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Formation of the Modern Concept of Research Education: from New Age to a Knowledge Society

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Abstract

The present article considers the cultural and historical background and genesis of the research education concept from the perspective of the knowledge society development. Ideas and educational practices linking educational activities and research studies both in the higher and secondary schools are presented. It is stated that research education is becoming a mission not only of a specific university but also of a specific school. Such education requires the successive cognitive development of a personality. In this connection, there occurs the process of forming educational partnerships of schools, universities and research organizations. Examples of educational activities in Russia, the United States, and Western Europe are given. The conclusion has been made that at the end of the 20th century there appears an educational institution of a research type – the University and school - which uses the cognition methods inherent in a scientific search, is institutionalized in cluster-network forms and is based upon an educational innovation system.

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1. Introduction

In modern society, the research knowledge is forming the basis of the material and spiritual life: technical

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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, are its main productive force. Creation of the new knowledge and its innovative use is the result of the research function of thinking. Hence, the modern scientific education is oriented towards a research model of cognition, which determines the anthropo-social basis of knowledge production.

Transition to the modern model of research education is taking place in conditions of changing the entire education system in the society.

In the middle of the last century, with the appearance of the global economics and the rapid acceleration of the technological revolution, higher education is beginning to lose its elite status; it becomes mass and directly responsible for the development of society (Agazzi, 2012). Experts say it is increasingly being recognized by and connected with public policy (Trow, 1972).

In 1940, American colleges and universities enrolled approximately 15% of young people aged 18 to 21 years; by 1963 the number grew to 40%, and in 1968, a fast-growing sector of public education covered about two-thirds of all college and university students (Trow, 1972).

In the 60's, European universities covered only 4-5% of the relevant age group; today they cover 40-50% (Anderson, 2010). For example, at the end of the 90's in German and British universities there studied more than 30% of young people of a suitable age (Duda, 2000), (Greenaway and Haynes, 2003). Now in Russia, more than 60% of the relevant age cohort study in universities (Po mirovym lekalam, 2013).

At the beginning of the 60's, in UK, there was one teacher per eight students; forty years later, he already "served" 21 pupils (Collini, 2011). D. Greenway and 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 Russia, the ratio of students and teachers is 9:1; by 2018 it is planned to have been up to 12:1, freeing up 30% of the teaching staff. I. Abankina ("Higher School of Economics") says, "the ratio "1:12" is typical of most advanced universities in the world" (Bulgakova, 2013, p. 5).

At the beginning of the new century in higher and secondary education, a paradigmatically-differentiated structure begins to be forming, consisting of separate educational locations based on different paradigmatic principles (Karpov, 2013c). Both university and school are increasingly subordinating to the cognitive-role structure of society (Karpov, 2013b). Their socio-cultural and epistemic functions are differentiated depending on the orientation towards cognitively different fields of activity: to a social service, government system, the arts and technical application of knowledge, traditional intellectual spheres, including medicine, pedagogy, law and, certainly, science. A separate "paradigmatic" locus is shown through the dominant type of cognitive activity, systems of meaningful educational situations and basic methods, normative and methodological declarations, educational organization structures and forms of educational process (Karpov, 2014).

In the transition to the knowledge society, the research education area, or as we call it a "locus of scientific gifts", is a culture carrying segment of paradigmatically-differentiated education system. A research model of scientific education is based on the open system of education, which uses the methods of cognition inherent in scientific research, is institutionalized in cluster-network forms and dissipated in educational and scientific innovation environment (Karpov, 2013a).

The *ontologically key role* of research education in the knowledge society formation is that it creates a personality capable of creating the new knowledge, its technologization and integrating into the socio-economic turnover. Such a personality is an *anthropo-social basis* of the new cultural production. This personality education starts in the period of going to school, continues in university education and changes into the professional level of fundamental and applied knowledge creation (Karpov, 2010). Consequently, cognitive development of a modern researcher personality demands an "end-to-end" education in secondary and higher schools, which have been previously separated. The research education is becoming a mission not only of a specific university but of a specific school.

