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THE USE OF DEVELOPMENTAL METHODS IN DEVELOPING STUDENTS' CREATIVE QUALITIES IN "TECHNOLOGY" LESSONS

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ABOUT ARTICLE

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Abstract: In terms of their didactic potential, such methods as "Brainstorming," "Focal Objects," "Morphological Box," "Six Thinking Hats," "Mental Map" ("Cognitive Map"), "Synectics," and "Indirect Strategies" are recognized as methods for developing an individual's creativity. Taking into account the educational potential of the "Brainstorming," "Six Thinking Hats," and "Morphological Box" methods, their appropriate and purposeful use in developing students' creative qualities in "Technology" lessons guarantees the expected results. This article discusses this issue.

Introduction. Throughout the history of humankind, the issue of educating a creative individual has been the focus of attention of numerous scholars and educators. In particular, "If Sparta presented the world with a model of socio-military-physical education, Athens, in turn, offered a system of comprehensive and harmonious development of the individual. It was precisely here that the ideas of educating a free and creative individual, as an element of the polis (social) way of life, were put forward" [5, p. 249]. As can be understood, when describing

a creative individual and the qualities inherent in such a person in Ancient Greece, particular attention was paid to freedom of action and freedom in organizing activities.

The results of research conducted during subsequent periods of the development of human civilization also confirm, despite differences in the approaches of the authors, that freedom occupies a dominant position in the activity of a creative individual. Indeed, "many researchers have attempted to define the fundamental quality of a creative individual, which constitutes the basis of their creative ability. Although their views differ, they all express a similar idea: a creative individual is a free individual, and a free individual is one who can be themselves and listen to their own 'self'" [1].

The problem of developing creative qualities in an individual has been systematically studied in economically leading countries since the 1960s. The subjective phenomenon referred to as "creativity," which reflects the process of original thinking, has now become a "focal point" determining development in all spheres of social life. This, in turn, has led to the increasing relevance of the issue of educating individuals capable of creative thinking.

Materials and methods. Pedagogical and psychological sources [3, 4, 6] recognize such methods as "Brainstorming," "Focal Objects," "Morphological Box," "Six Thinking Hats," "Mental Map" ("Cognitive Map"), "Synectics," and "Indirect Strategies" as methods for developing an individual's creativity. These methods help develop an individual's ability to put forward new ideas, propose multiple solutions to a particular issue, and subsequently select the most appropriate one. The "Brainstorming," "Six Thinking Hats," and "Morphological Box" methods were effectively used to develop students' creative qualities in "Technology" lessons.

Discussion. It should also be noted that working in pairs, as well as in small and large groups, in combination with these methods is considered effective. This is because such conditions provide an opportunity to generate numerous ideas.

I. "Brainstorming" Method. This method was developed by Alex Osborn, and its main principle is to develop the ability to generate new, purposeful ideas and to critically analyze each of them. Each student expresses their opinion on the problem under study and puts forward their own proposal for its solution. The others supplement and develop the ideas expressed. No idea expressed by the students is criticized. Only after all students have presented their proposals for solving the problem are the ideas analyzed collectively and the most appropriate and effective solution selected [4].

The use of the "Brainstorming" method in "Technology" lessons enables students to systematize the theoretical knowledge acquired in the subject, or, over a certain period of time,

in its sections or chapters, and to search for ways of applying this knowledge in practice. In addition, the "Brainstorming" method can be used to monitor students' learning and cognitive activity in the "Technology" subject and to determine the level to which they have mastered the topics.

In particular, during the research period, this method was used to determine students' level of knowledge concerning the topics "Products Manufactured by Folk Craftspeople for Export and the Domestic Market. Rare Materials and Tools Used in Handicrafts" (Grade 9) [8] and "Chemical and Technological Properties of Wood. Chemical Properties of Wood" (Grade 7) [7]. To achieve effectiveness, the students were assigned to small groups.

