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Unity of science and education as a paradigmatic way of development of economy and social sphere: the conceptual aspect

Abstract. The role of science and education in the society is explained by the fact that they are the dominant and present basic conditions for integration of a human in a variety of human life forms, introduction to the development of culture and spirituality mainly through education. There is a direct dependence: the more intensively science and education develop in the country, the more progressive and competitive society and the state are.

Science extends not only a range of knowledge, but also strongly encourages progress in the system of training with regard to technologies of the learning process. Hence, there is a close logical connection between science and education. Their common basis is knowledge which builds up information society.

The 21st century has fundamentally changed the basic resources by means of which society and the economy develop. Today, information, intellectual and innovation (science and technology) resources are the most important. All of them depend solely on knowledge and the state of the scientific development of mankind.

The approval of the information society concept as the basic one creates fundamentally new possibilities for the development of economy and social sphere.

Keywords: Science; Education; Information Society; Economy; Social Sphere

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Єдність науки та суспільства як парадигмальний шлях розвитку економіки та соціальної сфери: концептуальний аспект

Анотація. Роль науки, освіти в суспільстві пояснюється саме тим, що вони домінуючі, базові умови для включення людини в найрізноманітніші форми життєдіяльності суспільства, залучення до розвитку культури, духовності за допомогою, головним чином, освіти. Існує пряма закономірність: чим інтенсивніше розвивається в країні наука, освіта, тим прогресивнішим, конкурентоспроможнішим є саме суспільство, держава. Наука не просто розширює діапазон знання, але наполегливо викликає прогрес у системі навчання, у технологіях здійснення процесу навчання. Звідси й логічний, найтісніший зв'язок науки й освіти. Їхня загальна база – знання, яке єдине створює інформаційне суспільство.

У XXI столітті принципово змінилися основні ресурси, на основі яких розвиваються суспільство й економіка. Нині трьома найважливішими ресурсами є інформаційний, інтелектуальний та інноваційний (науково-технологічний). Усі вони залежать винятково від знань, стану наукового розвитку людства.

Ухвалення концепції інформаційного суспільства в якості базової створює принципово нові можливості для розвитку економіки та соціальної сфери.

Ключові слова: наука; освіта; інформаційне суспільство; економіка; соціальна сфера.

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Единство науки и образования как парадигмальный путь развития экономики и социальной сферы: концептуальный аспект

Аннотация. Роль науки, образования в обществе объясняется именно тем, что они доминирующие, базовые условия для включения человека в самые разнообразные формы жизнедеятельности общества, приобщения к развитию культуры, духовности посредством, преимущественно, образования. Существует прямая закономерность: чем интенсивнее развивается в стране наука, образование, тем более прогрессивным, конкурентоспособным является само общество, государство. Наука не просто расширяет диапазон знания, но настоятельно вызывает прогресс в системе обучения, в технологиях осуществления процесса обучения. Отсюда и логическая, теснейшая связь науки и образования. Их общая база – знание, которое единственное создает информационное общество.

В XXI веке принципиально изменились основные ресурсы, на основе которых развиваются общество и экономика. Ныне тремя наиболее важными ресурсами являются информационный, интеллектуальный и инновационный (научно-технологический). Все они зависят исключительно от знаний, состояния научного развития человечества.

Принятие концепции информационного общества в качестве базовой создает принципиально новые возможности для развития экономики и социальной сферы.

Ключевые слова: наука; образование; информационное общество; экономика; социальная сфера.

1. Introduction

The 21st century is characterised by many striking features. Science and education, perhaps, rank the top position among them. Without them, it is impossible to maintain a truly innovative way of development of the economy and social sphere, to create human communities, to secure the transition from the

industrial to the information societies and to form a qualitatively new identity that should be viewed as competent, highly professional, creative, socially active, without which no economy of the third millennium is possible.

The issues of how fundamentally science and education have changed since the beginning of the 21st century, the impact

they have had on the universal human development (including the economy and the social sphere), and the problems of their functioning are the staging points of our present consideration.

It should be started with the following. The birth of scientific knowledge is usually referred to 8th-4th centuries BC, and ancient Greece is viewed along with China, India, Babylon and Egypt as the most rapidly developing scientific centres. But for all that, the historical development of science and, respectively, of the economy has never been steady, which is primarily due to the circumstances and needs of social development.

Initially, philosophy and scientific knowledge were viewed as a scientific integer, and many researchers consider the beginning of modern science in the New Era, the period of industrial revolutions in Western Europe in the 16th-18th centuries. This period is characterised by the division of integral knowledge into philosophy and science [9, 103].

During this period two major changes associated with science took place. Firstly, science was separated from theology (this is due primarily to the activities of Leonardo da Vinci, Giordano Bruno, Francis Bacon and other brilliant scientists).