2. Objectives, methodology and research design

The purpose of this article is to show both the cultural and historical background and the genesis of the concept of research education, which can not only shed light on its origins, but also understand the idea of the perspectives of its development. The research methodology is based on an analysis of the key trends of education development

both from the perspective of the development of the knowledge society and in cultural-historical retrospect. Based on studying primary sources, paradigmatic ideas and theories of the development of education and society, significant educational practices linking learning process and research both in higher and secondary schools will be analyzed. The results, published in the article, have been obtained within the framework of the implementation of the project part of the Government order by the Ministry of education and science of Russia (grant No. 27.1560.2014/K).

3. Discussion of the research outcomes

3.1. The genesis of the concept of a research University

The traditional system of ideas, linking educational activities and research, is expressed in the form of a classical paradigm of education - in the writings of theorists of the 18th-20th centuries. Immanuel Kant (1994) puts the search for and public presentation of the truth into the idea of a university. He writes that a university (higher school) is an academic community where truth is the most important thing, the search for truth being the cause of the philosophical faculty (in 1798). It is through the faculty of philosophy that natural sciences penetrate into the university education. The other three senior faculties (theological, law and medical), operate the teachings or doctrines entrusted to them by the Government; their usefulness is only a minor point compared to the philosophical truth.

In the early 19th century, there were three models of a university. British model was focused on the traditions of medieval universities, existing outside the public administration system, the research being the task of the society. In France, the University was accountable to the state, while the researches were transferred to academies. In Germany, the model of Humboldt University was implemented – an independent institution carrying out research and teaching.

The German University of the 19th century, according to Wilhelm von Humboldt (2000), combines objective science with subjective education. Here researchers are searching for truth, teachers take it out of the latest achievements of science, and students critically absorb these latest results that their teachers bring them (in 1810). Humboldt University presupposes the relationships between research and teaching, rather than research and learning. The latter will have become the cause of a university of the 20th century - the century of industrial culture.

In the second half of the 19th century, within the walls of the Imperial Moscow Technical School (IMTS, now - MSTU named after N.E. Bauman) the "Russian school of training for engineers" was established, the fundamental principle of which was a combination of theoretical studies and practical training in teaching “skillful masters ... who know the latest improvements ... and able to spread them" (Nauchnye shkoly Moskovskogo gosudarstvennogo tekhnicheskogo universiteta im. N.E. Baumana. Istoria razvitiya, 1995, p. 3, 6, 7). This principle was formulated in 1830 in the “Regulations for the Trade School” established under the Empress Maria patronage. It was from this educational institution that IMTS grew out of.

In 1873, at the World exhibition in Vienna, the “Russian method of apprenticeship", cultivated in IMTS for training engineers, was awarded the Great gold medal. The Russian method of training engineers was implemented in other countries. "Russia is a complete success in the important task of technical education," wrote G. Runckle, President of Massachusetts Institute of Technology. No other system will be used in America after that" (Nauchnye shkoly Moskovskogo gosudarstvennogo tekhnicheskogo universiteta im. N.E. Baumana. Istoria razvitiya, 1995, p. 3, 6, 7). Today, the Massachusetts Institute of Technology is one of the best *research* universities in the world. As for BMSTU, it has given many creators to the world, including makers of a helicopter and diesel locomotive, a wind tunnel and passenger jet aircraft, an automatic production line and television tube. It was from the Bauman University that mankind has stepped into space

In the mid-20th century, Karl Jaspers (2006) looks upon the relationship between research and education as a supreme and inalienable principle. "As truth must *be sought* by scientific methods, investigation (Forschung) is the main task of the University", and education should lead to research methods, "due to contact with live research" (in 1946). In the report of the Committee on higher education, chaired by Lionel Robbins (1963, United Kingdom), the development of education through combination of teaching and research is mentioned as one of the main principles (para. 27). The University of industrial period requires the student to participate in research studies, which is becoming *an element* of the process of education. However, the University’s mission is education *and* research, i.e.,

the research work is the part of education, but does not determine its content and structure as a whole.

Formation of research education episteme is directly related to the development of innovation culture, generating functions of knowledge and movement towards a knowledge society.