During the lessons, this method was used in Grades 7 and 9 according to the following procedure:

I. Since the topic "Products Manufactured by Folk Craftspeople for Export and the Domestic Market. Rare Materials and Tools Used in Handicrafts" (Grade 9) [8] was covered in the first lesson, the "Brainstorming" method was used in the following lesson during the process of reinforcing the material studied. The method was implemented as follows:

1. At the end of the lesson in which the topic was studied, the students were introduced to the method and its essence.

2. They were instructed to carefully study the information related to the topic provided in the textbook.

3. They were assigned to search for and familiarize themselves with additional information on the following topics using the Google.co.uz and Google.com search websites:

1) On the Google.co.uz website:

- to familiarize themselves with the teaching manual entitled "Studying Folk Crafts in Labor Education Lessons in Grade V";
- to familiarize themselves with the topic "Woodworking Industry" (Group 1), and, based on it, with such subtopics as "Jewelry Making" (Group 2), "Metalworking" (Group 3), "Blacksmithing" (Group 4), "Coppersmithing" and "Metal Engraving" (Group 6);

2) On the Google.com website:

- to familiarize themselves with information presented under the general topic of "Carpentry Products" (Group 1), "Blacksmith Products" (or "Forged Products"; Group 2), "Upholstered Furniture" (Group 3), "Furniture" (Group 4), and "Jewelry Products" (Group 5).

II. Since the topic "Chemical and Technological Properties of Wood. Chemical Properties of Wood" (Grade 7) [7] was covered in the first lesson, the "Brainstorming" method

was used in the following lesson during the process of reinforcing the material studied. The method was implemented as follows:

1. The students were informed that the “Brainstorming” method would be used during the lesson.

2. The students were introduced to the method and its essence.

3. The students were instructed to carefully study the information related to the topic presented in the textbook during the previous lesson.

4. They were assigned to search for and familiarize themselves with additional information on the following topics using the Google.co.uz and Google.com search websites:

1) On the Google.co.uz website:

- to familiarize themselves with the teaching manual entitled “Studying Folk Crafts in Labor Education Lessons in Grade V”;
- to familiarize themselves with the topic “Woodworking Industry”;

2) On the Google.com website:

- to familiarize themselves with the information presented under the topics “Carpentry Products” (Group 1), “Types of Carpentry Products” (Group 2), “Carpentry Tools” (Group 3), “Names of Carpentry Tools” (Group 4), “Carpentry Tools and Devices” (Group 5), “Carpentry Machines” (Group 6), “Carpentry Work” (Group 7), and “Carpentry Workshops” (Group 8).

Certain conditions [2, 13] were observed when applying the method. The most important of these were the following: creating a favorable environment for students to think independently; paying attention to the variety and quantity of ideas and new suggestions expressed; encouraging students to enrich their ideas further; ensuring that no idea was objected to; not bringing the discussion to an end while new ideas were still being expressed; and reaching a final conclusion based on the students’ ideas through generalization.

Most importantly, when using the “Brainstorming” method during the lesson, particular attention was paid to ensuring that students expressed complete opinions concerning the most important aspects studied within the topic and explained the key concepts.

In particular, during the study of the topic “Products Manufactured by Folk Craftspeople for Export and the Domestic Market. Rare Materials and Tools Used in Handicrafts,” organized in Grade 9, the respondent students expressed the following ideas:

1. Handicraft products: they serve to meet people’s everyday needs; they introduce a nation to the world by demonstrating its identity; they embody the centuries-old values of a

nation; they provide information about the lifestyle, customs, social relations, and aspirations of a particular people; they enrich the aesthetic taste of individuals, especially children and adolescents; they have practical value and can be actively used in everyday activities; and they have continuously developed on the basis of social changes, new ideas, and the development of technical means.

