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Socialization for the Knowledge Society

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ABSTRACT

The purpose of the study is to give an overview and present special features of socialization of the research type that prepares young people for life in the knowledge society. Methods of cultural and historical epistemology, of hermeneutic and structural-functional analysis of social action have been used in the study, as well as elements of the theory of values and philosophic ontology. The experimental part of the study involves methods of comparative analysis and synthesis of social work with creatively active schoolchildren and students. The article analyses the role of education in the conception of the knowledge society, created in the period 1940-1960s. As fundamental factors of a new type of socialization, the cognitive role structure of the knowledge society and spiritual abilities determining creativity are presented. The possibility of early research socialization is explained through the dynamics of the professional maturation period in the conditions of the general technological field of modern knowledge culture. The article lays a theoretical foundation and provides practical justification for a new socialization of the research type, which plays a crucial role in the development of the knowledge society and interprets the content of modern education according to its cultural mission.

KEYWORDS
Socialization type, knowledge society, education program, research personality, self-identification

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Introduction

One of the key problems of the knowledge society development is socialization of young people capable of ensuring its socio-economic and cultural growth. Nowadays, ordinary people need to understand science, says J. Mackenzie (1998), because "decision-making is increasingly associated with science, and those, who do not have the idea what science is, are disregarded". Therefore, we are talking about the formation of a new type of socialization that gives the growing individual a productive attitude to knowledge and cognition, i.e., about socialization for the knowledge society. Both definition and description of this type of socialization are lacking in the scientific literature. I

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introduce the notion of "socialization of the research type" and state that research education is the main instrument for this type of socialization in the knowledge society.

The knowledge society development relies upon cognitive abilities of a creative personality. Professions of cognitive type that include a big amount of creative activity in spheres related to science are becoming the instruments of this society's growth. Education is acting as a culturally productive basis of the knowledge society, which brings up young people able to scientific research, i.e., it is the research education.

"Scientific" domination, however, does not exclude cultural diversity of the types of education according to their attitude to knowledge. "The knowledge society needs diversity in higher education systems", is recorded in the Communiqué of the World Conference on Higher Education (Haddad, 2009), "when a number of institutions will have a wide range of powers and deal with different types of students". The access to education alone is not enough, "the efforts should be focused on the students' success" (Haddad, 2009). A special humanistic task of modern education is to create mentally comfortable cognitive conditions for different cognitive personality types in their related socio-cultural environment (Karpov, 2015). The movement in this direction indicates the initiation of a paradigmatically differentiated system of education, starting from its early stages (Karpov, 2013).

Literature Review

Socialization through education includes different pedagogical approaches, which accentuate its culturally active nature.

J. Brunner notes that a modern educational institution, being a bearer of a specific organizational culture, is able to realize the idea of the learning community where each student represents quite well what he is doing, how it should be done and why. In his Karplus lecture, he introduces the notion of a "soft technology" to study natural disciplines. The soft technology focuses on the process of solving scientific problems and is able to provide the best learning results (Bruner, 2006). R. Godon (2004) emphasizes in the socializing role of education the formation of open thinking (against one-sided perception) and inter-subject character of cognition as a factor of cognitive diversity. Looking upon school as a socializing component of a new educational culture, J. Tomlinson (2000) regards school as a microcosm of a pluralistic society, in which personal and collective values are mixed, i.e. he considers school as a maker of his own life. Socialization and development of an individual in modern school, writes S. Cuypers (2004), should be put into effect within his own priorities, decisions, reflections. Critical rationality, argues C. Winch (2004), as a basis of socialization, stipulates the study and verification of the person's own vocation while the individual's self-sufficiency assumes the ability to determine his purposes in life. This meets the requirements of modern professional labor, for which the ability to critically evaluate and respond to new situations, as well as collective and individual skills, are important.

As a basic institution of socialization, various forms of association of school with academic, professional and cultural organizations in the society are being considered nowadays. J. Graham calls these associations "transformative partnerships" (Tomlinson, 2000), D. Carr considers education in these

associations as a way to the human being perfection realized through complex sociocultural practices. In modern education, the issue of bringing to teaching institutions, specialized on functions performed by knowledge in the post-industrial culture, is being discussed (Carr, 2003), and the viewpoint is being stated that the roots of creative society should be looked for in general education.