In 1940-1960's, Peter Drucker creates conceptual provisions of the theory of a knowledge society. In the book "The New Society" (1950), he speaks about a specific mission of a knowledge worker. The emergence of new ideas about the necessary qualities of a worker of the future Drucker (2010) relates to the year 1942 when his book "The Future of Industrial Man" was released, with its key chapters, as he himself notes, having been written in 1940 (Drucker, 2009). Moreover, in 1967, in the book "The Effective Executive" Drucker was already able to claim that "the knowledge worker is the one "factor of production" through which the highly developed societies and economies of today - the United States, Western Europe, Japan, and also increasingly, the Soviet Union - become and remain competitive" (Drucker, 2006, p. 5). Education is indeed an extremely important source that can give competitive advantages to society and economy. It is education that is able to make a knowledge worker efficient.

In 1957, in his book "Landmarks of Tomorrow" Drucker (1996) is developing a package of ideas on *innovation* system of society, these ideas remaining highly relevant to the current socio-political situation. Among them is the concept of "education society ", i.e., a society, which is based on education and the idea of an *advanced* education. In the book "The Age of Discontinuity" (1968), Drucker (1970) refers to the need of establishing a system of *continuing* education in the knowledge society. Thus, the new educational episteme, according to Drucker, should provide fostering talents for the knowledge economy, knowledge workers training for the work that does not yet exist (advanced training), his lifelong training and retraining (continuing education) and, consequently, the mobility of human resources. University laboratories, as Drucker alleges (1970), are the basis of scientific production, this basis growing out of them. In 1968, Martin Trow (1972) says that in modern societies, the search for the new knowledge and new ways of its application has turned into an important sphere, and colleges and universities are destined to meet this challenge, which is of growing importance.

By the end of the 20th century, the mission of the University had been stated as education *through* research, rather than research *and* education (Simons, 2006). "The learning process at universities should not be separated from research activities", says Magna Charta Universitatum (1988). In the materials of the University of Oxford devoted to the future of higher education, one can note the presence of a strong correlation between educational institutions, which have a high rating for scientific research and those that have the best teaching assessment results (The University's Response to the Government's White Paper, The Future of Higher Education, 2003). Scientific research is becoming the genetic part of university education of a specific type, in which research studies are used as teaching methods. They begin to form a system of education and take the role of the main cognitive tool, removing the discursive ways of gaining knowledge to the background.

At the beginning of the new century, universities have become the key link in building a Europe of knowledge as they are at the crossroads of research, education and innovation (The Role of the Universities in the Europe of Knowledge, 2003). At the European meeting at Hampton Court (in 2005), universities were referred to as the basis of the European competitiveness (Delivering on the Modernization Agenda for Universities: Education, Research and Innovation, 2006). The decisive factor for the EU research excellence was claimed to be the superiority in *teaching* research (Developing Foresight for the Development of Higher Education. Research Relations in the Perspective of the European Research Area (ERA), 2002). The ideology of research excellence is based on rigid scientific and educational protectionism in relation to attracting and retaining talents, acting solely in the interests of the EU economy (The Role of the Universities in the Europe of Knowledge, 2003).

The quality and productivity of research studies performed in Western universities make them the leading agent in the commercial development of scientific knowledge. The number of patents that universities get annually, is growing rapidly; in 1980, American universities registered 250 patents, in 2000 - more than 1500 (Thursby and Kemp, 2002). A significant amount of licenses that they receive for these patents, turn them gradually into commercial organizations. Thus, the income of the University of Cambridge from intellectual activities reaches 3.5 million Euros per year. Only in 2008, 120 patents and 35 licenses were received (Beliayeva, 2009b). In the same period, H. Chesbrough (2007), the author of the theory of Open Innovation, is examining the processes of collaboration between universities and industry, which results in scientific discoveries transformation into innovative products that are commercialized with the help of suitable business models (Harvard, 2003).