2. Types of folk handicraft products:

- household furnishings – equipment used in everyday domestic life (kitchen equipment; bedroom equipment; living-room equipment; children's-room equipment; these are made from plastic, glass, ceramics, metal, household chemical products, and textile materials);
- upholstered furniture – a collective term for comfortable furniture intended for sitting or lying and containing a soft component (element; spring, textile fabric, leather product). Upholstered furniture includes armchairs, sofas, sofa beds, couches, backless sofas, seats, and benches (soft seats with or without a backrest, mainly placed in the corridors of various offices or next to women's dressing tables); ottomans (from French "meuble"; thick furniture designed for one person, without a seat back or armrests; various items can also be stored inside; usually placed near the entrance of a house for convenient sitting while putting on footwear or next to a woman's dressing table); upholstered furniture may be produced separately, as a set, or as a suite;
- hard furniture – household furnishings that can either be moved or permanently installed (chests, tables, chairs, stools, chests of drawers, beds, armchairs, sofas, wardrobes, cabinets, cupboards, sideboards, shelves, multi-level open shelves (étagères), racks (open shelves with several levels), coffee tables, dressing tables (trumeaux), three-panel dressing mirrors (trellises), auxiliary tables (tables for placing telephones and flowers), secretary cabinets (cabinets that can be used both as bookshelves and as desks), tables for bathrooms and toilets, couches, sofas (wide, upholstered sofas), armchair beds, and sofa beds); they are usually made of wood or metal and are placed in residential and socially used buildings; hard furniture may also be produced separately, as a set, or as a suite;
- carpentry products – objects and equipment made wholly or partially from wood or wood-based materials (the process of producing carpentry products includes cutting, sawing, shaping, planing, and drilling); areas of carpentry include house building, tool making, cart making, saddle making, chest making, cradle making, lattice making, and wood carving; window and door frames, lattices, barriers, panels, stairs, household furnishings for houses,

kitchens, bedrooms, children's rooms, and living rooms (cradles, chests, tables, chairs, low stools, bedside tables, armchairs, benches, ottomans, couches, sofas (wide, upholstered sofas), armchair beds, sofa beds, wardrobes, sliding-door wardrobes, chifoniers, cupboards, multi-level open shelves (étagères), racks (open shelves with several levels), secretary cabinets (cabinets that can be used both as bookshelves and as desks), sideboards, shelves, coffee tables, dressing tables (trumeaux), three-panel dressing mirrors (trellises), auxiliary tables (tables for telephones and flowers), bathroom and toilet tables, saddles (for animals used as means of transportation), shovels, and snow shovels); they may be double-tiered, open, hinged, fixed, or movable;

- blacksmithing products – products manufactured by processing metals under pressure at high temperatures (areas of blacksmithing include sheet-metal work (nailing sheet metal to roofs and making various tools and equipment from sheet metal, such as stoves, chimneys, and their caps); coppersmithing and metal engraving (artistic products such as trays, ewers, water pots, bowls; gates, barriers, stairs, seats, furniture, lattices (lattices installed on windows, doors, and plots of land), backrests, metal lamps, interior elements (mirrors, chandeliers, light fixtures, awnings, canopies installed above doors), fireplaces, braziers, hearths, samovars, liquid containers, adzes, axes, hammers, hoes, chopping tools, shovels, and souvenirs); most of these products are artistically decorated; each metal used in blacksmithing requires processing at a specific temperature; the required temperature depends on the physical properties of the metal (melting and crystallization) and its chemical properties (the presence of alloying elements); metals are processed at the required temperatures within the following ranges: iron – 1250–800 °C, copper – 1000–650 °C, titanium – 1600–900 °C, and aluminum – 480–400 °C);
- jewelry – ornamental and decorative items (for example, women's jewelry, which enhances women's beauty; types of jewelry include bargak, bibishak, bracelet, bozaband, bozgardon, boldok, oyboldok, qashqarboldok, buloqi, boyintumor, gajak, duotuzi, jevak, jiga, zarkokil, zebigar, don, zulfi, isirga, kokil, osmatuzi, sanchok, tavq, tilla bargak, tilla tuzi, tillaqosh, turunj, ring, shokila, and halqa); precious metals such as gold, silver, platinum, copper, iridium, palladium, ruthenium, and osmium are used in the production of jewelry;
- precious metals – metals that are rare in nature and distinguished by their luster, beauty, and resistance to corrosion (rusting) and oxidation (such metals include gold, silver, platinum, copper, iridium, palladium, ruthenium, and osmium).

During the experimental work, the ideas expressed by one group could also be supplemented by other groups.

During the research, in the process of studying the topic “Chemical and Technological Properties of Wood. Chemical Properties of Wood” (“Making Household Items from Wood” subtopic) (Grade 7) [7, 7], the following activity was conducted with the aim of developing creative ideas among the students:

1. Samples of pictures presented under the topic “Carpentry Work” on the Internet website https://www.pinterest.com/toppolyana/stolyarnыe-rabotы were presented to the students. In particular:









2. The students were assigned the task of putting forward ideas for enriching the creatively designed chairs and stools presented to them with new details or creating new interpretations of them (the photographs were obtained from the websites https://www.pinterest.com/toppolyana/stolyarnыe-rabotы and https://roomble.com/ideas/soveti-i-idei/vdohnovenie/100-samyh-krutyh-izdelij-iz-dereva-s-vystavki-wood-works):

