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The Role of Globalization and Integration in Interdisciplinary Research, Culture and Education Development

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Abstract

The goal of this review article is to show the role of globalization and integration in interdisciplinary research, culture and education during the rapid development of human civilization in the 21st century. The process of globalization is largely connected with human development and consists in the universalization of human culture and the creation of a global human community - the only one we know today. As there are different attitudes to globalization in the world, positive, negative and neutral attitudes are considered in the article. Most researchers often distinguish economic, political, sociological and environmental approaches to the problem of globalization. But in the context of our research, it is more important to consider the cultural and educational aspects of the problem. No specific definitions and relationships of globalization and culture are proposed in our review article, but the process of globalization is described in detail. It was not easy to find research works dedicated exclusively to globalization impact on culture and education as most researchers simply conclude that culture and globalization are incompatible. The paper tasks contribute to the field of pedagogy by summarizing some theoretical issues and offering comparative study and analysis of contents and discontents of globalization in different spheres of life, but especially in education and culture exchange. The attitudes to globalization is different, so our main task was to give an unbiased assessment of the phenomenon, to show that there are more to it than just pros and cons. The globalization process and integration as its constituent part can not be turned back in the socio-historical context as much as human development and evolution can not be stopped. If we can show the inevitability of globalization then the advantages of globalization will outweigh its disadvantages.

Keywords: Globalization, Interdisciplinary research, Culture, Education development, Integration.

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Introduction

Globalization is a trend of modern life; it means transparent national borders and creation of a world connected by markets. Globalization is the process of changing to an integrated world from an isolated one. It can be summed up as a long-term change towards greater international cooperation in economics, politics, cultural values, and the exchange of knowledge (Levitt, 1990), but it will also deal a fatal blow to regional economy and national traditions, customs, myths and everything that defines the cultural identity of any country or region.

It is generally accepted that the term 'globalization' was used in 1983 by the American Theodore Levitt in an article in the "Harvard Business Review". Using this concept, he described the process of merging the markets of individual products produced by transnational corporations (Collins, 2018; Levitt, 1986). But this term was not widely spread until in 1996 it was given a new start in life in Russia. In 1997 the Moscow "Expert. Business weekly" wrote: 'Globalization' is the world terminological hit of this year interpreted in all languages in every way ... The exact common definition has not yet been worked out." (Expert. Business Weekly, 1997).

The generally accepted definition of globalization has not been worked out so far because everyone is investing something different in the notion of globalization. Globalization is a process of worldwide economic, political, cultural, educational and religious integration and unification (Spring, 2008). This definition is the most common, though rather blurry.

In general, globalization is a process of increasing mutual influence of various factors of world significance (such as political and economic ties, information and cultural exchange). The most powerful factor of globalization is the economic one, it manifests itself in the existence of transnational corporations that operate simultaneously in different countries and use political situation for profit and benefits. Globalization is an absolutely objective process; it determines all qualitative changes in the global world, an increase in the interconnectedness and interdependence of the uniqueness of specific people or civilizations and states as a whole. Globalization is a difficult and contradictory process though. This explains the complex research of this process. Modern researchers (Rizvi & Lingard, 2010; Stiglitz, 2006; Walby, 2009) assess the globalization processes rather ambiguously. In relation to globalization, the following are the main approaches that can be conditionally defined as optimistic, pessimistic and neutral. 'Optimists' (Ahmad, 2013; Grinin, 2012) proceed from the premise that globalization is an inevitable phenomenon, objectively conditioned, having basically a positive direction and prospects. Supporters of this position clinch to uncritical acceptance of globalization and its results. Unilaterally, the positive aspects of globalization are actualized, and its negative aspects are hushed up or downplayed. A kind of justification of globalization is being implemented - this is the position of liberal globalism. The need for globalization often derives from the need to address the complex global problems facing humankind, the problems of war and peace, ecology, demography, etc. But the 'optimists' ignore the specifics of the peoples and regions involved in globalization, which means unification of the entire wealth of cultures and civilizations.

'Pessimists' (Soros, 1998) usually draw attention to negative consequences of globalization, i.e., to the unwillingness of many countries to participate in this process on equal terms. This position is directly opposite to the optimistic one, it exposes globalization to complete, indiscriminate denial emphasizing the negative aspects of globalization, ignoring or downplaying the positive ones. This is the essence of the position of anti-globalism. It seems that both positions are limited, one-sided and biased. They obviously reflect the objective social reality, but accidentally distort it.

Is it necessary to work out a more dialectical, objective position in the consideration of globalization? And it seems to be a neutral one. 'Neutrals' (Held & McGrew, 2000) perceive globalization as a given, inevitable social phenomenon. Processes, changes and transformations are considered by them without regard to globalization changes.

Definitely, globalization of socio-cultural processes in the modern world has its pros and cons. The main consequences of this are the world division of labor, the migration of capital, human and production resources throughout the planet, standardization of legislation, economic and technological processes, and the rapprochement of cultures and education of different countries. This is an objective process that is systemic in nature, which means it covers all spheres of society and all levels of life. First of all, globalization is connected with the internationalization of all social activities. This internationalization means that in the modern era all of the humanity is included in a single system of social, cultural, economic, and political and other ties, interactions and relations. In our research we can consider globalization as integration at the macro level, that is, as the convergence of countries in all spheres: economic, political, social, cultural, technological ones, etc. At the micro level, individual companies, particularly industries are globalized.