New economic clusters bring together scientific research and technological products, financial capital, production

and political power. In 2008, in the UK there was published a White Book under the ambitious title of "The Innovation Nation White Paper). The document announced a long-term innovation strategy, the aim of which is to create the most attractive environment in the world for innovative business, to turn the UK into a leading country in the world in terms of the knowledge economy. Innovation strategy of the UK provides a dramatic increase in the number of knowledge transfer partnerships; the latter are the structures funded by the State, enabling British companies to benefit from the knowledge and experience accumulated by universities and research institutions (Scott, 2009). In 2011, the British White Paper on higher education notes that throughout the world, the best universities are deepening their links with business. Thus, universities seek to derive maximum benefit from the innovation and contribute to its growth, as well as provide training for students at the level above the general level of the labour market (3.29) (Higher Education: Student at the Heart of System, 2011).

3.2. The genesis of a research school concept

The analysis of the problem "Education through research", performed by the European expert group Strata-Etan, showed that the formation of research competences should begin at the stage of school education (in 2002), (Developing Foresight for the Development of Higher Education. Research Relations in the Perspective of the European Research Area (ERA), 2002). Such a task is new to school. It is necessary to form educational partnerships of schools, universities and research organizations to build a *successive* education on the principles of research learning (Karpov, 2012b).

Social and philosophical theories and practices of the past used to separate school and university, both in terms of cognitive principles and in educational and institutional aspect.

According to Kant "school is a compulsory culture" and "schooling must be the *work* for a child" (Kant, 1994a, p. 432, 431). W. von Humboldt states that school should be "always and clearly" separated from university, not only theoretically but also practically; it "has to do only with ready-made and well-established knowledge" (Humboldt, 2000, p. 70, 69). E.P. Cubberley (1916) in "Public school administration" published in 1916 in Boston, compares schools with factories where raw materials (children) should be processed and transformed into a product that would be consistent with the requirements of life." From the famous concept of scientific organization of labour developed by American engineer F. W. Taylor, school adopts the model of an assembly line. School taylorism justifies the existence of a linear and closed educational system based on a timed curriculum oriented at results, while a pedagogical principle is the *mechanization* of thinking in the *standardized* knowledge environment. In 1914, J. M. Rice (1969) offers the idea of standardizing education, which essentially is the idea of a "mechanical" culture, to administrate the teaching process "scientifically". The reformative movements, such as "new school", "pragmatic pedagogy", "liberal education" remained experimental patterns.

In the middle of the 20th century, in the United States the problem of creative education in schools was addressed at the *State* level. The launch of the first Soviet satellite on October 4, 1957 stimulated the work on improving education in the United States, which took place under the influence of the cognitive revolution in psychology. On this day, President D. Eisenhower in his address to the American people, said, "Our schools are more important than our radar stations; schools are fraught with greater strength than the energy of the atom" (Galagan, 2006, p. 217-274). The Congressman J. Kennedy warned the Americans: "It is not an overstatement to say that the battle that we are waging now may be won or lost in school classrooms of America" (Galagan, 2006, p. 217-274).

During the period when a powerful external influence factor for the Americans was the "cold war", writes J. Bruner, the competition apart from the ideological and military fronts "was being extended to the sphere of scientific and technological progress. Can we compete with the Russians in this area? Do we have enough intellectual resources for this? Do our schools provide their students with necessary knowledge in the exact sciences and mathematics? These were questions that stirred the Americans" (Bruner, 2006, p. 8).

In the late 50's-early 60's, notes the American sociologist Martin Trow, the Federal Government of the United States began to give special *political* attention to the creative approach in education. In connection with Soviet advances in military and space technology, the task was clearly formulated: the objective is "to place education at the service of national strength and prosperity" (Trow, 1972, p. 176, 177). What was at issue was a *centralized* replenishment and training of qualified technical staff.

"The United States' national demand for revealing and relevant training inherent talents gave rise to lots of new

research studies," writes Alex Inkeles (1972, p. 53). These studies were generously allocated. In particular, an analysis of the "ways to attract talented young people to deep studying of science and technology" was conducted. The investigation of this issue resulted in the recognition of the fact that formal training made the disclosure of abilities problematic and led to the loss of potential possibilities. From this perspective, the most critical link in the system of education is secondary school because it "lays the foundation for scientific and technological careers of students" (Trow, 1972, p. 176-177).

