

Formation of Creative Skills of Students in The Conditions of Informatization of Education as an Urgent Pedagogical Problem

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Article History	Abstract
Received: 06 June 2023 Revised: 05 Sept 2023 Accepted: 29 Nov 2023	<i>In this article the current tasks of the subject of technology study at general secondary schools, its problems in psychological, pedagogical and technical-technological aspects of the educational process and the use of interdisciplinary links of technology in the educational process are discussed. Many organizational, legal and scientific research works are being carried out on reforming in the system of improving teaching technologies, forming modern knowledge and skills in students, using new teaching methods for this purpose have been investigated. Through this, it is aimed to create a system of training a generation as a competitive and high-potential personnel. This makes the formation of creativity-related skills in students one of the urgent tasks. Therefore, opinions and considerations about the need to form creative abilities in young people based on innovative tools have been discussed</i>
CC License CC-BY-NC-SA 4.0	Keywords: project, design, creative person, creativity, creative thinking, ability, creative abilities.

1. Introduction

In the world, a number of scientific researches are being carried out devoted to the psychological and pedagogical features of the development of creativity in students, to improve the methodical system of organizing educational activities related to the development of creativity, to implement the creative activities of students, and to develop innovative pedagogical technologies. It is especially important to improve the pedagogical conditions for the development of creativity among students in the process of extracurricular activities, to teach students to design thinking through collaborative project activities, and to develop pedagogical mechanisms for the formation of a creative personality through design education. By expanding the prognostic possibilities of creative pedagogy related to the creation of the "school of the future", the development of the creative-intellectual potential of students acquires an important relevance.

To raise the quality of school education to a new level in our republic, to form a healthy, strong and effective motivation to study in students, to teach them to plan their professional growth independently, to educate the ability to acquire modern professions in the conditions of the digital economy is on the focus of teaching goals of modern teaching. "In order to organize effectively the educational process in educational institutions, the development of scientific research of a practical nature aimed at the study of new, including alternative approaches and scientific justification, without changing the study period "expanding the use of modern educational technologies that ensure the expansion of mastering competence" is defined as the priority directions of the improvement of teaching methods and the gradual implementation of the principles of individualization in the educational process. This requires substantiating the interrelationship between design thinking and the formation of students' creative abilities, revealing the didactic possibilities of design projects for the formation of students' creative abilities, and improving interactive technologies for the formation of students' creative abilities based on design projects.

Today, there is an increasing need to form creativity in students and thereby develop their creative skills in relation to labor and professional activities. The place of technology classes in the educational content aimed at developing students' creativity skills is very high. The design process in technology classes helps students to work independently, to think freely, to search creatively, and to increase efficiency. Determining the content of materials aimed at forming knowledge and skills

related to design elements as part of educational materials that should be taught to students in general labor and general professional competencies, first of all, the labor activities of specialists and inventors in production enterprises today implies the development of the skills of observation, design of the process of manifestation of creativity in them and its practical application. Also, design projects are selected as a tool in this research, aimed at forming students' creativity skills, based on the fact that the topics of technology science for students of 1-4th grade, 5th-7th grade and 8th-9th grade are selected in a simple and understandable way.

It is clear from the analysis of the State Educational Standards and curriculum of the subject "Technology" of general secondary education schools that aims to familiarize students with the basics of design (artistic construction), to continuously form knowledge and skills related to design. . In this program, students of the 5th grade" do practical exercises from design works. "It is intended to acquire knowledge and skills related to the design of professional items and products, taking into account the aesthetic and economic aspects². And in the 6th grade, students were given educational assignments on "...in the process of constructing and modeling simple items, analyzing the artistic aesthetic characteristics of products related to the fields of folk crafts and carrying out exercises to solve design solutions", 7 and the students of the first grade"... design the products to be prepared and apply design methods to them. It is established that the assignments on "creating projects for the performance of design tasks" ³ will be carried out.

Currently, in the "Technology" lessons of general secondary education, according to the content of the modernized State Education Standard, it is envisaged that students acquire a number of knowledge, skills and qualifications related to the science of technology. According to it, students should have an outlook on the labor process, general labor knowledge, skills and qualifications, a general idea of professions, national economy, production and service sectors. to have knowledge about, to have basic artistic processing skills for various materials, to know national labor traditions and customs, to have skills to prepare a technological map of the product focused on solving.