Secondly, there appeared to be a process of replacing scholasticism with principles of materialism and the elements of dialectics [6, 18]. That was a period of truly revolutionary development of knowledge and science.

Modern science began to form at the end of the 18th century, after the industrial revolution, and in the 19th-20th centuries there was the highest scientific upsurge associated with the collapse of the mechanical picture of the world and with a great number of truly revolutionary discoveries in different scientific fields.

Information society has become a great step towards the formation of societies featured by fundamentally new interpersonal and other subject-object relations, and therefore, by the economy and the social sphere of a new type. These are societies where information technologies permeate all spheres of public life and, above all, develop the economic growth processes. It is a society in which science and knowledge is the most valuable product, which is why information societies are also called «knowledge societies».

2. Brief Literature Review

Altogether, there is a need to specify the problems of development of societies. We shall pay attention to the most notable aspects of the relevant issues covered in literature, both in the positive and problematic terms:

- Francis Bacon (1561-1626), eminent English scholar and philosopher, founder of the research methodology. He was the first who drew attention to the need to protect information, state support of the information development of society to, connect knowledge and science.
- Vernadsky Vladimir Ivanovich (1863-1945), an outstanding Russian scholar and lexicographer. In his writings, especially in the monograph «Scientific Thought as a Planetary Phenomenon», he revealed the essence of the meaning, the content of the process of scientific knowledge. He predicted the processes of globalization, with knowledge and science at the foundation, and was the first to substantiate characteristics of a knowledge society.
- David Riesman (USA) was the first who coined the term «post-industrial society». Afterwards, his compatriot Daniel Bell described in detail the kind of society. He drew attention to the fact that in the information societies theoretical knowledge is dominant; information means power, and the availability of information means freedom. We draw attention to the fact that the computer area should be subject to state control and regulation.
- Masuda Yoneji (Japan) with his most prominent work «Computopia» (1966). He was one of the major candidates who attributed credit for coining the terms and concepts of «information society», «global information society», «information age», «global information space», etc. Substantiating the model of the Japanese information society, he suggested characteristics of the information society, which comprise three main components:
 - a) globalism, the output of humanity to the cosmic level of consciousness;
 - b) the global symbiosis of man and nature;

c) the transition to the existence of mankind in the global information space.

- Alvin Toffler (USA) was the first to analyse the «information bomb explosion in the community». He called modern society a «superindustrial society». Toffler divided the power into three main types:

- a) the low-quality power - the power based on violence;
- b) the power of average quality - the power, the basis of which is wealth;

- c) the high-quality power - the power, which is based on knowledge and information.

4. Results

We can identify two most important issues among many features of science. The first feature is huge differentiation of scientific knowledge along with science integrity. The other one is the formation of a fundamentally new vision of the world. This is really a revolutionary process which not only produces but also saves, transfers knowledge and merges science with the economy and production.

Science should be considered as a complex and systemic phenomenon, above all as:

- a cognition process (a set of a certain kind of knowledge and processes to obtain it);
- a social institution existing at a particular historical stage of mankind development;
- part of culture (an integral part of culture) [3, 9-10].

Since «the progress of science lies in the fact that it gets more and more systematically in depth and breadth to the reality, in the elements of being, in the events» [11, 288], there has been an urgent need to try to find a better understanding of the subject matter of science in general.

In many ways, the so-called special sciences are inconsistent. In this, particular sciences are classified in terms of their subject matter or method. There are descriptive, explanatory, typifying, generalising sciences; sciences that study events, laws, structure of something purely metric disciplines, technical methods, etc.

Today, the differentiation of science has significantly affected the differentiation of education. From a holistic, philosophical understanding of human education realised in 1960s, modern universities have come to the training on the principle of «the largest of the least.» This is really required by modern production, but this way and approach to education eliminates, above all, philosophical and humanitarian education.

The general education of the student, in particular, occupies less space, and this complicates the formation of the future expert of a harmonious, comprehensively developed person. This affects the general cultural and humanistic component of the person whose knowledge are technified and narrowly objectified. We recall here that science is a specific form of social consciousness, the way (mechanism) of establishing and interpreting objective truth. That's what science is radically opposed to religion, superstition, mysticism, various simplifications and speculative conjectures.

Today, in the process of scientific activity both levels of scientific knowledge have changed significantly:

- at the empirical level (observation, experiment, grouping, classification and description of the results);
- at the theoretical level of scientific knowledge, we have not only a multi-variability, but also the need of the most accurate explanations, interpretations of scientific results and, therefore, the formulation of hypotheses, theories, concepts, programs, and so forth.

The 21st century and changed the basic functions of science, among which are ideological, industrial and social [2, 461].