In response to political, scientific, and technological challenges, the United States began to develop actively a system of research training for schoolchildren. Many scientists devoted themselves to science and education in schools. University laboratories and research centers opened wide doors to American schoolchildren; dozens of regional science fairs for pupils were organized; the ideas developed by young researchers were used in technical devices, in research projects, including space projects. At the same time, an international scientific and engineering fair for schoolchildren was established, which is known today as Intel ISEF, which invites annually thousands of young talents from all over the world. At the same time, in several European countries there occurred the evolution in the direction of "using education as a means to identify and train talented and capable children from all walks of life" (Trow, 1972, p. 181).

In the 80's, when the concept of a United Europe got its institutional embodiment, stimulation of scientific research in school became an integral part of human development policies implemented by the European Union Commission, i.e., by the Government of a United Europe.

Since the mid-20th century, the issues of school sociocultural environment expansion have been discussed. In 1989, K. Mannheim, speaks about the need for integration of schools with other public institutions. In 1989, the Russian sociologist I.S. Kon (1989) defined the fundamental condition of such integration, according to which the cooperation of school with out-of-school organizations inevitably means a serious breakdown of the usual, emerging from the XVII century forms of educational process. In the early 2000's, in Western education the issue of bringing the institutions, specialized on functions performed by knowledge in the post-industrial culture (Carr, 2003), to problems of teaching, and also a position was established according to which the roots of creative society should be found in general education (Higgins, 2000).

In 1991, the program "The Step into the Future" was launched in Russia (Karpov, 2012a). The program's active cooperation with pedagogical administration and the Committee on Education and Science of the State Duma of the Russian Federation has led to the introduction of a design teaching method into the educational practice of Russian schools; it stimulated the development of modern models of research education in both secondary and higher schools. In early 2000'es, based on the experience of the program "The Step into the Future" implementation, the author of the present paper developed a theory of research education.

Western experts say that in the short term research studies should become an effective means to address the problems of education in Europe, while teachers have to keep up with the latest developments in the field of epistemology (Simons, 2006). In the report "The development of creativity of the young "(2006), prepared for the UK Government, the objectives of the educational system included the disclosure of *creative* potential of a personality and the formation of individual educational route (Roberts, 2006). Both belong to the didactic basis of research education. It should be noted that "the studies of creativity in the context of the discussion about the knowledge society economy have started quite recently. … in particular we lack research studies in theoretical understanding of creativity in education" (Hammershoj, 2009, p. 546).

In 2002, the United States National Science Foundation, the primary source of federal support for *basic* research, announced an educational program on nanotechnology for students, and in 2003 –for schoolchildren; the Government also developed measures to keep talented foreign students studying in this field (Terekhov, 2009). In 2009, the Barack Obama Government, at a time of economic crisis, contributed to the supplementary funding in the amount of three billion dollars (Beliayeva, 2009c), the Foundation's budget providing support for young researchers at the *beginning* of their careers (Beliayeva, 2009a). In 2008, the "Innovation Nation White Paper", released by the British Government, says about the *development* of teaching subjects related to science, technology, engineering and mathematics in schools, colleges and universities. Moreover, the support for such activities will be provided by the main innovation department of the country - the Department of innovation, universities and skills (DIUS) (Scott, 2009).

In connection with the new social reality, Western experts note the 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 curricula have a propensity to the epistemic system of Descartes, Newton and Laplace (Doll, 2011). 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 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 appreciable decay in school training, which is one of the main social challenges. The school training, 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, p. 13). The backwardness of education from cognitive conditions of the present time is the main factor of deconstruction of the knowledge society (Karpov, 2007).

However, the commodifiable policy, which regards education as a system of commodity relations, causes the destruction of its ontological principles. The process of learning is deprived of generative properties of a personality and sociocultural relationships in knowledge, creative functions of a teaching person and of a person being taught, the relations between education and research studies as well as motivation, and also the educational function of research that forms the scientific methodology of thinking and determines a high quality of education. Commodification ignores cooperative forms of life, education, and science that form the basis of their competitiveness (Karpov, 2013d).

