

**Students' Cognition in the Teaching of Technology.
Opportunities for Activity Development**

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**Познанието на учениците в обучението по технологии. Възможности за
развитие на обучението**

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Abstract

The article is based on an experiment conducted among students from the 1st to 4th grades in Baku. The focus of the experiment was placed on the following stages: definition, training, and verification. At the defining stage of the experiment, it was found that primary school teachers poorly use modern educational technologies in teaching, and pay little attention to the development of cognitive activity of young students in technology lessons. A relatively different average level of cognitive activity is observed, and the high level is very small. All this indicates that special attention should be paid to increasing the cognitive activity of students in technology lessons, and this work should be purposeful, systematic, and continuous. The analysis of the experiment results showed that the indicators of the experimental classes are better than those of the control classes. The quality indicator in the control classes averaged 35.7%, whereas in the experimental classes, it was 62.2%. This demonstrates the superiority of the proposed methodology and strongly suggests that the formation and development of students' cognitive activity during technology education in primary grades should always be a focus. As a final result, it was revealed that students from the experimental classes apply the acquired knowledge dynamically due to vital activity (in terms of the speed and quality of task performance) and due to a high level of voluntary efforts to achieve the goal (they insisted on performing the given technological tasks, mobilized their strength, demonstrated complete independence, focused on the task set).

Keywords: teacher training system, cognitive activity, technology, formation of cognitive activity, junior students, technology teacher

Резюме

Статията се основава на експеримент, проведен сред ученици от 1-ви до 4-ти клас в гр. Баку. Фокусът на експеримента бе поставен върху следните етапи: дефиниране, обучение и проверка. На определящия етап на експеримента се констатира, че учителите от началното училище използват слабо съвременните образователни технологии в преподаването, обръщат малко внимание на развитието на когнитивната активност на младите ученици в уроците по технологии. Наблюдава се относително различно средно ниво на когнитивна активност, а високото ниво е много малко. Всичко това показва, че трябва да се обърне специално внимание на повишаването на познавателната активност на учениците в уроците по технологии и тази работа трябва да бъде целенасочена, систематична и непрекъсната. Анализът на резултатите от експеримента показва, че показателите на експерименталните класове са по-добри от

тези на контролните класове. Така, докато показателят за качество в контролните класове е средно 35,7%, показателят за качество в експерименталните класове е средно 62,2%. Това показва превъзходството на предложената методика и категорично предполага, че формирането и развитието на познавателната активност на учениците в процеса на обучение по технологии в началните класове винаги трябва да бъде в центъра на вниманието. Като краен резултат се разкрива, че учениците от експерименталните класове прилагат получените знания динамично поради витална активност (по отношение на скоростта и качеството на изпълнение на задачата) и поради високо ниво на доброволни усилия за постигане на целта (те настояваха да изпълняват дадените технологични задачи, мобилизираха силите си, демонстрираха пълна независимост, фокусираха се върху поставените задачи).

Ключови думи: система за обучение на учители, технология, формиране на когнитивна дейност, малки ученици, учител по технологии, когнитивни дейности

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Introduction**

What does the learning process depend on? The learning process is rooted in learning.

Active learning is an effective means of effective organization of educational and cognitive activities.

The nature of learning depends on the characteristics of the learning material to be mastered, the pedagogical mastery and experience of the teacher, as well as personal abilities and methodology (Agayev & Hajizadeh, 2020).

Of course, improving the quality of training in educational institutions in modern times can be discussed on a wider level as one of the important educational problems, and it is possible to make more detailed considerations about it. By relying on democratic principles, it is possible to perform creative activities and thereby make greater achievements in the field of improving the quality of education. (Abbasov, 2021). Therefore, the effectiveness of learning can be significantly increased. The reasons for this are the following: due to the cognitive activity and learning motivation of students; due to independent, productive, and creative acquisition and assimilation of knowledge based on thinking. Applying active (interactive) training changes school conditions, increases students' self-confidence, improves interpersonal relationships, and fosters a more positive attitude toward school and studying. (Agayev & Hajizadeh, 2021)

The new approach is effective since learning is not only about enriching the memory of schoolchildren with new knowledge and information. At the same time, based on the development of thinking, conditioned by cognition, it becomes possible to independently acquire more knowledge, acquire the necessary skills, and, skills. At the same time, under the guidance of a teacher, students learn to identify causal relationships and patterns of facts and events, come to appropriate conclusions, and make generalizations when familiarizing themselves with very important teachings and textbook materials.