Globalization has both positive and negative features that affect the development of the world community. Among the positive are the rejection of obedient subordination of economy to political principles, a decisive choice in favor of a competitive market model in the sphere of economy, recognition of the market model as an 'optimal' social and economic system. All these, at least theoretically, have made the world more homogeneous, and have provided hope that the relative uniformity of the social order will contribute to the elimination of poverty and misery, and the alleviation of educational inequality in the world space.

Culture and Education Globalization

Cultural globalization process is secondary in meaning, imperceptible on the global scale, but not to notice how people gradually pass to universal stereotypes and cultural values is impossible. The globalization of culture has affected all areas, from schooling to entertainment and fashion. All over the world, people (especially teenagers) follow the same fashion, spend leisure time the same way, listen to the same music and eat dishes that come from the cuisines of other nations. The bestsellers are translated into several languages, and the film premieres start simultaneously in many countries. Couch Surfing and House Swapping programs have become very popular. To see the world, to get acquainted with the customs and culture of other peoples, people invite foreigners to their homes or go on a visit to any other country on the planet. This is promoted by the Internet network, thanks to which people have an opportunity to communicate across nations, to exchange experience and knowledge, to share cultures.

Human culture, thus, has risen to a new level and the process of its intensive development began within the framework of new opportunities. Culture is understood here as information that is transmitted from individual to individual directly or through various media, but not by a biological (genetic) path. "A national culture, if it is to flourish, should be a constellation of cultures, the constituents of which, benefiting each other, benefit the whole" (Eliot, 1948: 58).

The human culture is so large in its volume and so dynamic in its development that it is important to define and to designate this concept of civilization, because the process of globalization is largely connected with the human culture universalization and creation of a global civilization - the only one we know today. Probably the initial factor contributing to globalization was the development of trade between the peoples. An additional incentive arose as a result of scientific and technological progress and the dissemination and adoption of technologies by people (social technologies included).

Culture is a knowledge system shared by a fairly large group of people. Culture is symbolic communication; the meanings of symbols are studied and deliberately preserved in society through its educational institutions. It refers to the generalized stock of knowledge, life experience, values, hierarchies, religions, concepts of time and place, roles, relationships, understanding of the universe, material objects and property acquired by a group of people over generations in the course of individual and group effort. Culture consists of defined and implied patterns of behavior acquired and transmitted by symbols constituting the significant achievements of human groups, including their expression in artifacts. The core

of culture consists of traditional ideas and especially their intrinsic values, cultural systems can, on the one hand, be considered as products of action, and on the other hand, as determining effects on further action. Culture includes group skills, knowledge, attitudes, values and motives. Culture is shared patterns of behaviors and interactions, cognitive constructs and understanding that are learned by socialization (Zimmermann, 2017). Culture is a collective way of thinking that distinguishes the members of one group or category of people from another. A symbol is simply understood as an expression that stands in place of or represents something else, usually objects or real world conditions. The use of words in a language is the most obvious example of symbols. Words replace perceived objective unity, words as symbols, however, differ from the objects they represent, and have special qualities, which is why they are so useful to us (Abakumova, Ermakov, & Makarova, 2006).

The causes of globalization are also highlighted by the cultural factor of globalization itself, when culture is interpreted in its narrow meaning as "a system that suits to the social mental condition and organizational institution, the reflection of the social, politic and economic factors" (Lazzeretti & Capone, 2015).

Considering the problem of globalization process impact on cultural identity, it should be noted that in recent years the possibility of forming the so-called 'multicultural identity' is being increasingly discussed in literature, proving that it helps an individual go beyond local culture and not feel alien in the new cultural environment (Ushanov, 2004). However, while forming a multicultural identity, the following problems inevitably arise: on the one hand, the right to cultural differences should be preserved; on the other hand, multicultural values are necessary for the multicultural identity development. In this connection the question arises, which values can be considered multicultural and if they are possible to develop. The issue is being widely discussed in scientific communities and mass media around the world.

When considering globalization as a modern phenomenon it is advisable to single out new information technologies and communication media, without which it would be difficult to imagine a global human civilization. They, in many ways, have made globalization possible and have even predetermined its appearance making it inevitable. Of course, a particularly important role is played by the global information network. Some scientists are inclined to see the Internet as a variety of V. Vernadsky's idea of "the Noosphere". Academician V. Vernadsky suggested that in the future people would provide the living shell of the planet with reasonable control, turning it into a single sphere - the noosphere (the sphere of the mind). V. Vernadsky formulated this new concept in 1944. He only managed to outline the fundamentals of the new doctrine in general terms, but his words are still relevant and sound warning: "In the geological history of the biosphere, a great future will lie in front of a human being, but only in case humans would understand the perspectives and would not use their mind and work for self-destruction" (Vernadsky, 1944). Unfortunately, Academician V. Vernadsky died before he could finish his research concerning noospheric development of the Earth and its influence on human civilization.

