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SOI: 1.1/TAS DOI: 10.15863/TAS

International Scientific Journal

Theoretical & Applied Science

p-ISSN: 2308-4944 (print) **e-ISSN:** 2409-0085 (online)

Year: 2020 **Issue:** 01 **Volume:** 81

Published: 30.01.2020 **http://T-Science.org**

QR – Issue QR – Article

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STUDYING THE METHODS OF TEACHING TECHNICAL CREATIVITY

Abstract: *This article discusses the essence and structure of technological education of students. The main directions of modernization of technological education are analyzed.*

Key words: *method, technique, technology, technical science, features of technical science, technical creativity*

Language: *English*

Citation: Shamanov, G., Sheraliyeva, O., & Shomansurov, F. (2020). Studying the methods of teaching technical creativity. *ISJ Theoretical & Applied Science, 01 (81),* 706-710.

Soi: http://s-o-i.org/1.1/TAS-01-81-123 ***Doi***: https://dx.doi.org/10.15863/TAS.2020.01.81.123

Scopus ASCC: *3304.*

Introduction

UDC 304

Having entered the third millennium, our society is faced with a situation where the technological complexity of production is growing faster than the skill level of workers. The domestic vocational school should prepare new generations of young people for work in the conditions of an avalanche-like penetration of new technologies in all spheres of production. The question of the need for higher education for specialists in working professions is becoming ever more urgent.In the most developed countries, the processes of vocational training for young people are determined by the level of development of engineering and technology. The need to take into account new priorities in the system of primary vocational education in Russia is absolutely obvious.Scientists predict that the twenty-first century will be the century of science and high technology in all areas of human life. Technology is defined as the science of the conversion and use of matter, energy and information in the interests and plan of man. At the school "Technology" - an integrative educational field, synthesizing scientific knowledge from courses in mathematics, physics, biology and showing their use in industry, energy, communications, agriculture and other areas of human activity.

Teaching students in the educational field of "Technology", like the entire educational system, is aimed at solving the problems of adaptation and socialization of the younger generation and is closely connected with the processes of socio-economic changes in society.Changes in the socio-economic sphere of society, of course, led to changes in the education system, since the school is a part of society. The value orientations in social life are changing, and hence the change of priorities, goals in teaching and educating students in general, and in labor training and education in particular. The economic crisis and the associated drop in production negatively affect the organization of the necessary material conditions for labor training, on its educational material base.During the period of the country's socialist development,

under the conditions of state regulation of the economy and a shortage of workers, the practice-oriented training of students, called “labor training”, was mainly aimed at fulfilling the company's order to train future production workers. Labor training of students and teacher training at the industrial and pedagogical faculties of universities had a production focus. The solution to the problem of labor resources played a dominant role, despite the fact that in a developed society, industry employs no more than 20-25% of the working population. The orientation of the students' practical training activities mainly to meet the needs of production did not always correspond to the interests of students, a significant part of whom planned to become doctors, lawyers, scientists, journalists, education, culture workers, etc. This contradiction was one of the essential problems of the traditional system of labor education of the younger generation, which became especially acute at the high school stage and caused a rejection of this system by a significant part of the participants in the educational process.Changing the socio-economic structure of the state sets the task of adequate reform of the system of general secondary education, including preparing students for work. The transition to market relations and the emergence of competition in the labor market create the prerequisites for realizing the educational needs of students and ensuring the order of the state on the basis of a humanistic education paradigm that involves the development and maximum use of the internal potential of each person, taking into account what individual opportunities and the interests of the whole society in various fields and types of activities. Achieving goals should be based on the development of independent education of students, built on the principles of motivation of individually significant educational activities. From the perspective of the organization of the educational process, this means a transition from unified educational standards and programs to reapization of an individual educational path as the basis for the subsequent professional and educational development of each student.In the initial period of social and economic transformations in our country, steps were taken to transform the system of labor training of students into a system of their technological training on a broad basis of studying the processes of conversion of materials, energy and information. The development of a technological training system for students required, in the opinion of Academician P.P. Atutov, the formation of a unified system of practice-oriented teaching of the younger generation to create material and spiritual values in various fields of activity throughout the entire period of study at school. The solution to this problem involved the development of integrative pedagogical technology for the practical training of students within the framework of an integrated system that would allow such training to be carried out in all areas of general secondary education, at all its levels and stages.