The position of a student in the pedagogical process is the position of a “discoverer” or “researcher”. When faced with problems that are within his control, he freely performs them during his exploration. The students are in the position of researchers of this process, as equal participants in school educational activities. They acquire knowledge in the process of seeking knowledge.

When teaching the subject "Technology," the following characteristics are important: the teacher consciously (arbitrarily) organizes a cognitive problem situation; keeps in mind and evaluates the active research activities of younger students in the process of solving problems; provides opportunities for students to independently gather and assimilate new and necessary knowledge

The teacher who teaches classes on the subject of technology plays the role of a facilitator ("guide"). He constructs problem situations systematically and purposefully. It clarifies the problems associated with research, and at the same time assists in solving them.

The active learning method is characterized by the following moments:

- the training is subject-specific;
- there is a deep interest of students in learning;
- there is independent thinking;
- active participation of participants in technological classes;
- creation of a problem situation at the beginning of the lesson and the direction of the educational process to solve the problem;
- directing students to self-discovery of new knowledge through questions that require reflection and guidance;
- conducting training based on the research method; learning topics in a dialogue form, forming feedback; availability of pedagogical cooperation and interaction.

Achieving the quality of education, learning, and benefiting from new pedagogical technologies based on guidance is the main function.

The main principles of education - democratization, humanization, individualization, differentiation, integration, personality formation, and development are now being successfully realized. Those principles were taken into account in the classes on technology in classes I-IV involved in the experiment.

Interactivity consisted of the nature of elementary teacher and student interactions in the lesson, separate topics, dialogue, explanation, role play, etc. That is, the method that is being talked about is not planned; the course of the learning process creates that point and emerges with the independence and intervention of many schoolchildren.

Also, the students were interactive themselves. The main issue is that in that process, the student and the teacher, who are in a cooperative relationship, have a rightful position. As a teacher, he acts as a guide, facilitator, and consultant. Without interfering in the activities of schoolchildren, he puts forward problems, gives directions, supervises, and helps to prepare

search maps, but students work together on educational tasks among themselves, in research, and in a discussion environment.

Theoretical background

Interactive learning meant inter-student learning, communication, and cooperation, which occurred in technology classes. Interactive methods are the methods, approaches, styles, works, and tools that make learning and understanding skills and qualities of young schoolchildren in the classroom. According to the theory of constructivism, the trainer is not the teacher; the learner (student) is in direct contact with objects and events, and as a result, he adopts their properties and solves the problem. The student is encouraged to act independently and to be proactive, he was able to achieve an effective result by connecting new knowledge with previous knowledge in the course of learning. Dansereau expresses that cognitive skills help learners identify the relevant materials for their courses. It also assists them in retrieving information under appropriate circumstances.

According to the representatives of this theory, the environment and the student's opinions and attitudes affect the process of acquiring knowledge and skills.

Constructivist teaching is based on recent research on the brain of the individual and knowledge of how to implement the learning process. The connection of student learning to technology is an important theory that was introduced in 1999 by Sharon Adams and Mary Burns as part of the Technology Assistance Program at the Southwest Laboratory for Educational Development. Since 2005, teachers have been introduced step by step to constructive, interactive training and modern pedagogical technologies in training for improving the professional level of teachers, which is a project of the Ministry of Education and Madad Azerbaijan Humanitarian Organization (RELIEF) in our country. Training has important practical importance.