4. Conclusion

Therefore, the task of building a specific education system for teaching young people who are creatively productive in scientific activity was set and started to be addressed in industrially advanced countries half a century ago. The educational institution of a research-type – university and school – is being established at the end of the industrial era, in the late 20th century. Scientific studies are being used now as teaching methods and education itself begins to be implemented *through* scientific studies, which are not considered only as scientific tools, but are forming the process of education and cognitive thinking. Of course, this is a local process only. However, on the horizon of this movement there appears a global transformation of the classroom-set system of education into a specific educational establishment that is directed by the searching activity identifying both its content and its structure.

The concept of "education through research" identifies the immediate prospects in the sphere of education reforms in the West. The issue of pedagogy and psychology of creativity becomes the most important one: how to organize education so that to get an educational environment in which students could acquire research skills. Here, pedagogical techniques, executing creative academic challenges, a research learning method, a special form of tutorship in teacher-student interaction, which could be able to implement "cognitive learning" are meant (Simons, 2006, p. 35, 36). Today's Russia is only approaching to this problem *consideration* at the State level. The political directives made recently are still declarative.

This is how matters stand in the formation of research education as a *separate* part of the paradigmatically-differentiated system of education in the society moving towards a knowledge society.

References

Agazzi, E. (2012). Ideia obschestva, osnovannogo na znaniakh. [The concept of Knowledge Society]. *Voprosy Filosofii*. Moskva: Izdatel`stvo Nauka, No. 10.

Anderson R. The Idea “of a University” today. Retrieved from URL: http://www.historyandpolicy.org/papers/policy-paper-98.html (accessed: 16.10.2011).

Beliayeva, S. (2009a). Opyat’ shagayut vperedi? Amerikanskim uchenym povezlo s prezidentom [Again a step ahead? American scientists are lucky with their President]. *Poisk*. Moskva, No. 22.

Beliayeva, S. (2009b). S raschetom na vzaimnost`. Universitety i nauchnye parki Velikobritanii ne naraduyutsia drug na druga [With the anticipation of reciprocity. Universities and science parks of Great Britain cannot help rejoicing at each other]. *Poisk*. Moskva, No. 24-25.

Beliayeva, S. (2009c). Spasibo za stimul. Obama oschastlivil uchenykh milliardami. [Thanks for the encouragement. Obama has made scientists happy with billions]. *Poisk.* Moskva, No. 10.

Bruner, J. (2006). Kul`tura obrazovania [The culture of education]. Moskva: Izdatel`stvo Prosvetchenie.

Bulgakova, N. (2013). Na yasnom glazu. Ministru podskazali, kak reformirovat obrazovanie. [After careful consideration. The minister was advised how to reform education]. *Poisk*. Moskva, No. 21.

Carr, D. (2003). *Making Sense of Education.* London and New York: RoutledgeFalmer.

Chesbrough, G. (2007). Otkrytyie innovatsii. [Open innovation]. Moskva: Izdatel`stvo Pokolenie.

Collini, S. (2011). The Dismantling of the Universities: From Robbins to McKinsey. *London Review of Books*. London: LRB.Ltd, Vol. 33, No. 16.

Cubberley, E.P. (1916). *Public school administration.* Boston: Houghton Mifflin.

Delivering on the Modernization Agenda for Universities: Education, Research and Innovation. (2006). *Communication from the Commission to the Council and the European Parliament.* Brussels: Commission of the European Communities.

Developing Foresight for the Development of Higher Education. Research Relations in the Perspective of the European Research Area (ERA). (2002). *Final Report of the Strata-Etan Expert Group*. Brussels: European Commission, Directorate-General for Research. Unit RTD-K.2.

Doll, W.E. (1993). *A Post-modern Perspective on Curriculum.* New York and London: Teacher College Press, Columbia University.

Drucker, P.F. (1996). *Landmarks of Tomorrow. A Report on the New «Post-Modern» World.* N.Y.: Harper.