	Creative ideas: 1) installing a circular backrest, 20–25 cm in height, extending from the first leg of the stool to the third leg; 2) installing a downward-facing triangular backrest at the point where the second leg of the stool is located; 3) installing a backrest between the first and second legs and between the second and third legs of the stool, secured

	to two posts (the backrest is also circular in shape and is attached to the posts from both sides).
	Creative ideas: 1) installing a rail at the front of the rocking chair, with sides 4–6 cm thick and a length 8 cm (4+4) greater than the length of the chair seat; this would allow children under three years of age to sit comfortably as well; 2) installing posts at the front of both armrests and attaching them to the backrest at an angle of 1400 cm to create a chair with a canopy, which could also be used for sitting in the yard under sunny conditions.
	Creative ideas: 1) installing cushion-like armrests, 15–20 cm in height, on both sides of the chair, positioned 5 cm inward from each side of the backrest (5 + 5 = 10 cm); 2) installing posts on both sides of the backrest extending to the same height as the backrest, and attaching armrests 15–20 cm in height to these posts on both sides of the chair (the inner part of the armrest may be either open or closed).
	Creative ideas: 1) installing two posts, 30–35 cm in height, at the rear of the seat and attaching a wave-shaped backrest, 15–20 cm in height, to the posts (with the lower part left open); 2) installing a backrest diagonally across the seat at an angle of 45°, with a thickness of 10 cm and a height of 15–20 cm (with the lower part left open by 15 cm).

II. “Six Thinking Hats” Method. This method was proposed by Edward de Bono. The method makes it possible to organize creative processes by mentally putting on six hats of different colors. The hats of different colors represent the organization of the following actions by an individual: 1) the white hat – numbers and facts are analyzed; 2) the black hat – only negative opinions concerning the relevant issue are expressed; 3) the yellow hat – the positive aspects of the problem are sought; 4) the green hat – new ideas are developed and put forward; 5) the red hat – one’s emotional experiences concerning the problem are expressed; 6) the green hat – the results are summarized [4].

During the research, taking into account the nature of the information presented in the “Technology” subject and its acquisition, as well as the fact that the most important aspect of creative thinking is to comprehensively analyze a process (phenomenon, event, problem, or issue), identify multiple solutions, and develop practical proposals (recommendations), the

content of the activities represented by the colors of the hats was modified to some extent. That is (Table 1):

Table 1. A New Approach to the Idea of the "Six Thinking Hats" Method

Hats	**Main function of the hat (Edward de Bono's idea)**	**Main function of the hat (modernized idea)**
White	Analyzing numbers and facts	Studying the text (essence of the phenomenon or process)
Black	Expressing only a negative opinion concerning the relevant issue	Identifying negative aspects (errors and shortcomings)
Yellow	Searching for the positive aspects of the problem	Identifying positive aspects (achievements)
Green	Developing and putting forward new ideas	Developing practical recommendations (proposals)
Red	Expressing one's emotional experiences concerning the problem	Drawing a personal conclusion concerning the problem
Green	Summarizing the results	Summarizing the results

When applying the method, the requirement that colored hats can be used in two ways—selectively (using two hats) and sequentially (using all hats in turn) [2, p. 79]—was taken into account. The students were informed about this. However, since the students expressed a desire to try using three hats (white, black, and yellow), the activity was organized in accordance with this proposal. Before using the method, the students were assigned to collect information based on additional literature and Internet websites providing information on the topics "Straightening Metal," "How to Bend Sheet Metal at Home," and "When and Why Metal Straightening Is Performed" (https://tech.wikireading.ru/4986; https://si-3.ru/kak-zagnut-list-metalla-v-domashnih-usloviyah; https://metalloy.ru/obrabotka/sgibanie/pravka-metalla). The students worked in small groups while completing the task. During the lesson, the "Six Thinking Hats" method was used according to the following stages:

Stage I. White Hat – Studying the Text (Essence of the Phenomenon or Process)

The following information was presented to the students:

"Bending is considered the main method of creating three-dimensional shapes from sheet metal. Bending is carried out using a bench vise, special forms, and special equipment.