Anyway, the Internet has connected and in a certain sense 'squeezed' the space and time, partly leveling the spatial and temporal barriers. The Internet today facilitates the process of information and ideas exchange, which leads to acceleration of socio-cultural development of human race, thus contributing to a constant increase in the rate of global civilization development. Global politics has emerged as a potential way for mankind to manage its further development - for example, the direction of evolution, especially cultural evolution, into the channel that mankind desires, taking under constant conscious control the very process of human self-development, evolution and the civilization itself.

Indeed, modernization leads to the disappearance of many forms of traditional life. But at the same time, it offers opportunities and represents an important step forward for society as a whole. That is why people, when they can make free choice, give preference to modernization without any hesitation, sometimes contrary to what their leaders or intellectual traditionalists would like. People who see only negative sides of globalization say that the disappearance of national borders and the creation of the world connected

only by markets will deal a fatal blow to regional and national cultures, traditions, education, customs, myths and everything that determines the cultural identity of any country or any region. All the nations will lose their identity, their spirit and become nothing more than colonies of the 21st century – with no language, no traditions, no beliefs or dreams. Even though this 'cultural nightmare' argument against globalization is unacceptable, one should admit that in its depth there is a certain undeniable truth.

The process of modernization is inevitable. Statements against globalization and in favor of cultural identity are evidence of a commitment to the static concept of culture, which has no historical proof. Was there a culture in history that remained unchanged for a long time? If it were, it would be possible to detect such a culture (better to say a small and primitive pagan community) living in caves, worshiping monster gods and, due to their primitivism, increasingly susceptible to enslaving and extermination. All other cultures, and especially those that are called modern and progressive, have evolved, although they are a definite reflection of what they represented a few generations ago.

Cultural evolution is quite obvious in countries like France, Spain and England, where the changes that took place during the last half of the 20th century were so impressive and profound that people like Marcel Proust, Federico Garcia Lorca or Virginia Woolf would hardly know today the societies in which they were born and which they depictured in their works.

Opportunities Offered by Globalization in Education

The role of knowledge and, accordingly, education in the modern world is incredibly increasing. Modern economy, based on new technologies and technological revolution, will largely be determined by the policy in the field of education. Education continues to be a major factor in economic development and competition. In addition, public expectations in the field of education have also changed. It was regarded as one of the most important areas of social policy. In the modern situation, education (primarily and most of all, higher education) has ceased to be perceived as it used to be before, but on the contrary it has become a real prerequisite for social and professional progress and mobility, for economic progress and political stability. According to forecasts, the growing world demands for globalization of education and increase of academic mobility, creating a growing need for specialists that can operate in a variety of socio-economical and cultural conditions and capable of handling the complexities that arise while working in an international context (Andreassen & Makarova, 2015). If the development of new technologies and knowledge as the main resource are key characteristics of the modern world, then obviously this could not but affect the education. Education in the era of globalization has become a kind of central hub, the point where the advantages and contradictions generated by the modern era, the area that essentially forms the world of the 21st century, converge.

The role of education, which was demonstrated in the past, allows us to hope that in the new global world it will be able to retain the role of a leading center. The role of the university as a guarantor of academic order and stability can become even more important. Today it must interact with educational and other intellectual institutions, increasing the affordability and transparency of the educational system. Today's education, first of all, is not only a process of transferring knowledge accumulated by generations, but of developing a creative approach to life in general, moral qualities, internal culture, ability to perceive reality and actively participate in constant changes, continuous need for self-improvement.

The problems of education are actively developed by well-known research organizations. Groups of scientists from different countries of the world are attracted to scientific research; working groups and commissions created to develop recommendations on the development of cooperation and integration in the field of education. The main activities in the field of education are:

1) contribution to the maintaining of peace and security through the expansion of cooperation among peoples in education, science and culture in order to ensure universal respect for the justice of law and human rights;

2) normative activities on national policy issues in close coordination of education and employment;

3) strengthening of infrastructures at the national level;

4) information exchange through international conferences and students and teachers' mobility programs reflecting the latest trends in education.

A special emphasis in education development and innovations should be put on new educational methods using information technologies and communication means. The use of new information technologies for the development of distance learning based on the Internet leads to a new understanding of the 'real meaning' of the international level in education. While in reality academic mobility (students and instructors) continues to make a big difference, it begins to be seen as one of the elements of internationalization for interdisciplinary research and education development (Andreassen, Grinenko, & Makarova, 2016). There is a growing importance of such an international dimension in educational practice, in which academic mobility is carried out in virtual space or when the goal is to create conditions for a world-wide exchange of ideas. The new, improved, more cost-effective means of providing globalized education and training is being searched for all over the world. Many universities try to avoid main difficulties of globalized education by the development of the distance training offering online courses and degrees.

For most of the world, connection to the system of modern distance education is possible only after attracting huge investments in the infrastructure of modern communication facilities. The Internet has immeasurable potential and immense power, but it should not be allowed to become a new source of world inequality.

Education (high education especially) allows to receive high incomes in the future, but its cost is quite high. Today in many countries, the cost of education is 5 times higher than all other everyday expenses (such as clothing, housing, food, etc.). However, these costs pay off. For example, in 2015 an employee with a college diploma throughout his career could earn $ 600,000 more than a person with high-school certificate (Sabell, 2017). According to the forecasts for the future, this gap should soon increase by half.