Drucker P.F. (1970). *The Age of Discontinuity: Guidelines to our Changing Society.* London: Heinemann.

Drucker, P.F. (2006). *The Effective Executive: The Definitive Guide to Getting the Right Things Done.* N.Y.: HarperCollins.

Drucker, P.F. (2009). *The Future of Industrial Man.* Piscataway: Transaction Publishers, Rutgers – the State University.

Drucker, P.F. (2010). *The New Society. The Anatomy of Industrial Order.* N.Y.: Harper.

Duda, G. (2001). Idei W. fon Gumboldta i vysshee obrazovanie v kontse XX veka. [W. von Humboldt's ideas and higher education at the end of the 20th century*]. Sovremennye strategii kul`turologicheskikh issledovanii. Trudy instituta evropeiskikh kultur.* Moskva: Rossisky gosudarstvennyi gumanitarnyi universitet, No. 1

Galagan, A.I. (2006). Zakon SSHA "Ob obespechenii uluchsheniya federal`nykh issledovanii obrazovania, obrazovatel`noy statistiki, otsenki obrazovania, informatsii ob obrazovanii i eyo rasprostranenia i drugikh tselei [The U.S. law "On ensuring the improvement of federal research in education, educational statistics, assessment of education]. *Yezhegodnik rossiiskogo obrazovatel`nogo zakonodatel`stva.* Moskva, Vol 1.

Greenaway, D., Haynes, M. (2003). Funding Higher Education in the UK: The Role of Fees and Loans. *Economic Journal. Royal Economic Society.* Oxford: Wiley-Blackwell, Vol. 113 (February).

Hammershoj, L.G. (2009). Creativity as a Question of Bildung. *Journal of Philosophy of Education.* Oxford: Blackwell Publishing, Vol. 43, No. 4.

Higgins, M.D. (2000). Drifting Towards A Homogenized Future. *The AISLING Magazine,* Issue 27.

Higher Education: Student at the Heart of System (2011). *Department for Business, Innovation and Skills.* London: TSO.

Humboldt, W. (2000). O vnutrenney i vneshnei organizatsii vysshikh nauchnykh zavedenii v Berline. [On the Internal and External Organization of the Higher Scientific Institutions in Berlin]. *Sovremennye strategii kul`turologicheskikh issledovanii. Trudy instituta evropeiskikh kultur.* Moskva: Rossisky gosudarstvennyi gumanitarnyi universitet, No. 1.

Ilchenko, A. (2011). Ne interesno? [It's not interesting, is it?]. *Poisk*. Moskva, No. 13

Inkeles, A. (1972). Lichnost` i sotsial`naya struktura [Social structure and Personality]. *Amerikanskaya sotsiologia. Perspektivy, problemy, metody.* Moskva.

Jaspers, K. (2006). Ideya universiteta [The idea of a University]. Minsk: Belorusskij gosudarstvenny`j universitet.

Kant, I. (1994a). O pedagogike [On Pedagogy]. *Kant I. Sochinenia v vosmi tomakh*, Vol. 8. Moskva: Izdatel`stvo Chero.

Kant, I. (1994b). Spor fakul`tetov. [Conflict of the Faculties]. *Kant I. Sochinenia v vosmi tomakh*. Vol. 7. Moskva: Chero.

Karpov, A.O. (2007). Knowledge Society: Mechanisms of Deconstruction. *Herald of the Russian Academy of Sciences.* Road Town Tortola: Pleiades Publishing, Vol. 77, No. 1.

Karpov, A.O. (2010). Knowledge Society: A Weak Link. *Herald of the Russian Academy of Sciences.* USA: Pleiades Publishing, Vol. 80, No. 4.

Karpov, A.O. (2012a). Lokus nauchnoi odarennosti: programma "Shag v buduschee. [Locus of Natural Scientific Gifts: "The Step into the Future" Programme]. *Vestnik Rossijskoj akademii nauk*. Moskva: Izdatel`stvo Nauka,. Vol. 82, No.8.