Zokir and Kamron wanted to create three-dimensional shapes from sheet metal. However, the three-dimensional shapes did not turn out as expected. According to them, they had carried out the work according to the established procedure. Namely: 1) the place to be bent was marked; 2) the bending line was placed on the edge of the upper part of the vise; 3) the sheet metal was struck with a mallet."

Task: Study the mini-text carefully and think about where the young men made mistakes!

Stage II. Black Hat – Identifying Negative Aspects (Errors and Shortcomings)

The students were instructed to identify the negative aspects of Zokir and Kamron's actions. The respondent students expressed the following critical observations: 1) the bending was not carried out using a bench vise (or special forms or special equipment); 2) the place to be bent was not accurately marked; 3) the bending line was not correctly positioned on the edge of the upper part of the vise; 4) the sheet metal was struck not with a mallet or metal hammer, but with another similar object that could not deliver a sufficiently strong blow to the required area; 5) a complex shape was selected for bending; 6) they had not yet developed sufficient practical experience.

Stage III. Yellow Hat – Identifying Positive Aspects (Achievements)

The students were instructed to identify the positive aspects of Zokir and Kamron's actions. The respondent students expressed the following positive observations: 1) the bending was carried out using a bench vise, special forms, and equipment; 2) the place to be bent was accurately marked, the bending line was correctly positioned on the edge of the upper part of the vise, and the sheet metal was struck with a mallet; 3) the sheet metal purchased by Zokir and Kamron did not meet the required standard.

Stage IV. Green Hat – Developing Practical Recommendations (Proposals)

The students were assigned the task of providing Zokir and Kamron with practical proposals (recommendations) concerning the proper bending of sheet metal at home. The respondent students relied on information obtained from additional literature and Internet websites when developing their practical proposals (recommendations). During the formative experiment, the respondent students offered Zokir and Kamron the following practical recommendations: clearly determine what product is to be made from the metal that needs to be bent and select the appropriate metal (with a thickness of 2 mm); prepare the necessary tools in advance—a measuring instrument, a grinder with discs 1 and 2 mm thick, a metal hammer, a mask, and special protective glasses; accurately mark the places to be bent and their

dimensions; cut a small “groove” to make the sheet metal easier to bend; put on the mask and special protective glasses; run the grinder along the marked dimensions of the bending area to a depth of 1 mm; adjust the grinder disc to 2.5 mm and run it once again along the marked dimensions where the 1-mm “groove” has been created (this facilitates the bending process); place one of the resulting “grooves” against the edge of the profile and bend it along that groove; gradually strike the metal evenly along its length with a metal hammer (do not attempt to achieve the required bend all at once); repeat this action on all sides of the metal; inspect the bent areas; if the bending has not been achieved as desired, place the profile edge against the area again and straighten it; cut off excess sections using a grinder; inspect the cut areas at the corners and remove the metal scale using the grinder; level sharp and blunt areas by processing them and bring the product to its finished form.

Stage V. Red Hat – Drawing a Personal Conclusion Concerning the Problem

The respondent students were assigned to familiarize themselves with the text and the practical proposals (recommendations) prepared by the groups, examine the groups’ attitudes toward the situation, and draw personal conclusions.

The students reached the following conclusions: protective jaws should be installed on the clamping part of the vise so that it does not damage the sheet metal; when bending metal, the bending dimensions must be accurately marked on the section that needs to be bent; metals can be bent easily and quickly even at home, provided that certain requirements are taken into account; to ensure high-quality work, haste should be avoided; instead, the work should be carefully considered, measured, and the necessary tools prepared; after completing the bending process, the result should be inspected, excess sections should be removed using a grinder, and sharp or blunt areas should be leveled by striking them with a metal hammer and bringing the product to its finished form.

Stage VI. Green Hat – Summarizing the Results

The groups were assigned to summarize the results (reach a final conclusion) based on the outcomes of their learning and cognitive activities carried out during the previous five stages. The groups completed the task as follows:

Group 1.

Final conclusion: the process of bending metal (sheet metal) can be carried out both in a workshop and at home; certain tools are required for this; bending metal (sheet metal) requires a certain level of experience.

Group 2.

Final conclusion: when bending metal (sheet metal), it is necessary to have a clear understanding of the product to be made and its appearance (shape); the process of bending metal (sheet metal) is carried out in several stages.

Group 3.