The requirements to the quality of education also increase. If in the year of 2015 college graduates were viewed as highly educated and highly qualified staff, today they become a regular workforce compared to those who have got a Master's or doctoral degrees. College education in fact makes it possible to reproduce the available knowledge, but not to generate new ones, Master's degree or Ph.D. mean that graduates can create and develop new knowledge and provide workforce for the future. It is interesting that simultaneously with the increase in educated people's annual incomes; there are changes in value orientations. If long time ago financial incentives proved to be compelling, prompting for new knowledge, in the 2000s education and knowledge themselves acquired motivational power. People had sufficient incomes so that education and knowledge became an opportunity for the disclosure of creativity, self-control and self-improvement.

Globalization opens up wide opportunities in the field of education. The Internet has become the educational environment for many students and teachers, providing quick access to information for today's students and distant education for those who want to change their present occupation or get additional professional skills in this or that sphere of human activity. Links to Internet pages can be increasingly seen in the list of recommended literature in various textbooks. In the global computer network, more and more educational sites and portals are appearing every day. Many universities display their curricula and course programs on the Internet as well as other educational resources.

In addition, the Internet allows applicants to quickly obtain information about educational programs and courses around the world, which has made the choice of the institution more conscious and independent of national restrictions. The Internet has provided new perspectives for student exchange programs and academic mobility, for interuniversity communication, etc. In fact, thanks to the Internet it has become possible to talk about the loss of the state monopoly on knowledge dissemination and development of education. But the impact of the Internet on education is not limited only by open access to international information resources that are not subject to national restrictions. Thanks to modern information technologies, the educational process began to take on qualitatively new forms. A distance education has arisen and is developing rapidly. Internet seminars and webinars are held everywhere in many fields of human activity, communication between students and teachers, as well as among students, is increasingly carried out through a computer and social networks such as Facebook, LinkedIn, etc. Today, a student can independently choose a scientific advisor or a lecturing professor from another university, another city and even another country. Various methods of teaching with the help of the Internet are being actively developed. Recently, the question of creating full-fledged Internet universities, accreditation of their diplomas, has already been raised.

Due to the Internet, inclusive education for handicapped students has become possible. The Internet allows getting education from home, which is vital for particular groups of people with severe disabilities. The training course at the University is also intensified with the help of the Internet, and the availability of portals and websites provides students with a new interdisciplinary perspective, allowing greater flexibility in selecting courses and in mastering their content. As a result, we can talk about the universalization and internationalization of education. New technologies make it possible to get an insight into some global issues, to solve important international problems, such as visualization of learning. Graphs, diagrams, schemas, drawings, etc. allow better understanding of the material and have become an integral part not only of the Internet, but of the everyday routine reality. Schema theory and system approach in education are widely used today in the educational process (Abakumova, Ermakov, & Makarova, 2006). With the help of new technologies, students have diverse opportunities to master communication skills.

Another important issue in the development of globalization and its impact on education is that globalization literally opened the national borders of states, making education available for students from different countries at low expense. Currently, the most outstanding universities in the world have a large percentage of foreign students. By developing online courses other universities can provide international cooperation, for students and teachers exchange programs, thus enlarging the percent of international students.

Finally, the Internet and other communication technologies make learning a continuous process, the so-called life-long education. People, who have once received higher education, then replenish their stock of knowledge throughout their life. Education has to meet new challenges in the context of globalization. A new element of the modern system of education in the era of globalization is an increasing expansion of applied spheres and market relations. This causes the educational structures to develop dynamically, to respond to the needs and requests of commercialization of the world practices. Specialized educational centers are being created worldwide; training experts in different branches of knowledge are highly demanded by society, for example, in computer technologies, management, marketing, and so on. In addition to being more adapted to the practical needs of education, such centers allow to effectively develop team work skills, a sense of corporate community or loyalty to the company the future employees will work for, and ownership of success. As a result, corporate education is becoming an important tool for creating a trans-boundary social community.

All the above have made education a key factor in development of the globalizing world, opening up opportunities for people to actively influence globalization processes, shaping them according to the

requirements of progress and evolution. However, education itself is also becoming the object of globalization. This is primarily due to the active use of the global information network in the educational process, which allows bringing education to a qualitatively new level. At the same time, the process of globalization in education is not flawless; it has advantages as well as disadvantages. Globalization poses new challenges in front of education. First of all, it is the possible restriction of access to education in the modern world. In fact, the key issue is how to consider the globalization of education: as a chance or as an obstacle to bridging the gap between the rich and the poor in human resources training.

A special role is played by the moral and ethical functions of education in the modern world, the problem of teaching a creative individual, a professional ready to participate in a better world development. At the same time, such a task should be solved in a global context, using existing elements of global cooperation. As a result, modern educational systems face the following main tasks:

- To ensure the continuity of the learning process,
- To support expansion of opportunities for education,
- To provide constant adaptation of training courses to the needs of changing life conditions.