It is known that it is appropriate to work on various indicators in solving the goals and tasks of technology science. Accordingly, if we first pay attention to the content of the purpose of labor education, the intellectual development of students is to teach them to value hard work and human labor, to carry out pre-vocational training by preparing them to choose consciously a profession, and to promote the well-being of society and individuals. it is envisaged that it consists in developing personal qualities and thoughts that allow them to join labor activities.

In this sense, the analysis of the relevant aspects of the necessary requirements for the level of preparation of students in technological education is one of the current problems of this field, which is waiting for its scientific-practical solution. Therefore, in the course of the "Technology" classes, one of the priorities of this research is to compare and analyze data on the study of technologies for the formation of general labor and general professional skills and qualifications is considered one of the main tasks of technological education at secondary schools.

Certain subjects in technology have been changed for the 2021-2022 academic year and focuses more on introducing and guiding students to modern careers and activities. For example, "Technology and technological tools; technical construction and modeling; basics of robotics; modern professions; sections such as national handicrafts were newly introduced⁴. Also, the textbook "Technology" is aimed at giving the reader more information about professions such as designer, plant designer, marketer, interior designer, architect, engineer and programmer. The content of the textbook helps students to develop independent work skills in subjects such as sketching, modelling, layouts, conveyors, construction. In the chapter "Composite materials" of the 5th class, information is given about the methods of using composite materials, the equipment used in processing. Also, the introduction of the tutorial on making various three-dimensional objects from polymer clay (booklet-shaped key chain) and 3D pen will be an important tool in forming their creativity. A new chapter entitled "Energy production and use" will help the student to easily use the technical capabilities of various alternative energy generating equipment in his life activities. The chapter "Mechatronics-LEGO education" has been added to the technology textbook. This chapter includes the topics of making a simple rotating mechanism, making a carousel, increasing the speed of a carousel, basic algorithmic constructions, designing a robotic system, assembling an Otto robot, and a robot competition. The chapter "Basics of Socio-Economic Technology", which was newly included in the textbook, serves to help students acquire economic knowledge and develop the necessary skills to apply them in everyday life. Tasks related to the TRIZ (theory of solving inventive problems) method were included in the textbook. In this, students learn to conduct research and research, apply algorithms and models to research education, and implement problem-oriented projects⁵.

In technology classes, students' actions related to the performance of tasks, especially creative activities, including the development of creativity through design projects, play an important role in mastering the actions. The following factors require special attention:

The first factor is undoubtedly the compliance of education with normative requirements, that is, the content of any educational material must first of all be in accordance with the DTS of the field and the curriculum.

The second factor is complex, both as the main educational material and the material introduced as a component of the formation of general labor skills in students, in particular, as training sessions aimed at mastering materials related to design projects. It should not be too simple, i.e. content that does not arouse a sense of creativity. In the first case, it does not work due to a certain level of stress and low performance, and in the second case, there is no stimulation of creativity.

The third factor can be divided into two categories according to its structural components, that is, educational materials provided taking into account the interests and natural inclinations of students, as well as their gender characteristics, are one of the important factors in the development of creativity. Coordinating work activities, increasing work productivity, and quickly and qualitatively performing the work will serve as a source of goods and signs.

When organizing the process of teaching students in technology classes, it is necessary to determine the content of the situation and to focus it correctly. Conditions are created for the student to learn the educational materials specified in the State Educational Standards.

In order to acquire practical skills, the student needs to complete the mastery of labor exercises and initial tasks oriented to production. In order to implement this process, the methodical guide for students will be directed to methodological recommendations and educational goals. Students should do something independently in this process. This process is important.

One of the conditions for managing the educational process is that the teacher should be attentive to the work being done. It is necessary to monitor the level of skill and competence of any of the students. In each case, the content of education consists of situations that are new to the student or have not been mastered by him. Previously mastered knowledge serves as a basis for further mastering.

