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Education in the Knowledge Society: Genesis of Concept and Reality

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ABSTRACT

The aim of the article is to define the content of theoretical ideas about education in the knowledge society in terms of the birth of its social reality. It is shown that the genesis of the concept of education in the knowledge society goes back to the period of 1950-1960s and is due to the emergence of new qualities of an industrial worker that the knowledge worker inherits. In 1957 P. Drucker (1957) formulates an idea of advanced training and in 1968 the principle of continuing education to train the knowledge worker. Their relation to the concept of distributed education by P. Drucker is revealed. It is stated that the key institutions of the knowledge society are university and school established on the principles of research training and related scientific and cognitive continuity. The concept of dynamic competence is defined; the relationship of creative learning with the reality of the knowledge society is shown. The analysis of fundamental contradictions of education in the knowledge society is given.

KEYWORDS
Education, society, learning, competence, creativity

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Introduction

In the middle of the XXth century in the socio-economic reality of industrially developed countries of the world there was a move in the direction of a knowledge society. This process found its special expression in culture, social structure, economic instruments as well as in education. In the social humanitarian narrative of the last decades paradigmatic nature of current changes has been suggested, in other words, a fundamental transformation of the method, the content of the environment and institutional framework for training.

Thus, the W.E. Doll (1993) says about the creation of a new concept of knowledge in education, which should be focused on the creation of knowledge, and on its discussion and verification. Bourdieu suggests the idea of research pedagogy, in the

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basis of which he puts the creation of habitus of invention, creativity and freedom. Educational concept of K.G. Flechzig (1992) is based on multiple styles of teaching and pupils' strategies, which create multiple conditions for educational content. Education through contexts that offers R. Godon (2004), is based on the realities of the social world and intersubjective nature of knowledge as a factor of cognitive diversity. D. Carr (2003) points to increased opportunities to attract society to the problems of learning institutions which are specialized for the functions carrying out the knowledge in the postindustrial culture. K. Winch (2004) considers education from the point of view of the requirements of modern professional work, where it is important to have an ability to critically evaluate and respond to a new situation.

Today schools are more than ever an important part of the problem of education in the universities as academic efficiency of the latter directly depends on the degree of cognitive readiness of a student to master of complex systems of professional by specialized knowledge. Experts speak about a noticeable discrepancy between development and intellectual needs of students, on the one hand, and educational environment in schools and universities, on the other hand (Shernoff, 2013). Thus, according to one of the largest studies conducted in 26 states of the USA, almost 40% of respondents believe that the material, which is taught in school, is not relevant, 45% do not feel themselves an important part of a school community, and only 2% said that they have never been bored in school (Yazzie-Mintz, 2007). The passiveness of students causes the model of educational institution as a translator of constructions, overcoming of which is one of the main objectives of the educational theory and practices around the world (Shernoff, 2013).

At the present stage of development of society, as it was shown by the European sociological analysis, there is a high level of coincidence of competencies for “employment” which are involved in research activities (Developing Foresight for the Development of Higher Education , 2002). Such coincidence indicates the emergence of socialization of research type in the process of establishing a knowledge society (Karpov, 2016). It involves the formation of complex competencies of high level, which requires a long time, and, therefore, should start subsequent at the stage of schooling. Hence, one of the main challenges of education is the need to provide scientific and cognitive continuity between school and university, which requires a special, generative learning environment and research methods of cognition (Karpov, 2015b).

Research Methods

The aim of the article is to define the content of theoretical ideas about education in the knowledge society in the context of the emergence of its social reality. I believe that educational theory should proceed from the fundamental cultural and social foundations of its time. Only in this way it can become an effective theory, gain a scientific status and give productive implications for social practices.

Research methodology is built in terms of the cultural and historical epistemology; it is based on an analysis of socio-economic relations towards knowledge and cognition, including training, using a comparative analysis of the sources and correlation of theoretical propositions with reality.