All these problems of education in the context of globalization are beginning to be reflected at the level of higher world politics. It states that basic education, vocational training, academic qualifications, lifelong improvement of professional skills and knowledge in accordance with the needs of the labor market, and support for the development of creative thinking are essential for determining the direction of economic and technical progress as the world is moving forward to the creation of a knowledge-based society. They also ensure personality development, contributing to shaping of an individual's responsible civil position and involvement in the life of society. Providing adaptability, job opportunities and rational management of change will be the main tasks of education in the 21st century. The ability to change professions, cultural environment and civil communities will be essential. The high level of education and lifelong learning for everyone will guarantee workforce mobility and employment for everyone.

UNESCO today remains the main institution that has the greatest impact on education. It carries out its activities in the educational sphere through a number of organizations, the main of which is the International Bureau of Education (IBO), which officially became part of UNESCO in 1969 with headquarters in Geneva. Among the international projects of the integration activity of UNESCO institutes, the network of UNESCO Associated Schools, existing since 1953, is singled out. Its activities are an example of globalization in the educational sphere - an example of cooperation in enhancing the role of education in the establishment of peace, culture and tolerance values.

Integration in Interdisciplinary Scientific Research and Education

Since the relationship between globalization and education is becoming increasingly obvious nowadays, the concept of integration in interdisciplinary scientific research and education is becoming correspondingly important.

In global education there is a number of areas for integrating research and education that are new for students, including:

1. "New technology" sectors that will emerge as a result of the development of a new generation of technologies for industrial and consumer use (development and programming of "smart" power systems and other "smart" environments for cities and households);

2. Virtual economies - economies created inside on-line simulators, social networks and other virtual environments where people can find a huge number of activities, because virtual reality allows to overcome almost any limitations that exist in reality;

3. Knowledge Production Sector: although it is not realistic to expect a massive increase in the involvement of people in the process of creating scientific knowledge, there is a significant and growing demand for contextual knowledge generated in networks and communities. Such knowledge is undoubtedly associated with the management of these communities and is generated by combining collective experience as well as co-creation.

4. “Human-oriented” services, which will be based on the fact that “robots” cannot do, because there are two human qualities which are most difficult to imitate “creativity” and “humanity” (Global Education Futures Report, 2018).

Meeting the requirements of modernity, a group of integrated initiatives is growing in various areas of life (integrated management of environmental systems, integrated management of space flights, integrated environmental studies, etc.). The unity of knowledge is one of the greatest ideas of intellectual history. The unity of the world, as well as the unity of history, nature and man, is reflected in the ever-growing number of sciences expressing this unity. Modern science with general research efficiency and productivity combines natural research with social and humanities studies. A common understanding can only be achieved by applying an interdisciplinary scientific approach that overcomes traditional barriers between disciplines. The integration of scientific disciplines and the developed approaches and methods of interdisciplinary research that contribute to the development of the natural and social sciences enrich the sphere of the humanities too.

Interdisciplinary research refers to situations in which integration goes beyond combining disciplinary efforts. Key elements of discipline use of concepts and tools are changing. An example is the teaching of interdisciplinary courses at universities, such as physical chemistry or social psychology, which have now become independent disciplines (Petrie, 2012, p.264).

Real life problems are rarely limited by disciplinary boundaries. The integrated nature of society problems is researched by joining together knowledge and information from different spheres of knowledge in order to address the challenges facing society (Carayol & Thi, 2005; Jeffrey, 2003; Klein, 2006; Repko, 2008). The unity of knowledge is the greatest idea of intellectual history. The integration of sciences to solve complex problems can be achieved by overcoming barriers between academic disciplines. This does not mean erasing the boundaries between scientific fields of knowledge; on the contrary, individual disciplines are enriched by the interaction and integration of research methods. The integration of scientific disciplines, approaches and research methods that contribute to the development of the natural and social sciences enrich the humanities and contribute to their development.

Focusing on resources that can contribute to the integration of science in theory and practice, a theory indicates the need to use new approaches in science, as well as in educational process. Since the world around us is diverse in nature, it is absolutely necessary to study it using various resources and methodologies of diverse academic disciplines. In the 21st century, a series of parallel trends emerged for more inclusive research and methods of learning, all of which require more integrated science and adaptive learning management. The inability of mankind to solve many contemporary problems (for example, such as climate change, pandemics, land use, AIDS, cancer, environmental protection etc.) leads to the fact that such global problems should be researched from the standpoint of various sciences and using methods inherent in these sciences. Attempts to solve all the above and many other problems are a kind of challenge to science that can only be answered by reaching consensus in the scientific world and by joining forces. In addition, the isolation and limited scientific and professional knowledge far from real life leads to the fact that effective cooperation and collaboration in science is impossible, which, in turn, creates obstacles for the scientific results practical application.

It turns out that the scientific subject matter exists on its own, outside the cultural context and education. Developing common context for science is an important factor in harmonizing the world of the individuals,

strengthening their mental, physical, moral health. Many problems can be solved not through the renunciation of important scientific knowledge, but through the integration of the investigation and results analysis (Danilyuk, 2000).

The accumulation of changes in the societal life, approaching the critical level, has a tremendous impact on the relationship between the main links of the social system - education and culture in the broad sense of the word. Progress technologies have been accumulated to such a critical limit that they are already beginning to impact the very educational system. Now it is not enough for educational institutions just to transfer knowledge to students in order to forecast their “zone of proximal development” (Chaiklin, 2003) as the cycle of introducing new knowledge has significantly shortened. Moreover, the interests of society focus on knowledge that is not codified both today and in the future.