When dividing the educational content into parts, the teacher should first of all take into account the complexity of this skill, not in terms of implementation, but in terms of mastering. Therefore, depending on the student's preparation, each part can cover the entire labor process in one case, the sequence of work in another case, and the only known method in another case. In order for students to quickly and thoroughly acquire new skills, it is not appropriate to use real work tasks in many cases. A newly studied task may seem very complicated to a student, although he has already mastered the operation that is part of it.

In some cases, there are insufficient conditions to study specific labor activities. In such cases, replacing the labor activity with other methods, that is, hand-embroidery, patterns sewn on the basis of designer methods take place.

In any case, if the student does not understand the action he is studying, the quality of the work will not be effective if he does not know its content. The student should be able to understand and imagine the essence of the action he is doing. He needs to know whether the process is right or wrong.

The level of students' understanding of the task plays a decisive role, especially in tasks with elements of creativity.

The teacher must be able to convey the knowledge of the goal to be achieved. The student learns this process practically. In this, he observes with his own eyes the work done with production, learns to measure and define. In all cases, it studies a specific production task.

The types of knowledge implemented in technology lessons are different, for example, the tool of actions is used to implement it demonstratively. In the verb form, the condition of the matter is expressed using words. It requires a certain effort to implement it. In technology education, the form is more of an intermediate state at the end. The solution is always tested by practice.

Practices show that clear images of the work process also serve to speed up the work. It guarantees its actions and increases its success. Increases labor productivity. An important methodological task of the teacher is to determine whether the student can perform new actions correctly or to provide ways

to achieve them. In the process of labor education, the student should consistently learn the teacher's training, which serves to increase labor efficiency.

At the stage of educational types, the cooperation between the teacher and the student changes in different ways. At first, learning is difficult and slow to get used to, but later it becomes faster as a skill is formed. Each process study is continuously and systematically monitored. As skills are developed, productivity increases.

The design projects used in the formation of students' creativity are also changing and becoming more complicated based on the principle of continuity, and creative approaches are improving.

The use of interdisciplinary connections in the educational process is of great importance. It is known that "any science arises under the influence of other sciences close to it and develops together with them. Therefore, it is important to use interdisciplinary connections and connections in the teaching and learning of subjects in schools, "the land of knowledge" and higher education institutions. In the same way, connecting technology lessons to other subjects gives effective results and is one of the important factors of increasing the effectiveness of the lesson. Interdisciplinary connections in technology can be divided into two types and can be conditionally called internal and external interdisciplinary connections ⁶ . In technology lessons, internal connection is understood as the connection and connection of topics in the subjects related to this field. "External connection" refers to the connection of technology lessons with other subjects. Therefore, the teaching of technological science in such a sequence is inextricably linked, they strengthen and complement each other. "If training sessions in the form of preparation are held in primary grades, then in grades V-VII they will be improved and wider knowledge of industry and agriculture will be given. In the upper classes, they are directed to professions in certain specialties. It can be seen that the lessons of technology science are connected with each other at these stages and are conducted on the basis of the principle of going from simple to complex, from easy to difficult. The task of the technology teacher is to connect the new material with the previous material, following this principle. This is done using the three known types of interdisciplinary connections, namely, pre-transition, intra-transition, and post-transition methods. . External connections in technology education mean its interaction with other fields and disciplines. In forming students' creativity skills, technology lessons will be more effective if they establish interaction and cooperation activities with subjects such as painting, drawing, visual arts, physics, mathematics.

It is important to ensure cooperation between technology education and visual arts in developing students' creativity. "The role of pictures in technology classes is very important, because before making any detail or item, a picture or sketch of it is drawn and shown to the students. Pupils also copy and draw these pictures in their notebooks. Students create an idea about that detail or object through these pictures. It can be seen that here students develop various drawing skills. But it is known from experience that painting is not an easy task. Many students face difficulties in doing this work because they do not have enough knowledge and skills in drawing." Therefore, in technology lessons, the teacher should give students an understanding of technical drawings, sketches, clear images of objects, perspective, the sequence of work in drawing, as well as distinguishing colors, placing them in proportion, and so on.