Results

Work with knowledge and a knowledge worker in a new system of labour division

In 1940s-1950s work with knowledge is becoming a new element in the system of labour division which it starts to transform. In 1962 F. Machlup (1972) published a pioneering work "Production and Dissemination of Knowledge in the United States" which main objective is the development of a conceptual framework for the analysis of knowledge production. The performed statistical analysis showed that American knowledge industry in the middle of the XX century produces 29% of gross domestic product (GDP) and the proportion of the workforce, taking into account its potential, a students' part is 42.8%. Accoding to M.U. Porat (1978), in 1967 the sector of production of knowledge and information on the non-market services in this area had already been 46.2 percent of GDP. By 1970 the number of people, working with the knowledge in the "potentially labour force" according to calculations of F. Machlup & T. Kronvinkler (1975) had increased to 53.1 percent.

Working with knowledge is a necessary addition, and then it permeates the whole being of the working-machine operator work, a businessman, a manager, technology, politics, a transporter, a financier and it changes it beyond recognition. Hence, a new cultural nature of work is formed which involves the work with the scientific knowledge in its socially important types, i.e. what the author calls "a scientific hybridization of labor." It means manual and intellectual, as well as industrial and organizational labour.

When the author of the article says that the professional work started to include work with the scientific knowledge it means that it is not that scientific knowledge is included in the training for this work and, thereby, in the qualifications and activities of the employee. It presupposes direct-governmental manipulation with scientific knowledge as an integral part of new work, including physical work. This work is called "Knowledge Work» or "Knowledge Job». Its appearance is noted by P. Drucker in 1957 (1996); although in the early 1940s, even top executives in large US companies rarely had a higher education, while IBM hired its first manager with higher education one or two before World War II started.

Scientific knowledge in the new work is "codified" in the traditional and transformed forms: in scientific periodicals, technology, design, art, drawings, tables, schemes, regulations and professional slang.

The new employee has a hybrid nature: working with knowledge includes "white" and "blue" collar workers in his social group, but also, in some sense "white-blue." In the social sphere scientific hybridization of labour penetrates into management the control, policing, health care, utilities, trade, church, media, social welfare, etc. In the technical area, it creates a special kind of hybrids –human machine systems. They have emerged as a part of the industry, waterworks, electrical networks, logistics, infrastructure, and technical services in aviation, ground and water transport; later they were embodied in spacecraft and orbital stations.

In hybrid technical systems, a person is presented by his thinking, but also physical labour is used. The latter is rather an epiphenomenon of the functional essence as a new employee, which is working with knowledge. However, when working with knowledge is connected with technical work (the one that partially replaced physical work, but not outlived it), this connection is becoming the face of the new professional position of "knowledge workers" and a new separation labour system. In automatization workshops several operators have replaced hundreds of workers. The basis for the handling of labor has become operation with a model of knowledge, but their work included manual operation as well.

The development of hybrid technology systems was caused in 1930-1940's by preparations for war and the war itself. P. Drucker (1969) writes that it was from the

Second World War actually began the shift to the work of knowledge and knowledge industry that concerned such areas as metal processing, shipbuilding, construction, management, medicine, etc. (Drucker, 1969).

According to P. Drucker (1969), the event which produced a decisive shift in the emergence of the knowledge worker in America was "Soldier's Bill of Rights» (G.I. Bill of Rights) – a legislative act signed by President Roosevelt on 22nd June 1944. The law provided a number of benefits for veterans returning from the war; including payments for training in universities, schools, technical schools (including accommodation) and low-interest loans to start a business. Another, notable event was the appearance of venture capital firms in 1946 in the US that had created a new economic reality for the knowledge worker. In the initial period they considered their activities as a tool for financing "noble ideas" of knowledge worker and invested in the start-up companies, which was led by soldiers returning from the war.