At the same time in the field of education there is a gap between the needs of society and generation of educational product. Even the most successful teachers in the education market derive some general patterns; translate them into models and schemes based on the knowledge developed in the past (background knowledge). The situation prompts the mankind to search for effective tools for using the main strategic assets - knowledge, ways of modeling and conducting future projects of changes, developing unique solutions, the nature of which is creativity. Against this background, the need to change the concept of education is very acute.

The modern education is going through a period of transition from the usual qualitative level to another, new and unknown one. A noticeable increase in the change rate requires, respectively, an accelerated reaction of the educational institution to the demands of the external environment, instantaneous consideration of circumstances, and pro-active solution of problems.

This situation is characterized by serious changes, both in the field of content, and in the field of ways and methods of teacher’s organizational and methodological work. As for the content of education the condition for expressing the integration of modern scientific knowledge is the personal attitude to it. Integration of knowledge in the content of education is not specified, but is constructed by the cognizing person. In other words, the possibilities of interdisciplinary activity such as going beyond the standards, opening up new horizons for their regionalization, attracting new terms, apparatus and innovative methods, transforming traditions, etc., allow the subject forming qualitative changes in student’s attitude to the content of education. The integrative approach creates prerequisites for restructuring the sphere of organizational and methodological work, allows correcting distortions in the system of assessing the quality of activities. Nowadays formally organized interaction based on a rigid subject division determines the negative factors in the activities of teachers and students. The mechanistic approach in the organization and management of educational activity resembles a well-established mechanism in which both a teacher and a student are just "mechanical details", "cogs" in the educational process. In the traditional subject-centered teaching system, knowledge is divided into separate disciplines studied and taught separately. Each academic discipline is adequate to a certain science which has its own special object and methods of study. Thus global culture is divided between different sciences and autonomous academic disciplines.

In contemporary situation of educational renovation, transformation of universities into educational development centers and research institutions there is a need to clarify the concepts of “educational environment” and “educational space”. These concepts are very similar in meaning but create a certain hierarchy: at the bottom there is the notion of “educational environment”, because it is a set of objective factors that have an impact on students; the notion of “educational space” is built up at the top of it because it acts as a set

of factors of a higher order. “Highlighting the characteristics of the notion of ‘educational environment’ we are talking about the internal educational environment of the individual in which the external influences are internalized. We understand such an environment as a set of relations, educational actions and technologies that are significant for the individual” (Laktionova, 2010: 44).

Education consistently acquires a spatial organization, expands to the boundaries of life and begins to model life performing its functions. This process requires teachers having a higher skill level to create theoretical models, referring to a certain area of scientific knowledge. An even more difficult task is the development of students’ independent theoretical awareness, the creation of didactic conditions for mastering via theoretical analysis procedure.

Such activities should be built up according to several main principles:

- Development of the individual’s creative capacity;

- Resolution of internal contradictions between the processes of assimilation of old knowledge and acquiring new one;

- Understanding that no theory can be considered universal and eternal, it should have a culture of multi-objective formulation of tasks, tolerance to dissent and moral responsibility for the actions;

- Observation, analysis, making proposals, responsibility for decision making, ability to overcome conflicts and contradictions in the modern atmosphere of uncertainty;

- Combination of the analytical and symbolic thinking, logics and intuition, different levels of thinking: operational, theoretical, constructive, heuristic, and individual worldview.

The integration is organized in two directions:

- Laboratories, departments, temporary research teams. In such a team, it is possible to distribute groups of analysts, methodologists, idea generators, and technologists;

- Research laboratories, uniting scientists working in different spheres that function for a long period and are engaged in painstaking scientific research and experimental work. Such laboratories are of great importance not only in the context of updating the content of education; they lead to the emergence of a new type of researchers.

Interdisciplinarity is the research methods that cross the traditional boundaries of academic disciplines and scientific schools at the moment when new needs and/or professions arise. In an interdisciplinary approach, pedagogical knowledge was used to describe studies that cover several traditionally established disciplines or areas of knowledge. Subsequently, these terms have received much broader application, for example, when applied to new professions (for example, geobiology, geopolitics) and to older areas, such as psychiatry, where a professional should have broad knowledge in several different areas of medical and psychological knowledge. Interdisciplinary factors are used by researchers, students and teachers in order to integrate several academic schools, professions or technologies in order to achieve the solution of their tasks. Interdisciplinary approaches usually focus on problems that are considered too complex to be adequately understood and quickly solved with the help of one traditional science. The epidemiology of AIDS, for example, or global warming requires an understanding of various physical phenomena from different perspectives. Interdisciplinary approaches can be applied when the question or problem under study is considered incomplete in the traditional disciplinary structure of research institutions, for example, in studies of ethnic characteristics.