The conception of the knowledge society is one of the influential paradigms of modern social development. Its theoretical development emerged from the writings of P. Drucker and P. Machlup that were published in the period from 1940 to 1960 (Karpov, 2015).

During this period, there was a change in the entire educational system of society. With the emergence of the global economy and the rapid acceleration of the technical revolution, higher education is beginning to lose its elite status; it becomes mass and directly responsible for the development of society. In 1940, American colleges and universities enrolled approximately 15% of young people aged 18 to 21 years; by 1963, their number had grown to 40%. In the 60's, European universities covered only 4-5% of the relevant age group; today they cover 40-50% (Anderson, 2010). At the beginning of the 60's, in the UK, there was one teacher per eight students; forty years later, he already "served" 21 pupils (Collini, 2011). D. Greenaway & M. Haynes (2003) show that the doubling of the proportion from 9:1 to 17:1 occurred in the period from 1980 to 1999 year.

In modern society, scientific knowledge from the material and spiritual life basics: technical environment, economics, communication, social technologies, and cultural activities. The society turns out to be "running on knowledge", and key epistemic communities, both educational and scientific, make its main producing force. "Today", writes M. Simons (2006), "in order to become financially and socially successful, one should become competent in creating new knowledge." From this standpoint, "education through scientific research should be looked upon as a necessity, and active participation in scientific research really prepares students for life in the modern society".

In 2009, "Cosmopolitan" published the interview with G. Baratashvili (2009), 27, a young talented London couturier, who was born in Russia. Georgy associates his first success with "The Step into the Future" programme. "At the age of 16", he writes, "I scooped one of the prizes in the "Step into the Future" contest for a crazy dress that was in the shape of flower. This victory added me self-confidence. I studied in Moscow, then in London at the world-famous Saint Martin's. In parallel, I was working for the British fashion house Preen, collaborated with Puma, where I created a conceptual model of sneakers, designed luxurious handbags and was developing my own clothing line G. Baratashvili (2009), which is, alas, is unavailable in my motherland". This example is an illustration of the total penetration of socialization of the research type in modern life.

With regard to the problem of socialization, which is being solved by education, there historically appeared two positions, sometimes artificially separated – those of "education for life" and "education for a person". The first relates to the instrumental tradition of education, the second – to a liberal tradition. While the liberal tradition considers education from the angle of individual benefits with inherent freedom and internal value, the instrumental

position focuses on the benefit of the public, sharing its professional, public and personal interests.

Aim of the Study

The objective of the study is to provide an overview and reveal special features of socialization of the research type that prepares young people for life in the knowledge society, as well as to examine its stages in research education.

Research questions

What does socialization of education include and what are its stages?

Methods

Methods of cultural and historical epistemology, of hermeneutic and structural-functional analysis of social action have been used in the study, as well as elements of the theory of values and philosophic ontology. The experimental part of the study involves methods of comparative analysis and generalization of social work with creative schoolchildren and students.

The article generalizes the 25 years of experience of the Russian scientific and social programme "The Step into the Future", which trains young research workers – schoolchildren and students, this programme have included more than 150 thousand participants by now.

The main idea of scientific research method is the formation of a cognitive attitude in educational communities on the principles inherent in the process of scientific research.

The curriculum to be realized relaying on the method of scientific research can be characterized by cognitive flexibility, cognitive generativeness and sociocultural interaction. Cognitive flexibility is the ability of the teaching process to be cognitively tuned, both individually and collectively. It results in the formation of cognitive diversity first in the school team and further in the cognitively active part of society. Cognitive generativeness is the ability of teaching to create thinking that discovers the world. It is responsible for cognitive diversity of a personality. Socio-cultural interaction includes into the process of teaching the experience of public life, creating spiritual and material perspectives of the individual, i.e. synchronizes teaching and learning with cultural future of society.

Data, Analysis, and Results

Nowadays, human cognitive abilities begin to play a dominant role both in the processes of his spiritual growth and in professional spheres, providing production and technologization of knowledge. Following the process of the knowledge society formation, the social structure is acquiring the features of cognitive stratification (Karpov, 2013). The cognitive role acts as a method of thought functioning in society, this role defining group identities in the system of cultural-deterministic forms of work with knowledge.