Method and discussion

To achieve the cognitive activity of young schoolchildren in the experimental classes on the subject of technology, the exercises on technology were organized at the level of modern lessons. When we imply modern lessons, we understand the pedagogical skill and mastery demonstrated by the teacher during the acquisition of knowledge, skills, and habits. If the teacher creates business conditions in primary classes, allocates necessary space to the independent judgments of young schoolchildren, challenges them, and benefits from problem-based learning using methods, styles, and tools appropriate to the nature of this or that subject, then his lesson is realized according to modern requirements. In the lesson, special importance

was given to thought-provoking issues and problematic questions that allow creative and cognitive independence for the development of creative imagination in young schoolchildren. Such organization of the lesson formed the necessary life skills and technological habits in the students. A modern lesson on technology requires the teacher's responsible approach to teaching. A primary school teacher determines in advance which methods and styles, how and when he will use the means to achieve his goal, thinks in advance about the structure of the information he will convey, helps to solve the main problem related to the topic, learns from scientific and technical innovations, important social and political events of the time, he regularly enriched his knowledge. A modern lesson on the subject of technology should develop the outlook of students in I-IV grades and create conditions for their conviction. In the lesson, students' understanding was enriched by the use of visual aids and information collected from different sources (Rauan, Dinara, Nurzamal, Dyussebekova, Aidos, 2022). In the primary classes participating in the experiment, the interactive learning process on the subject of technology was organized in such a way that students acquired knowledge through research. All this creates conditions for the search of the solution of the problem in the form of class (audience) groups and pairs. The groups wrote the obtained results on worksheets and then presented them.

After the presentations, the results were reviewed again, the information was systematized and summarized. Younger schoolchildren saw which of the results matched, what was new, and came to a general conclusion. Motivation was created due to the high level of assimilation of the subject to be studied. Motivation means incitement. In other words, it directs the learning-understanding position of students in technology classes toward problem-solving. Another function of motivation is to frame the research question. It is this research question that allows us to make hypotheses and direct research. A research question makes the research a requirement. The results of the research are written in a worksheet, and there are presentations. Conclusions are drawn by comparing the received with the initial assumptions. Then, work is done on the implementation of the results.

Junior schoolchildren are full participants in technology classes. They acquire knowledge through searches and discoveries. Active learning methods have several features. Let's consider them: the active learning position of schoolchildren; cooperation and interaction in a group; independence and freedom of thought; and creative use of knowledge to achieve life goals. These characteristics can be considered the main factors in the preparation of students of I-IV classes for educational activities.

By creating an active learning environment during the teaching of technology to the experimental schoolchildren, they treated the students individually and benefited from the most effective training methods and information technologies for the development of their knowledge, skills, and habits. At the same time, the efficiency of training (the ability to absorb more information in a short time) increased significantly. Some of the reasons for this can be noted: due to students' cognitive activity and learning motivation, with the free and creative acquisition and comprehension of knowledge concerning thinking.

Changing the method of applying active learning increases the self-confidence of young schoolchildren, improves interpersonal relations, improves the attitude to study in the educational institution, and allows them to gain and acquire new knowledge independently.

As the enthusiasm and achievements of schoolchildren increase, the activity of teacher becomes easier. However, this does not mean that the teacher's hard work decreases. Although there are advantages of active (interactive) training, the teacher should not completely dismiss the use of traditional (explanatory-illustrative and reproductive) methods. Depending on the goal of the training, the content, and the level of preparation of the students, the teacher should make their choice. For example, if the teacher defines technology as the main goal of the formation of skills and habits, he may consider the more reproductive (repetition and model work) method to be superior. If the content of the training is relatively complex, if it is required to learn a lot of new concepts and information, then the traditional explanatory-illustrative method is effective. However, interactive elements (asking clarifying questions, conducting a short exchange of ideas in pairs, explaining what has been observed, etc.) can be useful in traditional class time.

These issues were the focus of the classroom teachers involved in the experiment.

One of the most complex problems of the traditional education system is the conservatism and nature of the pedagogical technologies used. Previously, students were satisfied with 2 main sources of knowledge (teacher and textbook) to acquire knowledge, but now there are more of those sources. As a result, one of the main tasks of training is to make learning a habit in the process of teaching subjects, including technology. Students should be able to acquire knowledge independently. In terms of the quality of training methods, their orientation to students and their needs increases the effectiveness of training in the conditions of benefiting from creative thinking in acquiring knowledge. At the same time, such a personalized educational process will affect the quality of its development, will increase cognitive and social activity, and will form the values and habits of the student. Taking these requirements

into account makes it necessary to give priority to active learning technologies that incorporate productive, thinking, and means of free acquisition of new knowledge.