The adjective "interdisciplinary" is most often used in educational environment when researchers from two or more disciplines combine their approaches and modify them so that they are better suited to solve a problem, including in the case of a lecture course in which students need to understand the new academic

discipline in terms of many traditional disciplines. For example, the subject of land use may look different if we consider it from the point of view of different disciplines, for example, biology, chemistry, economics, geography and politics. Interdisciplinarity is seen as a means of overcoming over-specialization and limited knowledge epistemologically and methodologically. However, according to some scientists, interdisciplinarity completely depends on those who specialize in one field of study, that is, without specialists interdisciplinary projects will not have the necessary information, no leading experts will advise such projects. When interdisciplinary collaboration or research leads to the identification of new ways to solve a problem, integration is considered to have fulfilled its role.

Creative dialogue between teachers and students in the integrated space allows improving and widening professional skills for carrying out cultural construction within the educational system. Thus the integral space opens up opportunities for unlimited personal and professional growth, for creating routes for personal and collective methodical work.

The number of creative associations working on the problem of modeling culture in education can be unlimited. In the course of the work there is a constant change in the problems both substantive and methodical. It allows avoiding the monotony and mechanistic nature of the teaching work. The principle of personal and professional development that is the basis of the integral space activates personality structures. They are the following:

- Criticality implies the ability to consider that one's value orientations are not the only true. They mediated by other opinions and orientations. This quality is quite achievable, when the teacher builds up relations with colleagues and students on a dialogical, creative basis that is provided by an integral methodical space;

- Reflection is determined by the ability to go beyond the limits of one's own self, to conduct a dialogue with oneself. Such dialogue is possible only in the horizon of culture, and it is culture that is the sole basis of the integrated educational and integral methodological spaces;

- Collision grows out of the ability to see the world in the integrity of its contradictions. It is this kind of world that is perceived in the process of comprehending and reproducing culture;

- Motivation provides an emotional and content-semantic experience of social and cognitive experience. It is the result of the internalization of cultural values;

- Orientation involves the ability to build up an image of the world. This internal individual picture of the world is a reflection of the cultural picture of the world created in the process of teaching in the integral educational space;

- Self-actualization and self-realization are the highest levels of an individual's spiritual and creative potential, as they are connected with the desire to reveal and develop personal abilities. In this sense, the integrated methodological space provides the teacher with an unlimited number of possibilities.

On the one hand, the realization of the principle of a person’s professional development is a condition for working in an integrated methodical space. On the other hand, it is a natural consequence of such activity. Thus, the principle of integration means the inclusion of all available forms of activity in the educational environment. Besides, it shows great opportunities for combining the disciplinary and interdisciplinary forms of the organization of the educational process.

Consideration of the integral nature of the modern education organization is also confirmed by the fact that in the modern world innovation is the driving force of the educational organization development and the factor linking all other resources in the development of a new, unique knowledge. The education system should play the role of the main generator of the society development on the basis of co-creative methods of elaborating actual knowledge.

The main challenge that modern education faces is to ensure that the knowledge acquired should become meaningful for each participant in the educational process. The younger the students, the easier and more naturally they connect together different areas of knowledge to understand the world around which is interdisciplinary in nature. Our constantly changing world makes it necessary for a professional to integrate knowledge from various fields of knowledge with the help of innovative and creative methods. As the knowledge and complexity of the information to be processed multiply, critical thinking of students must develop in the direction of integrating individual subject projections to understand complex issues and phenomena of the surrounding world. Students demonstrate interdisciplinary thinking when they integrate concepts, methods, forms of communication inherent in two or more disciplines, in order to solve a problem, to create a product, to apply their theoretical knowledge in practice.

This allows focusing on the theory of creating the organizational knowledge (Nonaka & Takeuchi, 2011). The principle of the development of auto-communication culture is also important (Lepsky, 2010). According to this principle, the knowledge obtained in the educational process is recorded by the person of innovative development.

Particular importance in this model is given to the interaction of formalized (explicit) and not formalized (implicit) knowledge. At the first stage (socialization), this model ensures the use of formalized knowledge obtained in traditional communication with teachers and involves identifying practical interests of students in solving problems.

The second stage (externalization) involves the interaction of individual knowledge with subsequent fixation as ‘group knowledge’. The position of the teacher changes since it is the teacher who makes approximations, precise deductions, proposes deductive-inductive scenarios, and generalizes all the semantic and mental patterns, creating effective thinking - a thinking-composite consisting of chaos of the creative, inventive thinking. The third stage (combination) activates the self-development processes of participants who are guided by teacher's comments and can create a ‘portfolio of knowledge’. The fourth stage (internalization) provides mutual understanding and coherence of actions, allows transforming formalized knowledge into ‘deeply personal one’ on the basis of comprehension and rethinking the results of joint activity.

The main advantage of the proposed model is that it does not involve transferring ready-made solutions from a teacher to students as a set of previously known problems. The modern life accelerates immensely, and those decisions that were good to apply yesterday do not work today. This model allows teaching co-creative methods of generating innovative ideas, transforming new knowledge into actions in a specific teaching and learning environment, and transforming actions into personal achievements of students.

Discussion

Thus, the transformation of the education system on a global scale, including the concept of integration in interdisciplinary scientific research and education contribute three main factors.

1. The growing complexity of socio-technical systems (such as energy, transport, mass production, telecom, etc.), socio-economic, political and cultural environments which are increasingly acquiring integration features, as well as the growing demand for interdisciplinary skills and knowledge.