The boundaries of the new social stratification and professional disposition are determined by cognitive-role complexes (Karpov, 2013) that are formed as clusters of related forms of work with knowledge. Their types presuppose various creative abilities and cognitive competences, both open and latent. A cognitive type of the personality becomes an individual characteristic in the new

system of labour division, this type being a generalized complex of mental mechanisms that support work with knowledge.

However, mental processes leading to the solution of the same task can be arranged differently with different individuals. This cognitive "diversification" results from different instrumental organization of thinking, which arises, for example, from ethnic and cultural differences, from different cognitive experience and socialization, etc. Therefore, the cognitive-role complexes expressing the group social identity are multi-semantically interconnected with the cognitive type of the personality, which characterizes mental abilities and social opportunities of the individual.

Hence, socialization in the society "running on knowledge" acquires a specific binary complexity, where the instrumental and liberal traditions are interwoven. Today creativity often seems "the unity of the generative and evaluation modes of a thinking apparatus operation", argues L.G. Hammershoj (2009). Therefore, socialization of a growing person must not only involve a certain creative "content" but also bring up what V.D. Shadrikov (2002) has in mind when he speaks about "spiritual abilities". Spiritual abilities "are associated with cognition and creation of culture. They determine the effectiveness of social interaction and lead out to the top of creativity. But their main sociocultural function is that they confront the utilitarian values of rational thinking by the ethic meaning of an action. Creativity is genetically different from the "ability to implementation" because the creative comes from the spiritual and only after that from the active able; and this spiritual allows perceiving and thinking differently.

The research type of socialization being generated in the modern society incites man to look upon the world as not absolute givens but as the changeable new, requiring searching ways of thinking. The task of education as one of the institutions of this socialization is to articulate the intellectual and value logic of the creative personality development. The specific research environment and methods of education, by which alone this personality can grow, make education the main area of this socialization task solution.

Socialization of the research type is developing as a total social process, transforming the behavior of people of all ages and professions. In the most general terms, it is implemented through specific social teaching that involves man into the culture of work with scientific knowledge and its technical and technological incarnations in a professional environment and in everyday life.

The research cognition generates the essence and infrastructure of not only science and engineering; it is implemented through social engineering, politics and management; it creates new information, trade and financial instruments, it becomes a part of the work of a doctor, teacher and a man of art. In everyday life, an individual is faced with things that are endowed, to varying degrees, with artificial intelligence.

Socialization of the research type is stipulated by the dynamics of the period of professional maturation, which I determine as the period of a young person's life from the beginning of his internal movement, conscious or unconscious, to a professionally loaded activity before entering into a profession, when he acquires the status of a young specialist. The developing culture of knowledge creates a common technological field for a wide class of specialized environments, which

plays the role of a "mediator" when a student enters the profession of the cognitive type (Karpov, 2013).

Science is a concentrator of a wide range of cognitive professions and thus determines the tendency towards expanding this common technological field. Methods and tools of science, its achievements and technologies create a common system procedurality of work with knowledge; they also produce organizational and information structures largely invariant for professional fields having a great knowledge content. Due to the growing accessibility of the common technological field, along with the rise of the top border of the professional maturation period, its lower border goes down. The period of professional maturation of a modern individual increasingly covers his school years, while the common technological field of cognitive professions is becoming a place of "playing" its future cognitive-role complex. The consequence is the development of the early scientific and research socialization and the growth of opportunities for the early research education.

The European sociological analysis has shown a high degree of coincidence of competencies for "job placement" with the competencies that are inherent in the process of research. The list of basic competencies of a modern social person includes critical thinking, analysis, reasoning, problem solving, decision-making, project management, planning, coordination, administrating, and cooperation. The formation of these complex high-level competencies requires an extended period of time; therefore, it should begin at the stage of the incomplete higher education or school education (Bourgeois, 2002).

Hence, the main issue of socialization of the research type is the didactic solutions that are able to build successive education between secondary and higher schools and direct it at the creation of cultural basis for the creativity of the individual. In such a basis, spiritual abilities to social understanding and moral evaluation of innovation being created and introduced are inextricably linked to the main and special competencies, necessary for the effective functioning in the knowledge society.

