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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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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, a 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, W.E. Doll says about the creation of a new concept of knowledge in education, which should be focused on the *creation* of knowledge rather than on its discussion and verification (Doll, 1993, p. 157, 109, 216]. Bourdieu suggests the idea of research pedagogy, in the basis of which he puts the creation of habitus of invention, creativity and freedom. Educational concept of K.G. Flechzig is based on multiple styles of teaching and learners' strategies, which create multiple conditions for educational content (Flechzig, 1992, pp. 351-360). Education through contexts that is offered by R. Godon, is based on the realities of the social world and intersubjective nature of knowledge as a factor of cognitive diversity (Godon, 2004, pp. 593, 594, 599). D. Carr denotes the increased opportunities of society to involve into the problems of learning the institutions that are specialized in functions that knowledge carries out in the postindustrial culture (Carr, 2003, p. 9, 16, 14). K. Winch considers education

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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 new situations (Winch, 2004, p. 476, 477).

Today schools are more than ever an important part of the problem of education in universities because the academic efficiency of the latter directly depends on the degree of cognitive readiness of a student to master complex systems of professionally 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, p. 10, 9). 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, p. 1, 5). The learners' passiveness results in the model of an educational institution as the translator of instructions, which is to be overcome, and it is one of the main objectives of the educational theory and practice around the world (Shernoff, 2013, p. 3).

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/Research Relations in the Perspective of the European Research Area (ERA), 2002, p. 16, 29 40, 47]. Such coincidence indicates the emergence of socialization of research type in the process of establishing a knowledge society (Karpov, 2016, p. 3491, 3492]. It involves the formation of complex competencies of high level, which requires a long time, and, therefore, should start 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, p. 531-534).

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.

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

Results

Knowledge work 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 published a pioneering work "Production and Distribution of Knowledge in the United States" the main objective of which is the development of a conceptual framework for the analysis of knowledge production (Machlup, 1972, p. 10). The performed statistical analysis showed that the American knowledge industry in the middle of the XX century produced almost 29% of gross domestic product (GDP) and the proportion of the labour, including its potential students' part, was 42.8%. According to M. Porat, in 1967, the sector of production of knowledge and information as well as the non-market services in this area was already 46.2 percent of GDP (Porat, 1978, p. 71). By 1970, the number of people working with knowledge in the "potential labour",

according to calculations of F. Machlup and T. Kronvinkler (1975) had increased to 53.1 percent.

Work with knowledge turns out to be a necessary replenishment, and then it starts to permeate the whole nature of a machine-tool operator work, of a businessman, a manager, a technologist, a politician, a transport worker, a financier, and it radically changes it. Hence, a *new cultural nature of work* is formed which involves the work with scientific knowledge in its socially important types, i.e. what the author of the article calls "a scientific hybridization of labor." It means both physical, manual labour and brainwork as well as both industrial and organizational jobs.

When the author of the article says that the professional work started to include work with scientific knowledge, he does not mean that scientific knowledge has been included in training for this work and, thereby, in the qualifications and activities of the employee. He means the *direct* 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 (Drucker, 1996, p. 69, 122, 121); although in the early 1940s, even top managers in large US companies were rarely university educated, and IBM hired its first manager with higher education one or two years before World War II started.

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

The new employee has a hybrid nature: knowledge work includes "white" and "blue" collar workers in his social group, but also, in some sense "white-blue" as well. In the social sphere, scientific hybridization of labour penetrates into management, police, health care, community services, trade, church, mass media, social service, etc. In the technical area, it creates specific types of hybrids – man-machine systems. They have emerged as a part of industry, water-engineering systems, electrical networks, logistics, infrastructure, and technical services in aviation, land and water transport; later they were embodied in spacecraft and orbital stations.

In hybrid technical systems, a man is presented by his thinking, but he also uses the labour of his hands. The latter is rather an epiphenomenon of his functional essence as a new employee, which is the knowledge work. However, when knowledge work is united with technical work (the one that partially replaced physical work, but not eliminated it), this union becomes the face of the new professional position of a "knowledge worker" and a new system of labour division. In automated workshops, several operators have replaced hundreds of workers. Operation with models of knowledge has become the basis for work, but their work included manual operation as well.