2. The growing inefficiency of the modern local education system due to insufficient opportunities for its transformation, along with continued investment in the global education model.

3. The active development of communication and information technologies, mathematics, cognitive sciences, bio-pharmaceutics researches and other related sciences, providing incredible mobility, the ability to process "big data", automate a number of cognitive processes in artificial intelligence systems, as well as new ways of personal and collective on-line education and development based on these tools.

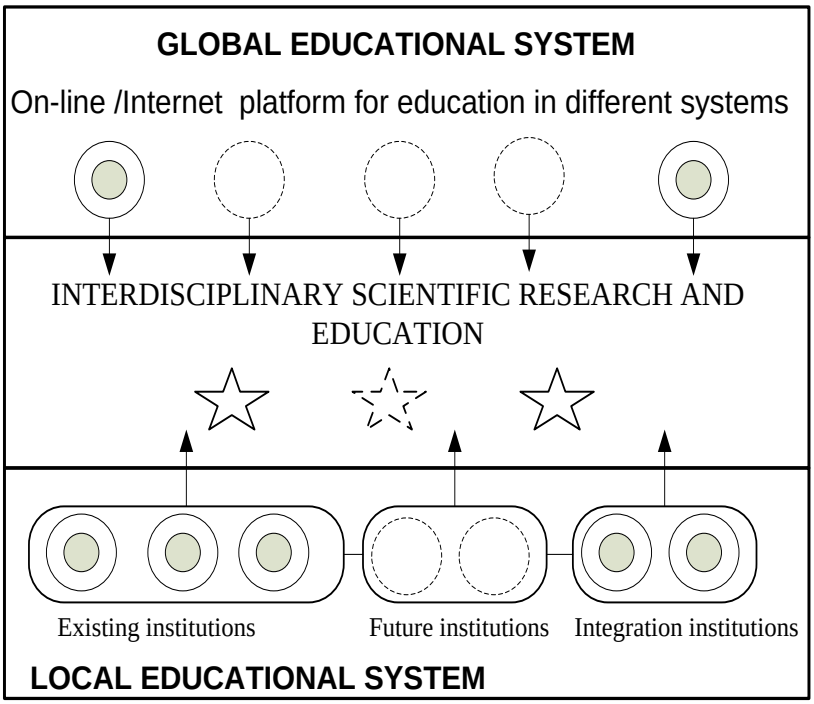

Figure 1. *Globalization and integration model in interdisciplinary research and education development*
Source: Authors

The globalization of education is an integral qualitative characteristic of an industrial society, which was the result of key events such as:

- The emergence of “social machines” of creating knowledge and innovations (from research universities, corporate research and development departments to regional and national innovation systems), which ensure a steady flow of new technologies;
- The emergence of network technologies (Internet and social networks), which are becoming an instruments of rapidly spreading new technologies, information and knowledge;
- The emergence of institutions to support globalization processes, which are gradually evolving from free trade agreements to systems of global technology standards, professional requirements and interdisciplinary educational processes.

Conclusion

As many complicated and controversial phenomena in the world globalization cannot be judged on a contents and discontents scale. Inevitable as the evolution itself globalization has advantages and disadvantages, contents and discontents, controversies and paradoxes. The very concept of globalization is optimistic, but there are still challenges and hazards on the way. The consequences of globalization in different spheres, its purpose, principles, methods formed on the basis of other concepts, are being widely discussed by philosophers, sociologists, economists and politicians all over the world. According to experts, democratization, market economy, globalization, significant technological innovations, the evolution of public and private factors, development of education are the most important factors that have already influenced and surely will influence our life in the future.

Globalization's consequences are associated with obvious success: the integration of the world economy contributes to the intensification and growth of production, the mastery of technological achievements, the improvement of the economic conditions, and so on. Political integration helps prevent military conflicts, ensure stability in the world, and do many other things in international security interests. Globalization in the social sphere stimulates huge shifts in human minds, spread of democratic principles of rights and freedoms. The list of achievements of globalization covers various interests from individual character traits to the world community development. Experts often distinguish economic, political, sociological and environmental approaches to the problem of globalization. But in the context of our article we have considered cultural and educational aspects of globalization as the most important. No specific definitions of the relationship of globalization and culture are proposed today; but the researchers simply conclude that culture, education and globalization are incompatible. This process is accompanied by the integration of elements of national cultures in the emerging universal human cultural and educational spheres.

The Internet is especially important in the process of globalization; it provides a high degree of information availability, the development of high technologies and broad cooperation and collaboration between scholars within the framework of globalization, students and lecturers mobility, open access to education for people from different parts of the world.

Globalization is a complex issue not only for the public consciousness, but also for scientific analysis. One thing is for sure, globalization is as inevitable as progress and evolution. It cannot be stopped and turned backwards. This process has affected all aspects of human life; globalization of culture is also a reflection of the cosmopolitan nature of human being. Our modern world which is a non-equilibrium structure eventually is coming to equilibrium, discarding everything that is unnecessary and artificially imposed.

Summarizing the discussion on the problems of globalization and integration and their impact on culture and education, we do not yet see any alternatives to these processes as they are irreversible. Dialectical principle, which is very important to realize, is that the negation of the old is necessary not through destruction, as is often the case, but through continuity and development.

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