Stages of socialization in research education

On the basis of the practice of "The Step into the Future" programme, we distinguish the following stages of socialization in research education: first, the involvement of students in research activities through the basic system of primary cognitive practices; second, building individual problem-cognitive programs; third, testing the achievements and their inclusion in the system of scientific knowledge, technical and social activities of the society. Building these stages of socialization occurs in the conditions of scientific and educational succession between secondary and higher schools.

The involvement uses scientific infrastructure, problematic situations from life, as well as the interest to know the unknown and enthusiasm to the creation of useful innovations. At the beginning of the programme "The Step into the Future", for example, the average age of a beginning researcher was 13-14 years. Today it is not uncommon that ten or even eight-year-old neophytes participate in research. The basic system of primary cognitive practices underlies the involvement in research training, this system allows determining the range of cognitive interests. It relies on a complex of research tasks that are given to a student "of his own choice" or are formulated by himself individually.

Fifteen-year-old A. Gureev (2001) from Samara was involved in research activity due to his interest towards a laser beam, which he used to test carrots, zucchini, cabbage and potatoes. The experience received in the school laboratory led him to identifying anomalies hiding in the depth of organic material. At the age of 18, at the National Fair "The Step into the Future", he demonstrated a laser detector that could find hidden subcutaneous tumors in human bodies. However, before Anton developed the method of early laser diagnostics of cancer, he had studied a human body in an anatomical theatre and made many technical findings.

Thus, from the basic system of primary cognitive practices, an individual problem-cognitive program has grown, in which a cognitive trajectory of personal development is expressed. The latter is not a direct succession in the search of the problem solutions. However, the continuity of movement from one problematic situation to another and its multi-year duration are what distinguishes research education from individual projects used in teaching schoolchildren.

The problem-cognitive program for an individual is an extensive in time, diverse complex of cognitive activities of the research type, which at a certain moment acquires definite thematic directions, focuses on forward-looking problems and possesses a significant status in the socio-cognitive formation of the personality.

In 2000, a school-girl from Russia Anastasia Efimenko won the right to present the young scientists of the EU at the Ceremony of awarding Nobel Prizes. In Stockholm, Nastya made a scientific report "My challenge to children's mortality", which began: "Hereditary factors cause about 50% of infant mortality and children's mortality and disabilities in the world. How can their destiny be relieved? Genetic research carried out in the Republic of Karelia (one of the Northern European regions of Russia) allowed me to evaluate and forecast the spreading of a serious hereditary phenylketonuria disease connected with metabolism and affecting the central nervous system. My hypothesis of a high morbidity level linked to the migration process in the Republic has been confirmed" (Efimenko, 2000).

The problem-cognitive program of A. Efimenko (2000), the "Nobel" representative of "The Step into the Future" programme, started at the age of 13 with classes in mathematics. At the same time, she took a great interest in biology, which led her to the development of models of population genetics based on genetic laws of Hardy-Weinberg. Wanting to check the heuristic potential of her models, Anastasia applied for medical statistics at the station of blood transfusion. However, in the period of reforms, this area came in full decline, and Nastya had to collect the relevant data piecemeal and process it by herself. Then she managed to find and prove the dependence of children's mortality in Karelia from migratory factors. In her student years, Anastasia became interested in the hereditary predisposition to diseases. At Moscow University, she was involved in embedding of "necessary" genes to help the diseased who had had myocardial infarction. In September of 2011, A. Efimenko (2000) defended a dissertation dedicated to the study of the regenerative potential of mesenchymal stem cells, which is one of the most promising types of cells for cell therapy during ageing.

The transition from the second to the third stage of socialization in research education is based upon the research activity in professional research teams. A. Obuschenko (2002) from Krasnoyarsk began to study astronomy at the age of 12. A year later, he already participated in astro-physical research in the laboratory of a scientific institute, where he could use the newest telescope. In order to start simulations of astrophysical processes, Sasha, by the age of 15, had mastered the necessary sections of the University courses on mathematics, physics and chemistry. By the age of 16, he had completed his first scientific paper, which was entitled "Light-induced particle aggregation" (Obuschenko, 2002) and two years later, in one of the most prestigious international journals "Physical Review" an article was published with his name on it.

