Formation of technological literacy and technological culture in school

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Abstract

This publication was considered to examine the concepts of technological literacy and technological culture, which must be formed in the process of technological education of students

About forty years ago by Russian scientists V.V. Krayewskiy, I.Y. Lerner and M.N. Skatkin put forward the concept of cultural approach to education, supposing the studying by the students pedagogically adopted components of human culture. This approach is directing education at the formation of the human of culture, defining the objectives and content of education in terms of culture, such as «humanitarian culture», «information culture», etc.

In the late XX and early XXI centuries technological culture of man - the culture of transforming activity- began to play an important role.

The term "technology" appeared in the XVIII century, although since the appearance of human society people used various technologies to ensure their life activity.

The rapid development of global social production in the second half of XX and at the beginning of XXI centuries was based, in particular, on the appearance of new technologies, including the high ones. The term "technology" began to be used not only to describe material changes, but also energetic, informational, and social ones. As a result no one is surprised now by the terms "social technology" and "educational technology".

Nowadays two definitions of technology, traditional and modern are widely used, which can be briefly summarized as the following.

.The traditional definition: a technology -is knowledge (-logy) of sequences of a man's actions and the necessary equipment used for materials (substances), energy, and information transformation according to the man's plan and interest.

Modern definition: a technology – is the science of of materials (substances), energy, information transformation according to the plan and within the interest of a man. The science of technology - is the kind of a gnostic activity, aimed at the development of objective, systematically organized knowledge about the transforming activity of a man, about the objectives, ways, steps, tools, limits, evolution and consequences of this activity, the tendencies of it modernization, as well as the description, analysis and optimization of transforming activity.

Technics (technical equipment) is the instrumental support of technology. It has been following up a man throughout his history. The main purpose technics is to make easier and increase of effectiveness of human labor. The world of technics including different machines, appliances (instruments, apparatus), electronic devices – is everywhere around us. Technics in the modern world is unseparatable from the

broadly-understanding technology.

Techno sphere is a complex of technical facilities of converting materials, energy and information. All the technologies are implemented by different means (tools and equipment such as PCs), energy and information (knowledge), but they differ by the objects of transformation and they can be divided into material, energy and information technologies, to which we can also refer social and pedagogical technologies.

Creating material, energy and information conditions of life, different technologies provide vital functions of people.

The technological revolution of the XX century and the development of postindustrial society have led to the fact, that new functional demands have been made on a man: the employee is now required to have very developed production functions, as well as the abilities and skills of designing, taking decisions and fulfilling creative work . These abilities and skills should be formed since childhood and continue to develop both during education and employment.

The world experience shows that due to the rapid change of technology throughput their working career a person has 4-5 times to change their job and the sphere of work.

This means that before choosing a career every person should receive a broad knowledge, get acquainted with the various possibilities of transforming activities of people, learn to solve creative tasks during the project work, to estimate their abilities and choose the right direction of their professional career. Therefore a wide pre-professional training of pupils, their acknowledgement with the world of technology, their acquirement of technological culture is necessary.

Technological education of youth at school plays a significant role in the implementation of these objectives.

At the end of the XX century, during the formation of a new technological society ("a society of knowledge "), technological knowledge and skills became a major resource for an individual, an enterprise and the economy as a whole, and technology has become an element of literacy. Realization of this fact at the end of the last century led to appearance of a new educational area - «Technology»of in the curricula of the most schools in highly developed countries. Having replaced the traditional labor training, Technology as a subject has become obligatory to the study for future engineers and programmers, as well as managers, lawyers, physicians, and others.

"Technology" is the main practice-oriented area of knowledge at a secondary school. It introduces various spheres of social production and contributes to the professional orientation, moral and labor development and upbringing of the growing generation. This area develops and expands the integrative basics, presented in the concept of modern school modernization. On this basis, the students form the ability to see, formulate and solve actual tasks to improve the life around them.

This educational area should acquaints all the students with the general principles of man's transforming activity both in material and in humanitarian spheres; with the principles of technology systems construction, as well as with modern and advanced technologies of materials, energy and information transformation. It should form on students a willingness to work, working culture, a culture of working with information and graphic images, skills of teamwork, and also contributes to their creative, ecological and aesthetic (designer) development.

It is in this educational area where project technology, revealing the great potentials of the creative development of pupils for self-movement from the idea to the manufacturing of completed goods (services) and their realization develops most successfully.