The term " knowledge worker» is introduced P. Drucker (1950) in the epilogue of the book "The New Society" written in 1962. However, his appearance as a new employee is noticed much earlier. As P. Drucker notes in 1950, a worker having new knowledge is a massive part of a new middle class, it is non-manual worker, intellectually and technically trained person who is the most productive member of society. For example, in the glass industry in the late forties manual labor was almost completely eliminated, as well as in the oil chemistry or production of plastics.

In his book "The Age of Discontinuity" P. Drucker (1968) defines a new society as a society of knowledge. A new era is the era of innovations and technological changes, says P. Drucker (1968). New industries are knowledge production, and knowledge is a major factor in their performance. They use the knowledge workers and produce goods and services with a high content of knowledge. A knowledge worker created modern agricultural production which has become a science industry. From there he drove labor in industry, services, information, and knowledge sector (Drucker, 1969).

P. Drucker (1969) distinguishes the knowledge worker from the mind worker. For example, he uses the term «mind work», when speaking about mental work, not «knowledge work», which characterizes the work of a knowledge worker. Knowledge workers are engineers, computer experts, teachers, medical technicians, highly skilled agricultural workers, aircraft technicians, etc. Thus, according to P. Drucker (1969), the knowledge worker is not mind worker. The "knowledge does not eliminate neither work, nor skill».

The author believes that the knowledge worker is primarily determined by dominating type of work, rather than his professional affiliation. The basic operational component of the knowledge worker's labor is the work with the knowledge enabling productive thinking. The knowledge worker can produce both tangible and intangible products, but the basis of its production is work with the knowledge.

Drucker writes that education is an exceptionally important source that can give a competitive advantage to society and economy; it is education that is able to make the knowledge worker productive. The knowledge worker is becoming the main investment; and for education - the most expensive investment of all. In the late 1960s, when there was a war in Vietnam, the expenditure on education in the United States exceeded defense expenditures; in the previous decade they had doubled (Drucker, 1969).

The genesis of the concept of education for the knowledge society

The concept of education for the knowledge society is beginning to emerge in the second half of in the XX century. During this period the change of the entire educational

system of the society takes place. With the emergence of the global economy and the rapid acceleration of technological revolution, education begins to lose its elite status, it becomes massive and directly responsible for the development of society.

In the book "Landmarks of Tomorrow" P. Drucker (1957) identifies the main parts of the social structure of which form a new society. This is an innovative system, including science, a special educational system and business enterprise as a model of a new social organization. The new employee should be ready to work in the conditions of integration of social and technological innovations and those organizations that carry out this function. These competences are laid by education (Drucker, 1996). Hence, beside the system of views on the innovative nature of a new society it is necessary to build up concepts of "educated society", i.e. a society, based on education.

The first edition of the book coincided with the event which fundamentally changed the attitude towards educational system in the United States and the Western world, also in terms of the concept developed by P. Drucker. On October 4th, 1957 Soviet spacecraft PS-1 (the simplest satellite-1), the first artificial satellite was launched into Earth orbit. The value of the first event for the formation of a new social group of knowledge workers was by no means a simple, but a milestone. On this day, US President D. Eisenhower in his speech to the American people said: "Our schools now are more important than our radio-locational stations; the school have a greater power than the energy of the atom" . Being then a congressman, Kennedy warned Americans: "It is no exaggeration to say that the battle we are waging now, can be won or lost in the classrooms of America."

The researchers conducted in the US, which were generously supported by government showed that especially critical part in the system of education is high school, because it lays the foundation for scientific and technical careers of students. In response to the political, scientific and technological challenges in the US and Western Europe, the system of scientific oriented students' preparation starts to develop actively, where many current scientists and scientific institutions take part. In Russia this work has become a reality only from the mid-1990s, thanks to the program "Step to the Future» (Karpov, 2015a). Due to this reality, a modern knowledge worker grows up.