The curriculum of the subject is one of the main educational and program documents that determine the content of student learning. The list of knowledge and skills formed during the study of a school subject is specified in it in the form of concepts, judgments, laws, hypotheses, facts, which together make up its categorical system. Thus, in the program, the content of instruction appears in a generalized, systematized form. This determines the importance and particular importance of the study and analysis of the subject's program.The curriculum is the main document that guides the teacher, determining the amount of knowledge and skills to be learned by students in this lesson, selecting objects of student activity, etc. Therefore, the teacher must always imagine not only the whole of what the program is talking about, but also clearly view the didactic relationship between its individual parts (program topics). It is necessary to rely on the knowledge and skills acquired by students and remember that the material studied should serve as the basis for the assimilation of new material in subsequent periods of study, for the students' project creative activities.The curriculum of the subject should be flexible, dynamic and take into account the achievements of science, engineering and technology in its content. It should allow for the possibility of reflecting the characteristics of teaching at school and the teaching methods of the teacher himself. In this regard, the teacher is given the opportunity to supplement the program with modern developments in specific areas of knowledge, eliminate obsolete material from it, rearrange topics in places and redistribute time for their study.The implementation of these tasks at a high scientific and methodological level is possible only if the decisions made by the teacher will be based on the principles of program development. First of all, they include the didactic principles of scientificness, accessibility, systematicity and sequence of training. However, the knowledge of some principles to solve the problems of selection and systematization of the program material is not enough for the teacher. He needs knowledge of the directions (criteria) by which these principles are implemented in programs and methods of analysis of curricula for compliance with their didactic principles, and, in addition, the ability to use this knowledge in the study and analysis of a specific program.Acquaintance with the "Technology" program begins with an explanatory note, which highlights the goals and objectives of technological preparation of students, reveals the basic ideas that are inherent in its content. Then, the place of the section chosen for analysis in the structure of technological education of students is determined (in which class it is studied, what percentage of time is devoted to studying the section, is intended for boys or girls, what basic technological concepts have already been

studied by the time the section is studied, etc.). Then the teacher gets acquainted with the explanatory note of the selected section, carefully studies it, identifies its main provisions, goals and objectives of student learning.The next stage analyzes the thematic plan and lists of basic concepts, facts, phenomena, etc. categories of basic knowledge and skills of students in the section. At the end of the analysis, methodological recommendations are given for the quality implementation of the educational process, comments are made, recommendations for its improvement. Thus, we can offer the following order (plan) of analysis of the selected section of the "Technology" program:1. general information about the program (section title, number of hours to study, author, where and when developed, etc.);2. goals and objectives of the study of this section;3. The relationship between the goals of studying this section and the goals and objectives of technological training of students. Place of partition in the structure of technological education of students;4. Thematic plan for studying the section (what topics and in how many hours are supposed to be studied);5. analysis of the implementation of didactic principles in the content of the program, indicating the analysis criteria and examples for each selected criterion (Appendix 2);6. methodological characteristics of the educational material section. Information security of the program with textbooks and teaching aids for students;7. interdisciplinary and intradisciplinary communications of this section;8. the possibility of implementing the educational component of the technological preparation of students by the example of the content of the selected section;9. the possibility of implementing the developing component of technological preparation of students by the example of the content of the selected section;10. The content of practical work of students, their characteristics, a list of objects of technological activity of students;11.characteristic of the forms and methods of studying this educational material, recommended for use;12. guidelines for monitoring the quality of students' knowledge in this technological field;13. recommendations on the material and technical support of the learning process in this section;14. proposals for changing the content of student learning or its improvement with justification of the reasons and the need for this.

