Umirzok M. Yarlakabov,
scientific researcher,
Djizzak Polytechnical Institute

Didactic Ways of Forming Students' Technical Thinking

Key words: *inter-subject communications, technical thinking, teacher of vocational education, integrative approach.*

Annotation: *the article is devoted to didactic ways of forming on the basis of the integrative intersubject approach that provides the students with the learning material that allows them to create a comprehensive, holistic view of objects, phenomena, devices and principles of engineering work, design and technical knowledge.*

Scientific and technological progress leads to an increasing complexity of the content and methods of work. This activity is connected with search, requires constant updating of technical and technological knowledge and efficiency in decision-making. However, until recently, special attention was paid to the peculiarities of the thinking of specialists who graduated from technical universities, and the existing practice of teaching in higher education was focused primarily on obtaining a certain amount of knowledge by students and, to a lesser extent, on the development of technical thinking. The main place among the teaching methods used is occupied by those that rely on the information-reproductive type of teaching.

Studies of technical thinking in conjunction with its development in the educational organization have been actively deployed since the 60s of last century. Analysis of various sources showed that the definition of technical thinking has no clear boundaries. The most important, from our point of view, is the following definition: technical thinking is one of the types of thinking, forms of logical reflection of reality aimed at the development, creation and application of technical means and technological processes with the aim of understanding and transforming nature and society in specific historical conditions (6).

A feature of modern technical thinking is the introduction of simulations, the virtual world (Jean Baudrillard) and new concepts of the creation and functioning of technology. The formation of the student's technical thinking in the 21st century is complicated by the fact that the management of technical systems is transferred to electronic technology, more and more devices and machines are closed, non-separable systems operating according to the "black box" principle. An ordinary person is increasingly withdrawn from the phase of creating technology and plays the role of a consumer-user.

The modern specialist must be able to quickly adapt to the changing conditions of his activity, make optimal decisions under multivariate conditions, build up causal relationships, use technical contradictions, that is, have technical thinking. The preparation of such a specialist is impossible in the context of information-communicating education and requires a substantial revision of previous approaches to the goals, content and structure of education.

The process of forming technical thinking begins long before the student enters the university. The first person who helps in the formation of this type of thinking is the school teacher such

as algebra, geometry, inscription, etc. It is with the stage of mastering these disciplines that formation begins, but it should be taken into account that the knowledge and experience obtained in the school are necessary for the formation of technical thinking further.

The training system has a large number of academic subjects that are not consistently and methodically consistent with each other. Isolation of these subjects from each other creates serious difficulties in the formation of the professional qualities of the teacher of technology. This naturally raises the question of what are the didactic ways of forming technical thinking? The main idea of reforming the education system is to integrate the educational material, its compaction, in the optimal use of intersubject communications.

Interdisciplinary links represent the didactic equivalent of inter-scientific relations, reflect the requirement of a system of knowledge and are a means of implementing the principle of the professional orientation of education. Because of the integrative approach to teaching, students acquire knowledge, to the conceptual attributes of which include generality, systemic, general scientific (4).

Intersubjectivity cannot be achieved spontaneously and spontaneously, it must be purposefully formed. The main means of formation of trainees' complete systems of interdisciplinary general professional knowledge and skills, as well as professionally significant personal qualities are interdisciplinary educational and methodological complexes, which include a course of lectures, a system of seminars, practical and laboratory sessions using intersubject communications.

The technology assumes a broad technical horizon, familiarity of students with different types of machines, equipment and types of production. The difference in the objects of technology makes it possible to organize a study with students of the specifics, essential features, features of technical objects, the knowledge of which deepens and widens the technical representations of students. The technical orientation, the interrelationship of laws, concepts of sciences, revealing the general scientific and technical aspects of modern production, constitute the essence of technical knowledge. Technical skills are connected with the solution of scientific and technical problems with production content. The availability of technical skills among students allows them to develop such functions as the compilation of kinematic schemes, fault diagnosis, and also design, technological, technical, graphic, etc. (1,2,4).

Technical knowledge has a number of certain characteristics: knowledge is not based on a single, but a variety of tools and technological processes, which facilitates the transfer of knowledge from one production situation to another; knowledge is formed on the basis of the assimilation of laws and concepts of natural, mathematical, general technical sciences that underlie the structure and functioning of modern technology and technology; knowledge is dynamic, undergo changes in connection with the development of science, production and their interrelationships; knowledge does not constitute the content of one science, they reflect the patterns, concepts of many sciences that are conditioned by the content of the object of study.

