital resources can be difficult to imitate)" (Boon, et. al, 2018, p. 36). Therefore, modern recruiters and managers should have a human capital assessment methodology and build a functional model that combines organizational mission, strategic goals and specific management actions.

Given the interaction and competition in the international economy, the problem of human capital and ways to optimize it attracts the attention of researchers. Olga Verkhohlyad and Gary N. McLean explore the problem of human capital at the national level (Verkhohlyad & McLean, 2011). The authors make convincing arguments in favor of ethnocultural influence on the content and development of human capital of the country (NCH − national human capital).

The importance of this study lies in the prospects for a positive impact on human development, both nationally and internationally: "Identifying the nation's status of current HC is an important step toward developing nationwide initiatives to improve and develop NHC.

Knowing a country's NHC can significantly improve organizational competitiveness and competitive advantage, as companies and organizations will know what qualities of their human resources to capitalize upon and what qualities need future development and improvement.

A multinational company considering entering a new country needs to study the NHC portrait of this country to make its hiring decisions" (Verkhohlyad & McLean, 2011, p.423). According to the testimony "Human Development. Indices and Indicators. 2018 Statistical Update": "The 2018 Update presents HDI values for 189 countries and territories with the most recent data for 2017. Of these countries, 59 are in the very high human development group, 53 in the high, 39 in the medium and only 38 in the low" (Human Development, 2018, p.2).

The indicators of human development, as well as the standard of living of the society, its economy and perspectives depend directly on the level and quality of education. This thesis is also supported by a more meaningful notion of "intellectual capital" introduced by American economist John Kenneth Galbraith in the middle of 1970s. This concept combines both intellectual potential and the result of intellectual activity: patents on copyright, technological processes, management algorithms and networks of production and marketing of products and services.

According to "Human Development. Indices and Indicators" (2018); there are countries with "Very high human Development" indicators are follows:

	Country	Human Development Index (HDI) Value 2017	SDG 3 Life expectancy at birth 2017	SDG 4.3 Expected years of schooling 2017	SDG 4.6 Mean years of schooling 2017	SDG 8.5 Gross national income (GNI) per capita (2011 PPP $)	GNI per capita rank minus HDI rank 2017	HDI rank 2016
1.	Norway	0.953	82.3	17.9	12.6	68,012	5	1
2.	Switzerland	0.944	83.5	16.2	13.4	57,625	8	2
3.	Australia	0.939	83.1	22.9	12.9	43,560	18	3
4.	Ireland	0.938	81.6	19.6	12.5	53,754	8	4
5.	Germany	0.936	81.2	17.0	14.1	46,136	13	4
6.	Iceland	0.935	82.9	19.3	12.4	45,810	13	6

7.	Hong Kong, China (SAR)	0.933	84.1	16.3	12.0	58,420	2	8
8.	Sweden	0.933	82.6	17.6	12.4	47,766	9	7
9.	Singapore	0.932	83.2	16.2	11.5	82,503	6	8
10.	Netherlands	0.931	82.0	18.0	12.2	47,900	5	10
11	Denmark	0.929	80.9	19.1	12.6	47,918	3	10
12.	Canada	0.926	82.5	16.4	13.3	43,433	10	12
13.	United States	0.924	79.5	16.5	13.4	54,941	–2	12
14.	United Kingdom	0.922	81.7	17.4	12.9	39,116	13	14
15.	Finland	0.920	81.5	17.6	12.4	41,002	10	15

It is easy to see, that most of the leading countries in the world are those who invest and implement the principles of science education. Accordingly, today's global economy requires the training of professionals who are able to think critically, solve non-standard tasks, respond quickly to changes (technological ones especially), act effectively at the age of Industry 4.0.

CONCLUSIONS.

A classic anthropological project cultivates rationality as the optimal algorithm for thinking and acting in a stable environment. Modern anthropological project eliminates the concept of stability and broadens the concept of rationality. The ability to navigate an unstable world, interact and communicate effectively with other people, find original solutions to problematic and contradictory situations, understand the practical possibilities of applying theoretical provisions − all these are the benefits of science education. At the national and global level, the qualitative updating of pedagogical technologies influences indicators of cultural, intellectual and human capital as a whole.

Science education does not translate ready knowledge into the unprepared consciousness of the student but generates the context and conditions necessary for independent research as well as scientific style of thinking. After all, future specialists require not an assortment of recipes to solve a certain set of common problems, but the ability of extraordinary thinking and the ability to be

effective in unusual situations and conditions of unpredictable changes. This kind of education is attractive and promising for investors. Science education destroys conservative and stereotypical thinking that nurtures the conviction of the ability to prepare a person for life.

Knowledge and interaction with the world are a permanent state of the individual, preparation for which coincides with the process itself. Accordingly, there is a need for education as a competence, ability to learn and act. Thus, the idea of human capital emerges as a significant factor in the world economy activating the series of stakeholders (national states, transnational companies, etc.) underlining the need of complex educational reforms (Oleksiyenko, 2019).

Scientific thinking becomes more and more vital at contemporary social and cultural architecture, and science education concept offers the relevant answer for the mentioned challenge. The European Commission Report 'Science Education for Responsible Citizenship' underlines that science education is vital "… to ensure citizens have the confidence, knowledge and skills to participate actively in an increasingly complex scientific and technological world; to develop the competencies for problem-solving and innovation, as well as analytical and critical thinking that are necessary to empower citizens to lead personally fulfilling, socially responsible and professionally-engaged lives; to inspire children and students of all ages and talents to aspire to careers in science and other occupations and professions that underpin our knowledge and innovation-intensive societies and economies, in which they can be creative and accomplished" (Science Education for Responsible Citizenship, 2015).

There is a dilemma: will education promote effective skills for acting at technologically-oriented world, or it will 'produce' the part of unemployed people distancing from new 'order of the day' (Industry 4.0, etc.)? Will human capital be produced by the national educational systems facing the challenges of social progress using the 'lens' of science education theory?

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