The world experience shows that the active learning method is an effective tool for improving the quality of training. The method makes the lesson interesting and attractive for students. Active learning increases the efficiency of content learning and application at the same time, making it easier for schoolchildren to understand. The project of using modern training methods is being implemented in our country. The main knowledge, skills, and habits have been formed by the experienced teachers, which can be considered important for the planning and implementation of active lessons. From the conducted monitoring, it appears that teachers face some problems when applying active learning methods. So, they need to exchange experience in designing innovations. As the experience of teachers teaching technology lessons in implementing innovations increases and relatively more teachers join this activity, the need for new methodical recommendations, teaching materials, and other sources of methodical information increases. It is one of the effective and appropriate ways to overcome the issues of dissemination and application of information and modern teaching practice on active training for teachers.

Active training. Conclusion

Through his educational activity, the student perceives technological knowledge within the program, stores it in his memory, applies it, and determines compatibility. By integrating modern learning technologies into lessons and transforming the traditional system with a research-oriented approach, students can actively engage in the learning process. In that process, the person who implements the technology exercises acts as a guide on the path to acquiring knowledge, a researcher in the student, and a discoverer of knowledge. Modern training technologies increase the efficiency of training.

Knowledge and skills in the field of technology must be connected with modern life and the development of society, otherwise, that knowledge will be a meaningless burden for the student. As a result, the interest of students in scientific knowledge decreases, and the level of awareness and activity causes concern. There are certain requirements for the pedagogical qualification and methodical preparation of the teacher who teaches the subject of technology. These requirements are reflected in the technology teacher's program. It is important for a teacher who teaches technology subjects to follow didactic principles to know student psychology and take it into account in their activities (Orucov & Rzeyeva, 2021). Here, it is considered necessary to enrich and make it more interesting with a creative approach to

technology lessons at the discretion of the teacher. In particular, it is important and necessary to expand opportunities and create conditions for the free and independent acquisition of knowledge and practical skills by students, to adhere to the principle of "teaching to learn" (Akhundov, Ahmadov, Salimova, Aliyev, 2019).

The unity of training and upbringing is also an important requirement for modern lessons. Technology classes helped students become morally active and educated them in the spirit of philanthropy, patriotism, and hard work. In the classes participating in the experiment, democratization, differentiation, humanization, integration, personalization, etc., are the basis of modern technology lessons. The principles stood.

Under the conditions of the implementation of the curriculum, favorable learning conditions were established for young schoolchildren, taking into account national and universal values, general development, tendencies, and interests, for the objective evaluation and stimulation of school achievements. The position of an active researcher was acquired by the schoolboy, and the teacher created opportunities for them to independently acquire and understand new knowledge. Active, creative thinking skills and means of independent acquisition of knowledge were combined in schoolchildren in active learning conditions. This form of work taught them to solve problems together, respect each other's positions, and acquire independent knowledge. Taking advantage of interactive learning methods and methods (groups, pairs, roles, brainstorming, results, etc.) intensifies the learning activity, makes it important and interesting for each student, and the level of activity in the lesson, as a result, and the developmental aspect of the training is strengthened.

The formation of competencies, which include skills such as using interactive learning methods, acting in current conditions, cooperation, and decision-making, includes a new attitude to the importance and at the same time the tasks of general education. In the modern era, technology teachers who have received an improved image from the methodical, scientific-pedagogical, and psychological point of view, understand well what innovation and modernity are, they benefit from them in lessons, including in primary classes, and they effectively benefit from the demands placed on the modern lesson and its organization. It is important to take into account the requirements for training, so that teachers who conduct classes on technology in classes I-IV participate in each other's classes and organize "open classes" of teachers with advanced work experience. The discussion and analysis of the observed lessons are ultimately based on critical thinking, the generalizations help teachers to

improve methodically, and at the same time, to have the opportunity to use new teaching methods.

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