Also, the formation of drawing knowledge and skills will be effective in this activity. "Technology lessons cannot be imagined without drawing. Drawing is also very necessary in technology classes. Because the making of any detail begins with reading its drawing, and in this process, the student has an idea about the parts of the future item. Therefore, the drawing and use of technological and instructional flashcards, one of the important exhibits in technology classes, also depends on how the drawings are used. So, the students' practical activities and the quality of the prepared items depend to a large extent on their drawing knowledge and skills. However, drawing is taught from class VII onwards. Therefore, it is necessary for the technology teacher to give information to the students about drawing, size, arrow lines, sectioning, cutting, drawing tools and their use, starting from the 5th grade. In this case, the work should be done taking into account the knowledge of the students in this field in the previous classes.

Mathematics education in school education has an incomparable role in the formation of students' creativity. Formation of students' mathematical knowledge and development of mathematical thinking also has a strong influence on their way of thinking and thinking. This way of thinking also develops their creativity. Therefore, it is effective to conduct mathematics education along with technology education in school education on an innovative basis. "In technology education classes, students will need the concepts of creating shapes such as right angles, perpendicular and parallel lines, right

triangles and rectangles. In addition to these, students in technology lessons learn about the axis of symmetry, symmetrical placement of shapes, circle, dividing it into pieces, experimenting with ruler, ruler, protractor, protractor, circle. with the help of tools, they have to determine the angles, centers of arcs, other dimensions of straight and curved lines. In such cases, knowledge of geometry is necessary. Therefore, in the school geometry course, there are great opportunities in the use of drawing and measuring tools, and the replacement of surfaces. The task is to use them appropriately in technology lessons⁷. " Also, knowledge of arithmetic is necessary to determine various dimensions such as length, width, height, surface, volume of the given items, to calculate how much material and time will be spent.

As the students go deeper into technology education, they lack the knowledge and skills of physics and chemistry. Because in technology education, understanding the harmful effects of a substance, the physical changes in the process of making something, allows them not to put their health at risk. "It is necessary to know their physical properties before working with various materials in practical training on technology education. The property of a substance to maintain its chemical composition as a result of external influence is called its physical properties. Such properties include such properties as color, density, solubility, heat resistance, heat capacity, thermal and electrical conductivity, and magnetism. For example, when a metal is heated, its composition does not change when heat is passed through it, or when a magnet is applied to the metal. The physical properties of metal are very useful in distinguishing them from each other and using them. For example, any metal has its own luster, which is called its color. Not all metals are the same color. For example, copper is red, tin is shiny white, zinc is gray, and steel is pale blue. Here it can be noted that if metals are oxidized in the air, their color will change, even the thinnest piece of metal will not transmit light. When a material is heated, it quickly transfers heat from itself is called its thermal conductivity. The faster the metal conducts heat, the faster and more evenly it heats up and cools down. Therefore, it is necessary to take into account the possibility of their dimensions changing due to heat during the manufacture and processing of metal products. In general, it is possible to distinguish materials according to their physical properties, to choose alternatives, and to prepare details and product parts. In addition to these, it is necessary to make extensive use of physical concepts such as movement types, force, pressure, power, energy, work, and friction when making various items from materials using primary tools or machines, adjusting tools, in technology lessons.

Technology education aims to develop students' skills to make the right choice when choosing a profession, based on the formation of creativity in students. For example, "in the 5th-7th grades, information is mainly given about the profession. Students will get to know what public working professions are. Elements of these professions form the content of students' activities in the workshop. This situation fully corresponds to the task of general technical training of students in this period of education. In the 6th grade and especially in the 7th grade, along with providing information about the profession, vocational training is also carried out. The reason for this is that on the eve of graduation of the 7th grade, students need to choose the profile (direction) of future labor training. Each profile includes many public worker occupations. These can be occupations that are closely related to the content of workshop training (for example, occupations related to metal and wood, gas processing) or occupations that have nothing to do with them. However, such a scene can be observed in the work experience of schools; teachers try to solve this problem depending on the mastery of students, that is, excellent students are given the right to choose, and poor masterers are forced to choose one of the remaining professions.

4. Conclusion

In conclusion, "technology" education in general secondary education has a positive effect on the development of creative skills in students along with hard work. Therefore, it is important to feel the working environment, the process of creating techniques and technologies, and to increase their knowledge about their use in the formation of students' creativity skills.

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