The development of hybrid technical systems was caused in 1930-1940's by preparations for the war and the war itself. Drucker writes that it was from the Second World War that the actual shift to knowledge work and knowledge industry began, which affected such areas as metal processing, shipbuilding, construction, management, medicine, etc. (Drucker, 1969, p. 252).

According to Drucker, the event which resulted in a decisive shift in the emergence of the knowledge worker in America was G.I. Bill of Rights– a legislative act signed by President Roosevelt on 22 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 companies in 1946 in the US, which created a new economic reality for the man of knowledge. In the initial period, they considered their activities as a tool for

financing "noble ideas" of the man of knowledge and invested in the start-up companies, which were managed by soldiers returning from the war.

The term a "knowledge worker» was introduced by P. Drucker in the epilogue of his book "The New Society" (1950) written in 1962. However, its appearance as a new type of an employee had been noted much earlier. As Drucker notes in 1950, a worker possessing a new knowledge is a mass part of a *new* middle class, it is a non-manual worker, an 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" (1968), Drucker defines a new society as a knowledge society. A new era is the era of innovations and technological changes, says Drucker. New industries become the production of knowledge, and knowledge is a major factor in their performance. They use knowledge workers and produce goods and services with a high content of knowledge. The knowledge worker created modern agricultural production, which became a science industry. From there he drove work force into industry, services, information and knowledge sectors of economy (Drucker, 1969, p. 54, 10-15, 154, 67, 254).

Drucker 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 Drucker, the knowledge worker is not a mind worker. The "knowledge eliminates neither work, nor skill» (Drucker, 1969, p. 24, 236, 251-255).

The author of the article believes that the knowledge worker is primarily determined by the dominating type of job rather than by his profession. The basic operational component of the knowledge worker's job is the work with knowledge, which involves productive thinking. The knowledge worker can produce both tangible and intangible products, but the basis of their production is the work with 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, he is the most expensive investment. In the late 1960s, when the war was waged in Vietnam, the education expenditure in the United States exceeded defense expenditure; during the previous decade, they had doubled (Drucker, 1969, p. 291).

The genesis of education concept for the knowledge society

The concept of education for the knowledge society starts to be formed in the second half of the 20th century. During this period, the change of the entire educational system of the society is taking place. With the emergence of the global economy and the rapid acceleration of technological revolution, education begins to lose its elite status; it becomes popular (popular означает «массовый», это не ошибка) and directly responsible for the development of society.

In the book "Landmarks of Tomorrow" (1957), P. Drucker identifies the main parts of the social structure of which a new society is being formed. 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 in the organizations that carry out this function. These competences are laid by education (Drucker, 1996, p. 19, 41, 42). Hence, along with 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 that fundamentally changed the attitude towards educational system in the United States and the Western world in terms of the concept developed by Drucker. On 4 October 1957 the Soviet spacecraft PS-1 (PS are the first letters of the Russian words that mean the simplest satellite), the first artificial satellite was launched into the Earth orbit. This event was not simply important for the formation of a new social group of knowledge workers but it turned out to be a milestone. On this day, the US 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". The then 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 the classrooms of America".

The research activities conducted in the US, which were generously supported by the government, showed that especially critical part in the system of education is secondary school, because it lays the foundation for scientific and technical careers of learners. In response to the political, scientific and technological challenges, in the US and Western Europe the system of research training for schoolchildren starts actively developing, in which many active scientists and scientific institutions take part. In Russia, this work has been realized only since the mid-1990s, due to the program "The Step into the Future» (Karpov, 2015a, p. 443, 444). It's this reality that brings forth a modern knowledge worker.

The innovative orientation of society stamps education with a hallmark. In 1957, Drucker formulates the idea of advancing training and closely approaches the idea of continuing education (also known as lifelong education) for people engaged in productive work with knowledge. "Since we live in the age of innovation, practical education should train a person for the work that does not exist yet and which cannot be clearly defined," he writes. More efficient in terms of training a new employee is education, which is built not in a chronological order but in a distributed in time configuration (let's call it *distributed* education). Drucker's concept of distributed education suggests that the education structure should allow of acquiring knowledge on those stages of the 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 <of learning> most effectively and economically». After all, knowledge is "the only real capital today," and "productive work in modern society ... is based on the mind rather than on hands» (Drucker, 1996, p. 129, 147-149, 120).