The innovative orientation of society imposes a special mark on the education. In 1957 Drucker formulates the idea of advancing training and closely approaches the idea of lifelong education for people engaged in productive work with knowledge. "Since we live in the age of innovation, practical education should prepare a person for such work, which does not exist yet and which can not be clearly defined," he writes. More efficient in terms of training of a new employee is education, which is not built in a chronological sequence, but in a distributed time configuration (let's call this education distributed). Drucker's concept of distributed education suggests that the education structure should allow to acquire knowledge on the stages of human life, when a person can perceive it from the cognitive point of view. This cognitive efficiency determines the experience and the development of thought. We are talking about adult education, education as a continuing process, which "uses these years <learning> the most effectively and economically». After all, knowledge is "the only real capital today," and "productive work in modern society ... based on the mind, rather than hands» (Drucker, 1996).

In 1962 in his book "Production and Dissemination of Knowledge in the United States" F. Machlup (1972) writes that education (secondary and higher) is the largest sphere of the industry of knowledge (the largest part of the book is devoted to it). "The level of resources to provide education, research and development is an important economic variable, which can significantly alter the growth rate of knowledge, both

fundamental and applied." That is why there is a surge in the activity of studying productivity of investment in knowledge.

The "Age of Discontinuity"(1968) Drucker argues the need for a new approach to education, which should be able to teach the knowledge worker. New education should form a "universal skill that is to use the knowledge and the systematic acquisition as the foundation for efficiency, qualification and achievement". He speaks about "universal" learning technologies in terms of technique of applied knowledge. Here P. Drucker connects the idea of continuing education with high dynamic of changes of knowledge, which are used at work. The necessity of constant retraining applies for all employees of Knowledge - engineers, doctors, mathematicians, teachers, etc. When continuing education becomes the norm, it is necessary to implement the idea of distributed education, Drucker said. Instead of increasing the period of initial training, it will be necessary to break it into parts and distribute-training on the entire active life. Therefore, the most important thing in education for the knowledge society to teach a person how to learn (Drucker, 1969).

The report of the UNESCO "Towards Knowledge Societies" (2005), the concept of lifelong learning is associated with the concept of "learning society", the introduction of which the authors of the report refer to the works of R. Hutchins (1968) and T. Husen (1974) (Towards Knowledge Societies, 2005). Meanwhile, in the book of P. Drucker's (1957) "Landmarks of Tomorrow" it was shown by the author of the book, a description of the company, which is based on education (educated society) contains explicit representations of advanced training and education as a continuing lifelong process. Such education is defined as a key instrument of the concept of innovative development.

Speaking of the novelty of the views of P. Drucker, it should be noted that for the period of the 1950s-1960s it was more typical to have romantic ideas about the role of adult education (education for adults), which inherit social consciousness of the XIX century and speak about "humanization" or «refining» mostly poor people about education for workers. They were based on the motivation to make learning a part of the process of social change. A. Stock (2013) notes that these highly romantic assumptions do not often correlate with the real world of ordinary working people.

According to P. Drucker (1969) a new educational system should provide bringing up the talented for a knowledge-based economy, preparation of the knowledge worker to the work, which does not exist yet (advanced training), his lifelong training(continuing education) and, as a result, the mobility of a new labor.

In the "Age of Discontinuity", P. Drucker (1969) says that the university will play the basic role in the development of the knowledge society and its employees - university laboratories are the basis of the scientific production, from which it grows (Drucker, 1969). At the same time M. Trow says that in modern societies the search for new knowledge and new ways of its application have become important sphere of activity, and colleges and universities are called upon to solve this task, which is becoming increasingly important.

After 12 years of Drucker's book came out in the United States Bayh-Dole Act was passed (Bayh-Dole Act-1980) that removed the obstacles to the transfer of scientific knowledge and technologies from universities to the corporate sector. Over the years universities created more than two thousand companies (260 thousand jobs) who were engaged in the commercialization of technology. A considerable amount of licenses which they receive for these patents is turning them gradually into commercial organizations. Thus, the income of the University of Cambridge from intellectual

activity reaches EUR 3.5 million per year. 120 patents and 35 licenses were obtained only in 2008.