Innovative activity is a logical result of the third stage of research socialization. It can be illustrated by the example with Valeria Gregorieva from Astrakhan. At the age of 14, she was involved into the problem of recycling fish-flour processing waste material, and at 17 she developed an economic method of obtaining from this waste a unique solution for cleaning grease and oil tanks from precipitation, which she romantically named "Shampoo for tankers" (Gregorieva, 2000). In 2001, the newspaper "Moskovskiye Novosti" reported "the Dutch to have already offered her ten thousand Euros for the patent. But she refused and explained her decision by the statement that the achievements of Russian scientists should work in Russia. There was also another reason: the Russian company "Yug Tanker" (South Tanker) was interested in the project and promised to sign a contract with Valeria and pay her interest thereon from profits after the industrial test. Now 19-year-old Valeria, one of the youngest scientists in the world, is involved into a new project on the study of trace elements of underground waters, which can provide information about oils deposits" (Bakulina, 2001). At the 5th International salon of innovation and investments held in February 2005 in Moscow, the innovative project made by Valeria "Shampoo for tankers" was awarded the bronze medal.

Discussion and Conclusion

The development of research socialization is especially urgent in the connection with the emergence of a new social reality that is defined as the knowledge society. Today, Western experts emphasize cultural backwardness of science education from cognitive conditions of the time, since scientific thinking is looked upon today through the conceptual vocabulary of Bohr, Heisenberg and Prigogine, whereas the curricula have a propensity to the epistemic system of Descartes, Newton and Laplace. The bulk of the Russian education system regards the language of our great compatriots Landau, Sakharov and Prokhorov as alien. In 2011, 81% of respondents of the all-Russian Center for public opinion study (VTSIOM) failed to remember the names of contemporary scientists (in 2007 the percentage was 67%) (Ilchenko, 2011). The Association of engineering education of Russia notes the "decay in school training" as one of the main social challenges. This decay, in particular, directly affects the status of engineering in this country. "Against this background, the proposition about the world's best Russian education does not sound convincing" (Pokholkov, 2011).

The theory and practice of research socialization mentioned in this article are the result of the 25-year activity of "The Step into the Future" programme. These theory and practice determine specific approaches to education of thinking young people required for the development of the modern society

"running" on knowledge. The experience of "The Step into the Future" programme shows that the age period from 12 to 18 is determinative for research socialization. The data of the psychological science are in agreement with this experience.

At the age of 11-12, an average child, according to J. Piaget's (1952) theory, demonstrates the first signs of formal intellect. At the age period from 13 to 18, there occurs the completion of the development of intellect basic abilities: qualitative-analytical at the age of 15, figurative-spatial at the age of 13, causative-experimental – up to the senior high school age, verbal-propositional – up to finishing school. The mental power reaches its maximum capacity at the age of 15. In the theory of cognitive development , the abstract control structures are formed during the age period from 11 to 18.5.

The above facts prove the validity of the research study and define them as trustworthy and actual.

Socialization of the research type defines the society's capabilities: (1) to produce intensively new knowledge, both fundamental and applied, (2) to transform effectively the necessary part of this knowledge in productive economic or social product, (3) to create humanitarian and value regulatory provisions of innovation growth.

The results of the research study have been used in the activities of the Russian scientific and social programme for young people and students "The Step into the Future". This Programme has been into operation for a quarter of a century in Russia; it engages in scientific training young researchers - schoolchildren and students, and by now has included more than 150 thousand participants.

Implications and Recommendations

Modern educational theory and practice deal with a completely new challenge emerging from the society, which is compelled to present its culturally authentic today through the prism of quite specific and distinct tomorrow. The peculiarity of today's approaches to socialization has become the understanding that an education system not only determines directly the growth potential of the economy, but also solves the problem of the advance cultural growth of a personality, which will be (or won't be) able to create the economy as well as the society of tomorrow.

The article lays a theoretical foundation and provides practical justification for a new socialization of the research type, which plays a crucial role in the development of the knowledge society and interprets the content of modern education according to its cultural mission. I was the first to identify this new tool of socio-cognitive growth of young people in the developing knowledge society.

Disclosure statement

No potential conflict of interest was reported by the authors.

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