The ideological function abounds with many theories, concepts, postulates related to a radical reassessment of norms, values, ideals, patterns related to life and its essence, organisations, etc. This theoretical multi-variability requires someone who teaches a person the ability to independently seek the truth and find the best option in the understanding of a particular phenomenon, fact or maxim.

If we talk about the production function of science, today in many respects science becomes a separate, independent production, de facto - a separate branch of the economy. We are

talking about associations of scientists, science funding sources, examination, industrial and technological bases, distribution of labour. But most importantly, scientific results are an effective product, in particular those basing on new capital goods, technologies and manufacturing processes.

Knowledge, scientific results become more goal-oriented, meeting interests of social and economic practices. In addition, modern science is intrinsic to multi-variability, methodological pluralism, as has already been mentioned above. In turn, this requires a synergistic, holistic, volumetric approach to the assessment of research results, scientific research. Diversity is a particular way to progress, towards a more prosperous human life.

Many analysts believe that the future war (according to the US analysts forecast around the year 2025) will be the war of knowledge. It should be understood that in the process of confrontation and competition in the development of society the most beneficial will be countries or societies with the highest level of education and science. The post-industrial period of development of many countries has fully proved this thesis.

It is through science and education, that a number of countries of the world has come to the forefront in the industrial development, space exploration, revolutionary technological renewal of production and much more. At the same time, the so-called knowledge economy, as well as economics of information (the beginning of the 21st century), is becoming more and more noticeable in the social development of mankind [8, 13].

However, there should be great public concern on the results of the intensive development of information and information technology. Problems associated with the uncontrolled development of the information system of the Internet really exist.

Thus, at the Fifth European Ministerial Conference on mass media, which took place on 11-12 December, 1997 in Thessaloniki (Greece), the participants adopted a special political declaration, which stated that, on the one hand, the development of information and communication technologies contributes to the expansion of freedom of expression and information, creativity and exchange between cultures, education and participation of individuals in public life, providing service for the benefit of human rights, democratic values and social cohesion and, on the other hand, «there is a danger that these technologies and services, under certain conditions, can be used to harm or contrary to human rights and human dignity ...» [ibid., 147].

Today, various virtual, mythical, biased, and sometimes twisted interpretations by the media of the facts, events, and even of the scientific data, are widespread in public life and politics. There is a manipulation of public perception carried out with the aim of psychological processing of huge human communities.

The development of science in the 21st century has been actualised and become an irreversible value in connection with the tremendous acceleration of development and increasing the volume of scientific information. This is confirmed by the following statistical data. The first doubling of the amount of information took 1750 years. The second one - 250 years, which is seven times faster. The third one - 50 years, which is 35 times faster. It is necessary to say that from the year 1950 to the year 2000 the volume of information began to increase exponentially [1, 23-24].

The role of science and education in society is explained by the fact that they are dominant, basic conditions for the integration of humans in a variety of forms of social life, initiation of the development of culture and spirituality mainly through education. There is a direct dependence: the more intensively science and education develop in the country, the more progressive and competitive society and the state are.

Science extends not only the range of knowledge, but also strongly encourages progress in the system of training with regard to technologies of the learning process. Hence, there is a close logical connection between science and education. Their common basis is knowledge which builds up information society.

There are many different arguments in favour of a greater need of the development of education and science in any human society. In our opinion, the most convincing of them are the following: UNESCO estimates that a sufficient level of the national wealth, which meets international standards, can only be reached by those countries where:

- a) 30-40% of the population are citizens with higher education;
- b) at least 25% of the adult working-age population is trained fundamentally in the new way (by content and nature);
- c) where the percentage of GDP (gross domestic product) allocated to education is more than 10%.

To most successfully implement the social function of education, and, consequently, to make the most of the latest scientific achievements in education in shaping the individual, it is necessary to make sufficient investments. Thus, in 2012, Japan spent on education 3.4% of GDP, Italy - 4.3%, Germany and Spain - 4.4%, the US - 5.5%, the UK - 5.6% [7].

It is clear that many countries cannot afford such funding of education and science, mostly from the budget. Hence, there are only two basic ways to obtain such costs. Firstly, it is necessary to establish an education system based on various forms of property - public, private, municipal, etc. Secondly, it is essential to fund education at the expense of not only the state, but also at the expense of entrepreneurs (employers), foundations, charitable organisations.

Today, the term «knowledge economy» has firmly entrenched in the sphere of science and education. In this type of economy, the human factor is at the forefront and, therefore, academies, colleges, universities, most of which are not only educational but also research centres play a crucial role in human development.

Without examining in detail the problems of functioning of higher education institutions in the world adequate to the needs of social development, we outline three criteria that define the best universities of the world. They are: a high concentration of talented students and teachers, the availability of the necessary resources and the latest system of higher education management.