Universities and industry cooperate more and more closely where discoveries are transmitted into innovative products and commercialized using suitable business models. J.R. Cole (2010) believes that "a significant portion of leading industries in the US, perhaps more than 80 percent of the discoveries, were generated in American universities». In 1999, D. Bell (2008) pointed at strong technology-intensive research universities as at the sourse of US technological leadership.

In the early 2000 in Europe, the main role in the creation of knowledge society was given to universities, as they were 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 universities, alongside with research and development were called the basis for European competitiveness (Delivering on the Modernisation Agenda for Universities: Education, 2006).

However, according to P. Drucker (1969), in the nearest future one can hardly expect that it will be possible to measure the "output" of knowledge work because it is not easy to define it in quantitative terms, and it can be impossible to do it all. Thus, the effectiveness of the university performance is being tried to determine by such parameters as "salaries of graduates and their positions", "reputation", "number of degrees and awards", "the amount of funds raised for development". P. Drucker (1969) believes that the evaluation of the university performance criteria is as questionable as counting hospital beds to determine the effectiveness of psychiatric hospitals (Drucker, 1969). This conclusion of an internationally recognized expert in the field of management is very instructive for the reality of education in Russia.

Drucker defines a new ability that the employee should have a knowledge society: he "will have to learn to understand the dynamics of technology and to anticipate the direction and the speed of technological change» (Drucker, 1969). Such ability the author of the article defines by the term "dynamic competence". It is based on a feeling of self-prediction directions of changes in the content and configuration of professional knowledge. It is determined by the research-minded, readiness to perceive and predict changes of the underlying paradigm type, the ability to penetrate into the unknown, i.e. the unknown that possesses systematic unpredictability as an inability to obtain a logical continuation of the established configuration of knowledge. The dynamic competence is created by means of of research training, which refers to the knowledge as to an unpredictable event. Such training, as the author of the article shows the horizon is development of modern education (Karpov, 2010).

Human creativity is defined by Drucker as a driver of economic growth and development of a new society (Drucker, 2010; Drucker, 1993). This idea has a direct influence on modern education.

So, in 2006 the European University Association (EUA) initiated a research project "Creativity in Higher Education", which is funded by the European Commission in the framework of the program «Socrates». The main objective of the project is to contribute to the promotion of a European knowledge society. The report notes that creativity is closely linked to lateral thinking that is required in order to take into account all known factors. In 2008, the UN report "Creative Economy" says that the economic aspect of creativity promotes entrepreneurship, innovations, economic growth. It refers to the creation of cultural products, scientific inventions, technological innovations. The concept of "creative economy" indicates the transition from traditional development models to the interdisciplinary one.

Discussion

In reality of a knowledge society the development of education is accompanied by profound contradictions. According to the author fundamental contradictions are the following: (1) the contradiction associated with the commodification (commoditization) of knowledge; (2) the contradiction between the knowledge worker and manager; (3) the contradiction between knowledge and information; (4) the contradiction between scientific knowledge and non-scientific.

The most important of these contradictions is generated by commodification policy that incorporates education and science in the system of commodity relations. Commodification of knowledge forms the business environment hostile to creative thought, this is creative knowledge . As a result, learning process excludes the creative personality traits and socio-cultural communication skills, creative function of the training and the trainee, connection of training to research and motivation to them, as well as educational function of the research, which forms the scientific methodical thinking and determines the high quality of education .

One of the most acute contradictions of a knowledge society is the contradiction between knowledge workers (a lecturer, a teacher, a scientist, a highly qualified specialist) and a pure manager, who cannot always be attributed to a group of knowledge workers. But even when he acts as a knowledge worker, it is not free of this contradiction.