The educational area "Technology" is a necessary component of general education of all students, which provides them with opportunities to put into practice the principles of basic scientific knowledge. This is actually the only school subject, reflecting in its content the general principles of people's creative and transforming activity and all the aspects of material culture of mankind. This educational course is aimed at the acquirement by the students the basics of object - transformative (as opposed to virtual) activity, creation the new values, which is certainly meets the needs of the developing society. Within the frames of Technology students are introduced the world of professions and are orientated to work in various sectors of social production. This ensures continuity in the student's transition from general to professional education and employment activity.

Technology is an obligatory subject at schools in many developed countries, extensively using high technologies. The existence of "Technology" in the general educational curriculum of secondary schools is actively supported by the business and industry in these countries, since this subject is to teach children to solve constantly evolving vital tasks in the process of project implementation and thus prepare them for creative labour work. In developed countries Technology is on the list of 4-5 obligatory subjects for all the students, as it is aimed at development students' creative intellectual abilities and their involvement in creative work.

It is this particular school subject that provides the opportunities interdisciplinary links for their practical implementation into innovative ideas, products and services that meet the needs of a man, society and state. Only this subject makes it possible to connect economic, environmental, legal and business education, and allows to give the students special skills in transforming materials, energy, information and provides their professional self-determination.

In a modern world - full of technical devices-technoshere – the study of Technology is important for all high school graduates. This educational area forms the technological literacy, technological competence and technological culture of students - the culture of transforming activity, necessary for any specialist. The criteria of technological literacy formation were thoroughly analyzed by U.S. experts in the publication [1].

The main purpose of technological education is to develop the technological culture of the student.

Various aspects of youth technological culture were analyzed in different publications and in many reports at international conferences on the problems of technological education of students, annually held in Russia since 1994 [2-6].

Conducted in recent years analysis of technological culture concept made it possible to make the following conclusion.

Technological culture of a man contains a number of components, given that a person in the community acts as a citizen, a worker, an owner, a family man, a consumer and a student:

- working culture – includes both reproductive and creative planning and organization of working process, the choice of tools and equipment, working place organization, labor safety, technological and working

discipline, quality production control, which is necessary   to perform the functions of a social worker ;
- graphical culture – the knowledge, skills and ability to use graphical tools (including the technical drawing ones) to ensure the technological process;
- design culture – the knowledge, skills and willingness to use the principles of ergonomics, aesthetics, design and artistic treatment of materials to ensure the competitiveness of products;
- information culture – the knowledge, skills and ability to use the principles of data collection, storage, handling and use of information from various sources to implement the working activity;
- entrepreneurial culture – the knowledge, skills and ability to analyze the needs of the people (the market), to organize and manage a small team of people to meet these requirements and to advertise their products;
- culture of human relationships – the knowledge, skills and ability to perform conflict-free (friendly) interaction with people both at the workplace, at home, in the street, and in public transport;
- ecological culture includes environmental knowledge, understanding, that nature is the source of life and beauty, variety of moral and aesthetic feelings and emotions received by the contact with nature and the responsibility for its protestion; the ability to connect any activity with the idea of the environment protection and a man's, health a strong interest in the correct implementation of environmental protection activity;
- home culture – the knowledge and skills of home decoration, creation of home comfort and a healthy lifestyle and well thought fulfillment of household choirs which is a social functions of a family man;
- consumer culture – the knowledge, skills and willingness to act thoughtfully in the market of goods and services, fulfilling the social functions of consumer;
- project and research culture – the knowledge, skills and ability to define individually the needs and opportunities when working on a project; to receive, analyze and use the necessary for that project information, to put forward a variety of ideas, to choose the best one, to do a research of the idea, and also planning, organization and the fulfillment of project work, including the acquisition of additional knowledge and skills, evaluation of the project and its presentation.

Nowadays it is obvious that the components of technological culture should be formed in the process of technological education, beginning at primary school. It is important to emphasize that regardless of the particular technology, which a man uses now, he has to deal with the invariant components of human activity: culture of work, graphical culture (creation and use of graphic images in the process of work), informational culture (using different sources of information in the process of work), ecological culture (careful attitude to the environment and human health, materials and energy saving, waste management), the culture of design, home and consumer culture, the culture of human relations and project culture.

Thus, the study of Technology, beginning at primary school, should, on the one hand, expand polytechnic horizons of students and develop their creative abilities; and, on the other hand, build their technological culture. Realization of these objectives should take place in the process of technological education, development of students' ability to work hard and respect the labor. It should help them to choose a career prepare for future working life.

At seniour school, it is more preferable to study the course "Fundamentals of the technological culture" [4].

Special courses on the formation of technological culture of students were read in Kabardino-Balkar State University and Sibai Institute of the Bashkir State University.

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