It is necessary to state that leading universities, as a rule, concentrate the best, progressive schools, closely combining education and science. In turn, their prestige and credibility affect the cost of education.

Thus, the average cost of training a student at Harvard University (USA) is 32,000 US dollars (Harvard Business School - 43,800 US dollars); Yale University (USA) - 26,800 US dollars (the course in Law - 44,000 US dollars); Cambridge (UK) - 17,000 US dollars (the course in Medicine - 38,000 US dollars); Oxford (UK) - 26,000 US dollars (the course in Business Administration - 70,000 US dollars); California Institute of Technology (USA) - 31,000 dollars. [7].

High dynamics of «generating» new knowledge requires mobility of the learner and the teacher. Today, more and more people try to find answers to two questions: what should be studied, and how to learn. In the first case, it is essential for students and their teachers to understand, what modern education is acquired for. Back in 1994, UNESCO defined the so-called four stages of formation as follows: [12].

- learn to realize what is happening in the world;
- learn how to make the necessary changes in the world;
- learn to live together (co-operation on a global scale);
- learn to just live.

Due to the intensive development of science and generation of knowledge, modern education is now becoming a truly continuous education throughout life, and learning models are becoming more intense and open. According to the economists, at present 5% of theoretical and 20% of professional knowledge is updated annually.

In education, the all-round formation of the person, especially his spirituality, occupies a leading position. In the words of the famous French humanist and philosopher Anri Munro, the twenty-first century will be the century of spirituality, or it will vanish.

The second essential feature of education is related to the fact that a person needs to learn every day all his life. It is significant that in the countries like Germany, over forty percent of the adult population is studying, whereas in Japan practically all citizens are trying to attain higher education.

Continuing education is now increasingly practiced only in its closest approximation and related to the humanistic backgrounds of education in general. This is evidenced by the works of A. Correa, E. Faure, P. Langrand, P. Shukla and many other scientists. Thus, in the P. Langrand's justification of continuing

education, higher continuing education is a system in which a person is at the centre of all educational endeavours. It needs to create the most optimal conditions for the continuous development of talents and abilities throughout his life [15].

With regard to the most efficient, productive learning technologies, the teaching techniques of the twentieth century comprise four integrated technologies:

- 1) continuing education (which is mentioned above);
- 2) pedagogy of cooperation (teacher, educator is not a transmitter of knowledge and information, but a partner training primarily how to find and learn certain knowledge);
- 3) dialogue: a subject-subject interaction;
- 4) distance education [10, 10].

It should also be emphasised that there has been a significant boost to the development of education. Therefore multiculturalism is becoming the mainstream of today, which is fully understood and used by economically developed countries [13, 14].

The latter has become possible and very popular with the development of not only television but also of computer systems that allow learning in the interactive format online. In fact, knowledge is «delivered» where a consumer currently needs it. At the same time, education, as required by the nature of the information and the nature of man comprehending such a transformation should closely combine the versatility and specialisation.

The great Greek Aeschylus used to say, «The wise man is the one who know not much, but the needed», and no less famous compatriot Democritus called on, «Do not seek to know everything to become ignorant in all». You need a golden mean.

Today's world is marked with not military armed conflicts, but information wars, when the news impact millions of people, which presents a total manipulation with public perception.

Currently, we observe the formation of information societies in which the information is a product and also a mechanism for ensuring effective communication, but also post-infor-

mation societies, in which the majority as well as the minority must be guaranteed the right to defend their views.

Without specifying and describing various concepts and models of information societies which are rapidly emerging in today's world, we are able to select only a number of specific and mostly problematic aspects.

5. Conclusions

Analyzing just a few theories related to the information society, we focus attention on the fact that the term «info-ruling» is used more and more actively today. It means the power of those who actually own information.

Thus, there is every reason to state that by the middle of the 21st century, the number of countries that will have shaped information societies will increase several times, which means that life processes and communication will be entirely due to the level and the state of scientific, educational development of large human communities.

Finally, radical changes in the methodology and practical comprehension of the role of science and education in the modern world relate to the following. Regarding the formation of the person as the supreme being of the whole universe, his mind has certainly been a priority. But when it comes to human activity as a conscious phenomenon, it is assumed that it is formed mainly by the information resource.

The 21st century has fundamentally changed the basic resources by means of which society and the economy develop. Today, information, intellectual and innovation (science and technology) resources are the most important. All of them depend solely on knowledge and the state of the scientific development of mankind. Therefore, the winner will be the one who is most aware of this idea and will adopt it in every possible way.

Obviously, there should be a fundamentally new concept of cooperation between the state and society, including the economic and social spheres [16].

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