In the "Age of Discontinuity" managerialism of Drucker is becoming mandatory. A "boss" of a knowledge worker, says Drucker, is a "manager usually not well professional in his disciplinary field, but with special competence in the field of planning, organization, integration of personnel and evaluation knowledge people, regardless their discipline or areas of expertise. " Thus, there is always necessary to have managers to run the university (Drucker, 1969). In the "post-capitalist society" (1993), he would say - in an organization based on knowledge, managers need to know the work of their subordinates (Drucker, 1993).

Today managerialism is positioned as an ideology that claims superiority of pure management and leadership - its abstract studies and schemes – over any another form and manner of organization of social institutions and activities. Managerialism postulates that its socio-technical practices are universal and always better than context-professional approach to the management of groups of people in modern society (Deem, Hillyard & Reed, 2010). Our days have shown devastating consequences that arise when "non-academic" people are trying to impose a purely institutional vision of an academic culture that is the basis of science education and scientific knowledge production. Schools can be run by people who do not know pedagogy, hospital –by those not knowing anatomy, universities and research institutes- by officials and people from the business, i.e. those who are "effective managers," who are only "responsible for the use and performance of knowledge» (Drucker, 1993); people who are not versed in scientific knowledge; people walking in shallow water.

The contradiction between knowledge and information is not less important. This is contradiction between the internal (meaningful) and external (superficial) understanding, between the independent and socially programmed thinking. In the analysis of learning processes P. Drucker defines arithmetic, history, language, reading and music writing as information (Drucker, 1969). M.U. Porat (1978) also refers teachers to information workers (category of "knowledge disseminators"), placing them on a par with the office assistants, accountants and telephone operators (Porat, 1978).

Today we see how the confusion between "information" and "knowledge" makes legitimate changes in people's lives, the economy and social structure on the officials' will or on the basis of outsourced expert's opinion rather than on a scientific study of the problem situation. In the education knowledge defined as information, acquires the status of the temporary acquisition, which is by no means necessary for life and work. This "knowledge" not only eliminates the possibility of the knowledge worker, but also about the knowledge society as a whole.

Socially critical is becoming the contradiction between scientific knowledge and non-scientific. It is exacerbated when the second replaces the first one. In case research, engineering, design is aimed only at the efficacy of the final result, it is not interested in the study of the factors that do not affect the efficiency. So things and technology unpredictable in their consequences are created. The rationale for their existence is palliative theory, prescription regulations and limited empirical data which are defined by the client, rather than a scientific necessity.

The knowledge is able to lose the status of being scientific when it is approved as a opportunistic knowledge that is the knowledge, aspiring primarily to an external stimulus, and not the truth. For the knowledge of production processes it is crucial to have context of use, rather than the context of the discovery and study in the scientific community. Uncontrolled commercialization of science causes erosion of the fundamental specialization of universities and its structural imbalances at the national level, as it facilitates hypertrophic development of those areas of research that promise quick rewards.

Conclusion

Knowledge society as a special social space of modern society is formed in the 1940s-1960s. Its crystallization centers are a new system of division of labor, innovative development institutions, educational organizations, bringing up a knowledge worker. Social order to prepare the knowledge worker, that is able to be productive in a rapidly changing knowledge and technological environment, is one of the main challenges of modern education.

The concept of the education system which is able to give an answer to this challenge is formed in the 1950s-1960s. As shown by P. Drucker (1957, 1968), such a system of education is based on the idea of advanced training and the principle of continuing education for the knowledge worker. The concept of distributed education created by P. Drucker in this period, in his opinion, should be implemented after the continuing education will become the norm.

The university and school built on the principles of research training and related to scientific and cognitive continuity are the key institutions of the knowledge society. The creative nature of learning determines the ability of knowledge worker to social, technical and technological innovation, and research forms his dynamic competence and socio-economic performance.

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