In 1962 in his book "Production and Distribution of Knowledge in the United States" F. Machlup writes that education (secondary and higher) is the largest sphere of the knowledge industry (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 such a surge in the activity of studying productivity of investment in knowledge (Machlup, 1972, p. 5, 11).

In the "Age of Discontinuity" (1968), Drucker approves the need for a new approach to education, which should be able to train the knowledge worker. New education should form a "universal skill that is to use knowledge and its systematic acquisition as the foundation for efficiency, qualification and achievement". He speaks about "universal" teaching for technologists in terms of techniques of acquiring knowledge. Here Drucker connects the idea of continuing education with the high dynamics of changes in knowledge that is used in work. The need for constant retraining is relevant for all knowledge workers: engineers, doctors, mathematicians, teachers, etc. When continuing education becomes the norm, it is necessary to implement the idea of distributed education, Drucker supposes. Instead of increasing the period of initial training, it should be broken into parts and allocated over entire active life. Therefore, the most important thing in education for the knowledge society is to teach a person how to learn (Drucker, 1969, p. 299, 300-303).

In the UNESCO report "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 by R. Hutchins (1968) and T. Husen (1974) (Towards Knowledge Societies, 2005, p. 57). Meanwhile, in P. Drucker's book "Landmarks of Tomorrow" (1957), as it was shown by the author of the article, a description of the society 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 Drucker's views, it should be noted that for the period of the 1950s-1960s it was more typical to have romantic ideas about the role of education for adults, these ideas inheriting public conscience of the 19th century and speaking about "humanization" or «refining» mostly of poor people and about education for industrial workers. They were based on the motivation to make learning a real part of the social change process. A. Stock notes that these highly romantic assumptions do not often correlate with the real world of ordinary industrial workers (Stock, 2013, p. 10-13).

According to Drucker, a new educational system should provide fostering talents for a knowledge-based economy, the knowledge worker readiness to the work that does not exist yet (advanced training), his lifelong training (continuing education) and, as a result, the mobility of a new labour (Drucker, 1969, p. 114, 300, 306, 286).

In the "Age of Discontinuity", Drucker says that the university will play the basic role in the development of the knowledge society and its employees as university laboratories are the basis of scientific production from which it rises up (Drucker, 1969, p. 187, 167). At the same time, M. Trow says that in modern societies the search for a new knowledge and new ways of its application have become the important sphere of activity, and colleges and universities are called upon to solve this task, which is becoming increasingly important.

In 12 years after the Drucker's book appearance in the United States, Bayh-Dole Act-1980 was passed that removed the obstacles to the transfer of scientific knowledge and technologies from universities to the corporate sector. For several years, universities created more than two thousand companies (260 thousand positions) that were engaged in the commercialization of technologies. 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 activities 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 overgrow into innovative products and are commercialized using suitable business models. J. Cole believes that "a significant portion of leading industries in the US, perhaps more than 80 percent, originated from discoveries in American universities» (Cole, 2010, 4). In 1999, D. Bell specified strong science intensive research universities, powerful entrepreneurial culture, and venture capital for small business financing as the sources of the US technological leadership (Bell, 2008, p. xl, xliii). In the early 2000 in Europe, the main role in the creation of knowledge society was given to universities 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, universities alongside with research and development were called the basis for European competitiveness (Delivering on the Modernization Agenda for Universities: Education, Research and Innovation, 2006, p. 2).

However, according to Drucker, in the near 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 altogether. Thus, one tries to determine the performance efficiency of a university by such parameters as "graduates' salaries and their positions", "reputation", "the number of degrees and awards", "the amount of funds raised for development". Drucker believes that the university performance evaluation based on

performance criteria is as questionable as counting hospital beds to determine the effectiveness of psychiatric hospitals (Drucker, 1969, p. 269, 270, 183). This conclusion of the world-known expert in the field of management is very instructive for the reality of education in Russia.

Drucker defines a new ability that a worker in the knowledge society should possess: he "will have to learn how to understand the dynamics of technology and to anticipate the direction and the speed of technological changes» (Drucker, 1969, p. 40). The author of the article defines this ability using the term "dynamic competence". It relies on the feeling of self-predicting the directions of changes in the *content* and configurations of professional knowledge. This ability is determined by a research mind that is ready to perceive and predict underlying changes of the paradigmatic type, to penetrate into the unknown in essence, i.e. the unknown that possesses systematic unpredictability as an inability to obtain the established configuration of knowledge just by logical continuation. The dynamic competence is created by means of *research training* that regards knowledge as an unanticipated event. Such training, as the author of the article shows, is the horizon of modern education development (Karpov, 2010, p. 373-376).