The educational material of general technical and special disciplines should include at an accessible level the complex scientific foundations of all technical objects, reflecting the basic

natural scientific process underlying their action, their decisive functional properties. Disclosure of the common scientific foundations of technology is facilitated by intersubject communications. The technical content of students' training is manifested in the selection of material, the construction of the system and the implementation of intersubject communications. The ways of expanding intersubject communications are connected with the study of a specific discipline and consists in realizing the connections of theoretical material with general technical, economic, humanitarian and special disciplines. The leading place in the interdisciplinary connections of the teaching of these disciplines belongs to physics, descriptive geometry, engineering graphics, materials science and technology of structural materials, machining of materials by cutting, hydraulics, heat engineering, theoretical mechanics, materials resistance, machine parts, electrical engineering, automatics, creative and design activities, economics (marketing, the basis of small business), etc., which are read to students studying in the direction of "Vocational Education" and are theorists the basis for technological training of future teachers of vocational education.

One of the important conditions for the successful implementation of interdisciplinary links is the knowledge of the main sections of disciplines. At the same time, it is necessary to build on the knowledge of students, obtained earlier in the study of natural-science, general technical and special disciplines, which creates a basis for studying technology and technology on a scientific basis.

General technical and special disciplines contain materials characterizing and illustrating the use of equipment, fixtures, materials and tools in various branches of modern production (3). As a result of studying the above disciplines, the future teacher of vocational education acquires knowledge and skills on technical objects, realizes the importance of their functioning in the production process, masters the skills and skills of working with modern materials, their properties, acquires knowledge in the field of technology, technology, and also develops technical thinking. Mastering the principles of the operation of equipment in the manufacture of objects, their destination, the device, gets practical skills in drawing up technological maps, diagrams, drawings, sketches and the implementation of economic calculations with the subsequent sale of manufactured products.

The basis for the preparation of such activities of students is the teaching of their general scientific principles for the functioning of objects of technology (machines, devices, tools, etc.), finding commonality in the variety of various engineering objects, analyzing individual aspects and determining the structural forms of the elements of the details of technical devices, sketching and performing practical and independent works, solving problems aimed at developing observation, attentiveness, thinking and spatial imagination, and also the instillation of aesthetic taste, the methods of performing creative tasks, the development of thrift and the economical use of materials.

Students must be trained by using the combination of active and reproductive methods and organization of students' technical activity in the educational process through their inclusion in the process of solving technical problems, performing creative projects in the system of laboratory and practical work. For example, to describe the structure and functioning of technical objects, the most important are the following concepts: "principle of operation",

"mode of action", "design", and also "technical function", "technical properties" and "technical characteristics", "parameters ". The notion of "principle of action" corresponds to such a level of consideration of the structure and functioning of the object when the main role is played by an indication of the natural process that takes place in a particular device, but also a functional description of those elements that make up the structure of the object.

From the above, we can draw the following conclusion that as a result of the integrative intersubject approach in the teaching process, students' perception of the teaching material allows them to create a comprehensive, holistic view of objects, phenomena, devices and principles of operation of equipment, design and technical knowledge of these objects, that contributes to the formation of technical thinking in future teachers of vocational education in technology education.

References:

1. *Bulashov KV. Project activity of students in the conditions of modern school: Actual problems of modern science in the 21st century: a collection of materials of the III International Scientific and Practical Conference part 2. Makhachkala, 2013; 115-118.*
2. *Doroshenko AG. Basics of designing: ed. AN. Rostovtsev. Novokuznetsk, 2010; 125.*
3. *Petelina EB. Theoretical mechanics for bachelors - problems, searches, solutions: Problems and perspectives of physical and mathematical and technical education: a collection of materials of the All-Russian Scientific and Practical Conference. Ishim, 2014; 181-186.*
4. *Prokhorov MS. Designing activity in the preparation of the bachelor of technological education: A new word in science and technology: hypotheses and approbation of research results: a collection of materials of the VIII International Scientific and Practical Conference. Novosibirsk, 2013; 48-51.*
5. *Prokhorov MS. Integrating the natural foundations of technological training for schoolchildren and students: Problems and prospects of the development of education in Russia: a collection of materials of the XXV All-Russian Scientific and Practical Conference. Novosibirsk, 2014; 169-174.*
6. *Mukhina, MV. Development of technical thinking in the future teacher of technology and entrepreneurship using the system of cognitive tasks: thesis. ... cand. pedagogical sciences. Nizhny Novgorod, 2003; 214.*