Students' independent work consists of “inventing” options for solving problems, analyzing them and choosing the best, drawing up sketches of solutions, drawings, diagrams and drawings, visiting the library after school hours. The directions of students' creative activity are determined taking into account material and technical, personnel capabilities, regional and national characteristics of the school. However, the chosen areas should to the greatest extent take into account the personal interests and inclinations of both girls and boys on the basis of psychological diagnostic testing and the recommendations of teachers.Areas of technical creativity and examples of developed objects of technology:1. Technical toy. Toys and games: static and dynamic, mechanical, electrical, electronic, electromechanical, optical, etc .; unique and for mass production; individual and collective; attributes to demonstrate physical effects and tricks, etc.2. Technical types of sports modeling: aircraft model, ship model, space, car model, radio engineering, etc. Products: mock-ups, model-copies, model-schemes, sports models, experimental (original) models and technological equipment for their manufacture, assembly, testing , adjustments, etc.3. Transport equipment. Products: bicycle, all-terrain vehicle, snowmobile, scooter, hang glider, maps, vehicles for the disabled, as well as individual functional units, accessories and models of this equipment, etc.4. Technique and technology for the home, garden and home workshop. Products: motor-plow, mini-tractor, mower, transport trolley, elevator, pump, seeder, lamp, woodworking device, device for collecting, processing and storage of crops, devices for caring for animals, security and alarm devices for home, car, etc.5. Equipment for sports and health. Products: massagers, sports equipment, sports and entertainment devices for home and recreation, etc.6. Radio engineering. Products: radio receiver, radio transmitter, tape recorder, TV, calculator, clock, car ignition control unit, signaling device, electronic game, radio control system, game console for the TV, etc.

The Greek method is “the way”, “the way of behavior.” By the method of teaching is meant the systematically applied way of the teacher to work with students, allowing students to develop their mental abilities and interests, master knowledge and skills, and use them in practice.Most domestic scientists consider the classification proposed by L. Ya. Lerner and M.N. Skatkin productive. The following methods are distinguished in it.Explanatory-visual (reproductive) method. It includes a demonstration, lecture, study of literature, radio and television broadcasts, the use of didactic machines, etc. He trains memory and provides knowledge, but does not provide the joy of research and does not develop creative thinking.The problematic method is used mainly in lectures, during observations, when working with a book, during experimentation, and on excursions. Thanks to him, students acquire the skills of logical, critical thinking.Partial-search method with independent work of students, conversation, a popular lecture, design provides students with the opportunity to participate in individual stages of the search. At the same time, they get acquainted with certain points of research work, test hypotheses and evaluate the results.Research method: students gradually learn the principles and stages of scientific research.In labor training, all these methods can be concretized into three groups - in accordance with the method of

transmission and assimilation of information: verbal, visual and practical. Verbal methods are widely used, they are characterized by richness and expressiveness, a variety of images and concepts that can be conveyed by live speech. A technology teacher, telling teens about relatively complex technical concepts, can use well-chosen images, analogies. Consider the features of each of the verbal methods.During the story, students become acquainted with certain objects, phenomena or processes according to their verbal description. The effectiveness of the application of the story mainly depends on how much the words used by the teacher are understood by students.In labor training, a type of story is much more often used - an explanation when reasoning and evidence are accompanied by a training demonstration. It is necessary to explain the design of machines, tools, devices or the rules for constructing a technological process. This method is used during introductory and ongoing briefings, in the disclosure of issues of preparation of work, methods of its implementation.In work with high school students often use the lecture method. A lecture differs from a story in that it not only affects imagination and feelings and stimulates concrete-shaped thinking, but also activates the ability to select and systematize the material presented. The structure of the lecture is more strict than the structure of the story, and its course is more subordinate to the requirements of logic.The story, explanation and lecture are among the monological teaching methods, in which the passive reproductive activity of the trainees dominates (observation, listening, memorizing, performing selection actions). At the same time, there is no “feedback” - information necessary for the teacher about the assimilation of knowledge, the formation of skills. Therefore, the more perfect method is conversation - a teaching method in which the teacher uses the knowledge and experience that students have and, using questions and answers, leads them to understand and learn new material, and also repeats and verifies the results.The conversation not only requires students to follow the teacher’s thought, but also provokes independent reasoning, develops attention and speech.The most used types of questions in a conversation:• questions that revive previous knowledge and practical experience in the memory of students.• questions for the formation of concepts, establishing links between facts, phenomena and processes.• questions aimed at the practical application of knowledge.• Conversation with a problem statement of questions is especially effective — such a conversation, in contrast to communicating and reproducing, is called heuristic, it helps to activate thinking, develops students' independence and initiative.The independent work of students with technical and educational literature is a word-based learning method and is one of the most important means of both cognition and consolidation of knowledge. When training in programmed texts, working with a book is an effective means of monitoring and evaluating the results of self-education.Independent work with the book allows you to teach students purposefully select literature, master the technique of proper reading.In the classroom, recordings of radio and television programs on the history of science and technology, stories about the achievements of modern technologies, and speeches by scientists and industrialists can be used.

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