Final conclusion: accurately determining dimensions and using tools correctly are important when bending metal (sheet metal); it is necessary to take certain requirements into account during the work process and strictly comply with them; the quality of the work depends on one's attitude toward the work process; it is important not only to organize the bending process correctly step by step, but also to ensure high-quality work, bring the metal (sheet metal) to the state of a finished product, and achieve artistic and aesthetic value.

It is important for the teacher to guide the groups' activities as they reach their final conclusions. Particular attention was paid to this aspect during the research.

III. "Morphological Box" ("Morphological Analysis") Method (or Graphic Organizer) [3]. It should be particularly emphasized here that some of the methods used in modern education are referred to as graphic organizers. They are called this because they are interpreted through specific forms—tables, diagrams, clusters, and images. In particular, the "Morphological Box" ("Morphological Analysis") graphic organizer is presented in the form of a table; the "Cluster" graphic organizer in the form of a cluster; the "Venn Diagram" graphic organizer in the form of a diagram; and the "Fishbone" graphic organizer through an image representing a fish skeleton.

The "Morphological Box" ("Morphological Analysis") graphic organizer, whose author is Fritz Zwicky, essentially involves dividing a selected object into several structural components by identifying several characteristics inherent to it. These components are then modified in essence and recombined. As a result, a new object emerges. This method was developed in the 1930s by the Swiss astrophysicist Fritz Zwicky. In substantiating the idea of the graphic organizer, Fritz Zwicky gives the following example: suppose a new business card needs to be designed for a perfume company. If the shape of the conventional rectangular business card is changed and it is produced in the form of a triangle that emits a pleasant fragrance, its impact on the human mind will be different [4].

For nearly a century, the "Morphological Box" graphic organizer has been a method based on analyzing the structural composition of an object, requiring the systematization of all variants representing the theoretical possibilities of an adopted decision. It is known that objects are usually arranged in boxes in a particular order. If a box is large, several types of objects, items, or equipment can be placed separately according to their type. In other words, a

specific place is allocated in the box for objects according to their type. The didactic significance of this method, which serves to investigate problematic situations and select solutions, lies in the fact that it enables systematic thinking about a particular process, type, or even field, analysis of ideas, and consideration of each situation that reveals the general essence of a process, type, or even field. This method, which is analytical in nature, also helps clarify ideas about a system and its structural foundations.

Also known as "Morphological Analysis," this method is based on analyzing the structural composition of an object and requires the systematization of all variants representing the theoretical possibilities of an adopted decision. Since it takes the form of a table, the method belongs to the category of graphic organizers. Just as objects and items are systematically arranged in boxes, the "Morphological Box" graphic organizer also involves placing key concepts related to the topic being studied systematically and sequentially in specific cells of a table. In this respect, it teaches students to think freely and critically.

Morphological analysis, as a specific form of a systematic approach to problem solving, makes it possible to find original solutions within a short period of time. In the educational process, morphological analysis takes the form of a table consisting of written elements based on various symbolic signs and images. The table naturally has vertical and horizontal dimensions. Usually, the general category to which objects or items belong is recorded vertically (for example, clothing, food products, medicines, etc.). Horizontally, the names of objects, items, or equipment belonging to each category are indicated. They should, as far as possible, be represented through images, conventional symbols, or logos. "Such indicators may include formats, colors, symbols representing the main problem, and symbols that help clarify the understanding of the structural components of the image" [6].

In organizing "Technology" lessons in Grade 7 of general secondary schools, or in extracurricular settings, including clubs, the use of Fritz Zwicky's "Morphological Box" method in developing students' creative thinking has cognitive and logical significance. During the research, particular attention was paid to revealing the general essence of the topic "Woodworking Technology" [7] using the "Morphological Box" method.

The use of the method is based on the following stages:

Stage 1. Dividing the students into small groups depending on the total number of students in the class (the most convenient way of grouping is according to their seats or rows of desks).

Stage 2. Providing students with theoretical information about Fritz Zwicky and the "Morphological Box" method developed by him.

Stage 3. Examining the students' level of understanding of the essence of the "Morphological Box" method using examples from school life.

Stage 4. Giving students a task to reveal the general essence of the topic "Woodworking Technology" using the "Morphological Box" method.

Stage 5. Setting a time limit for completing the task (8–10 minutes).