Human creativity is defined by Drucker as a driver of economic growth and development of a new society (Drucker, 2010, p. 161, 184; Drucker, 1993, p. 19, 28). This idea has a direct influence on modern education.

Thus, 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 «Socrates» program. The main objective of the project is to contribute to the promotion of the European knowledge society. The report notes that creativity is closely linked to lateral thinking that is required in order to take into account all factors known. In 2008, the UN report "Creative Economy" says that the economic aspect of creativity promotes entrepreneurship, innovation, economic growth. It refers to the creation of cultural products, scientific inventions, and technological innovations. The concept of "creative economy" indicates the transition from traditional models of development to the interdisciplinary model.

Discussion

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

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 a business environment, antagonistic to creative thought, which is creating this knowledge. As a result, the learning process excludes creative traits of a person and socio-cultural communications of knowledge, creative functions of the trainer and the trainee, the relations between teaching and research and motivation to them as well as educational function of research, which forms scientific methodicalness of thinking and identifies the high quality of education.

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

In the "Age of Discontinuity», Drucker's managerialism is becoming imperative. The "boss" of a knowledge worker, says Drucker, is "a manager who is usually ignorant of his

disciplinary field, but possesses special competences in the field of planning, organization, integration of personnel and evaluation of knowledge people regardless of their discipline or areas of expertise. "Thus, it is always necessary to have managers to run the university (Drucker, 1969, p. 251, 332). In the "Post-Capitalist Society" (1993), he says that in an organization based on knowledge, managers need not know the work of their subordinates (Drucker, 1993, p. 107).

Today managerialism is positioned as an ideology that claims superiority of pure management and leadership, of its abstract grounds and schemes, over any other 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 groups of people management in modern society (Deem, et. al., 2010, p. 6). These days have shown the devastating consequences that arise when "non-academic" people are trying to impose a purely organizational vision on the academic culture, which underlies science education and scientific knowledge production. Schools can be run by people who do not know pedagogy, hospitals – by those who do not know anatomy, universities and research institutes - by clerks and people who come from business, i.e. those who are "effective managers"; who only bear "responsibility for the use and performance of knowledge" (Drucker, 1993, p. 44); 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 the contradiction between the internal (sensible) and external (superficial) understanding, between the independent and socially programmed thinking. In the analysis of learning processes, Drucker defines arithmetic, history, language, ability to read and listen to music as information (Drucker, 1969, p. 319, 320). Porat also refers teachers to information workers (the category of "knowledge disseminators"), placing them office assistants, accountants and telephone operators (Porat, 1978, p. 71, 73).

Today we see how the confusion between "information" and "knowledge" makes legitimate changes in people's lives, in economy and social structure on the officials' will or on the basis of a committed expert's opinion rather than on a scientific study of the problem situation. In education, knowledge defined as information, acquires the status of a 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 per se.

The contradiction between scientific and non-scientific knowledge is becoming socially critical. It is exacerbated when the second replaces the first one. If research, engineering, design is aimed only at the effectiveness of the final result, it is by no means interested in the study of factors that do not affect the efficiency. Thus, things and technologies unpredictable in their consequences are created. The rationale for their existence is a palliative theory, prescription regulations and limited empirical data that are determined by the client rather than by scientific necessity.

The knowledge is able to lose the status of being scientific when it is approved as an opportunistic knowledge, i.e., knowledge aimed at primarily to an external stimulus but not at the truth. For the knowledge production processes, it is crucial to have a context of use rather than a context of discovery and justification in the scientific community. Uncontrolled commercialization of science causes erosion of the fundamental specialization of universities and its structural imbalance 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 labour division, innovative development institutions, educational organizations, training a knowledge worker. The social order to train

a 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, such a system of education is based on the idea of advanced training (1957) and the principle of continuing education for the knowledge worker (1968). The concept of distributed education created by Drucker in this period, in his opinion, should be implemented after the continuing education will have become the norm.

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

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