Karpov, A.O. (2012b). Obrazovanie v obshchestve znanij: issledovatel`skaya model` [Education in the Knowledge Society: Research Model]. *Vestnik Rossijskoj akademii nauk*. Moskva: Izdatel`stvo Nauka, Vol. 82, No. 2

Karpov, A.O. (2013a). Innovatsii i sreda issledovatelskogo obucheniya [Innovation and research education environment]. *Filosofiya obrazovaniya*. Novosibirsk: Izdatel`stvo Sibirskogo otdelenia Rossiiskoi Akademii Nauk, No. 4.

Karpov, A.O. (2013b). Sociokognitivnaya struktura i obrazovanie v obschestve znanii. [Sociocognitive structure and education in the knowledge society]. *Obschestvo i ekonomika*. Moskva, No. 11-12.

Karpov, A.O. (2013c). Sotsialnyie paradigmy i paradigmal`no-differentsirovannaya sistema obrazovania [Social paradigms and paradigmatically-differentiated system of education]. *Voprosy Filosofii*. Moskva: Izdatel`stvo Nauka, No. 3.

Karpov, A.O. (2013d). The commodification of education. *Russian education and society.* NY: M.E. Sharpe, Inc., Vol. 55, No. 5.

Karpov, A.O. (2014). Universitet – ot moderna k postmoderny. [University – from modernism to post-modernism]. *Obschestvennye nauki i sovremennost*. Moskva, No. 4.

Kon, I.S. (1989). Psikhologia rannei yunosti. [The psychology of early youth]. Moskva: Izdatel`stvo Prosveshchenie.

Magna Charta Universitatum. Retrieved from http://www.magna-charta.org/ (accessed: 08.10.2011).

Nauchnye shkoly Moskovskogo gosudarstvennogo tekhnicheskogo universiteta im. N.E. Baumana. Istoria razvitiya. [Scientific schools of Moscow State technical University named after N.E. Bauman. History of development]. (1995). Moskva: Izdatel`stvo BMSTU.

Po mirovym lekalam. Interview with I.Frumin. Besedovala N. Bugakova [According to world patterns. I. Frumin interviewed by N. Bulgakova.]. (2013). *Poisk*. Moskva, No. 19-20.

Pokholkov, Yu.P. (2011). Pechal`no, no fakt. Tezis o luchshem v mire rossiiskom obrazovanii segodnya zvuchit neubeditel`no [Sad but true. The proposition about the world's best Russian education sounds unconvincing today]. *Poisk*. Moskva, No. 10-11

Rice, J.M. (1969). *Scientific management in the education.* New York: Arno Press.

Robbins Report. Higher Education Report of the Committee appointed by the Prime Minister under the Chairmanship of Lord Robbins 1961-1963. (1963). London: Her Majesty's Stationery Office.

Roberts, P. (2006). *Nurturing Creativity in Young People: A report to Government to inform future policy*. London: DCMS.

Scott, R. Innovatsionnaya strategia Velikobritanii. [The UK Innovation Strategy].(2009). *Foresight*. Moskva: Izdatel`stvo Vysshaya shkola ekonomiki, Vol. 3, No. 4.

Simons, M. (2006). «Education through Research» at European Universities: Notes on the Orientation of Academic Research. *Journal of Philosophy of Education.* Oxford: Blackwell Publishing,Vol. 40, No. 1.

Terekhov, A. (2009). Kadry za kadrom? [Personnel has been ignored]. *Poisk*. Moskva, No. 3-4.

The Role of the Universities in the Europe of Knowledge. (2003). *Communication from the Commission.* Brussels: Commission of the European Communities.

The University's Response to the Government's White Paper, The Future of Higher Education. (2003). *Oxford University Gazette № 4660. Supplement (1).* Oxford.

Thursby, J., Kemp, S. (2002). Growth and Productive Efficiency in University Intellectual Prorerty Licensing. *Research Policy*, No. 1.

Trow, M. (1972). Sotsiologia obrazovania. [Sociology of Education] *Amerikanskaya sotsiologia. Perspektivy, problemy, metody*. Moskva: Izdatel`stvo Progress.