Stage 6. Completing the task.

Stage 7. Analyzing the groups' solutions.

Stage 8. The teacher evaluating the groups' work.

The effective completion by Grade 7 students of the learning task aimed at revealing the general essence of the topic "Woodworking Technology" [7] makes it possible to construct a morphological box in the following form (Table 2):

Table 2. Morphological Box on the Topic "Woodworking Technology"

Morphological parameters	**Option 1**	**Option 2**	**Option 3**	**Option 4**	**Option 5**	**Option 6**
I. Chemical composition of dry wood	Carbon – 49%	Oxygen – 44%	Hydrogen – 6%	Nitrogen – 0.1–0.3%	—	—
II. Main chemical elements in wood ash	Calcium	Potassium	Sodium	Magnesium	—	—
III. Compounds formed in wood	Cellulose	Lignin	—	—	—	—
IV. Substances contained in wood	Resin	Pectin	Fats	Others	—	—
V. Main properties of wood	Ability to hold metal nails	Wear resistance	Bending	Resistance to cracking	—	—

Morphological parameters	Option 1	Option 2	Option 3	Option 4	Option 5	Option 6
VI. Mechanical properties of wood	Strength	Hardness	Flexibility	Toughness	Brittleness	Splitting tendency / Nailability
VII. Groups of wood according to hardness	Softwoods	Hardwoods	Very hard woods	—	—	—
VIII. Products made according to the elastic properties of wood	Anvils of power hammers	Pads and gaskets	Drum beating sticks	Hammers	Chisels	Files
VIII. Products (continued)	Shovels	Hoes	Adze handles	—	—	—

Results. The purposeful and appropriate use of the methods "Brainstorming," "Six Thinking Hats," and "Morphological Box" in "Technology" lessons ensured the following results: 1) students' educational and cognitive activity increased; 2) they acquired creative thinking skills; 3) students began to demonstrate their ability to independently put forward creative ideas.

Conclusion. Thus, the didactic potential of the methods "Brainstorming," "Six Thinking Hats," and "Morphological Box" ("Morphological Analysis") in "Technology" lessons serves to develop students' creative qualities. Clearly defining the objective and developing learning tasks that require creative thinking create opportunities for the effective use of these methods. Taking into account the specific characteristics of the "Technology" subject, when developing learning tasks, the content of the "Six Thinking Hats" method needs to be theoretically modified without affecting its fundamental idea. The purposeful and appropriate use of the methods "Brainstorming," "Six Thinking Hats," and "Morphological Box" ("Morphological Analysis") in "Technology" lessons, together with the ideologically well-developed and methodologically appropriate formulation of learning tasks, provided opportunities for developing students' creative qualities.

References:

[1] Зауторова Э.В. Развитие творческих способностей курсантов в протсессе обучения // https://cyberleninka.ru/article/n/razvitie-tvorcheskih-sposobnostey-kursantov-v-protsesse-obucheniya.

[2] Interfaol metodlar: mohiyati va qo‘llanilishi / Met.qo‘ll. Tuzuv.: D.Ro‘zieva, M.Usmonboeva, Z.Holiqova. – T.: TDPU nashriyoti, 2013. – 136 b.

[3] 10 лучших методов генерирования идей // https://4brain.ru/blog/metody-generirovaniya-idey

[4] Методики развития креативности // http://moluch.ru/rules/?utm_ source= selfad&utm_medium=popup&utm_campaign=archive

[5] Реан А.А., Бордовская Н.В., Розум С.И. Психология и педагогика / Учеб.пособ. – СПб.: Питер, 2010. – С. 249

[6] Скрипник Ю. 5 приемов креативного мышления // ҳттпс://блог.манн-иванов-фербер.ру/2016/01/08/5-приемов-креативного-мйшления.

[7] Texnologiya / Umumiy o‘rta ta’lim maktablarining 7-sinfi uchun darslik. Mualliflar Sh. Sharipov, O. Qo‘ysinov, Q. Abdullayeva. – T.: “Sharq”, 2017. – 240 b.

[8] Texnologiya 9 / Umumiy o‘rta ta’lim maktablarining 9-sinfi o’quvchilari uchun darslik. Z.Sattorova, N.Abdusalomova, N.Ahmedova. – T.: “Ilm ziyo” nashriyot uyi, 2019. – 160 b.