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FIDAN ALI MAMEDOVA
PHD in Pedagogics, Doctorate Student
Institute of Education of the Republic of Azerbaijan, Azerbaijan
fa.mammadova@adpu.edu.az
ORCID ID: 0009-0002-4935-0645

MODERN PEDAGOGICAL TECHNOLOGIES AND THEIR IMPACT ON THE PROCESS OF DEVELOPING THE SCIENTIFIC WORLDVIEW OF YOUNGER SCHOOLCHILDREN

Abstract

The article explores the role of modern pedagogical technologies in shaping the scientific worldview of younger schoolchildren. It emphasizes that interactive teaching methods, ICT tools, and project-based learning foster active participation, creativity, and critical thinking among students. The study highlights how differentiated, ecological, and value-oriented approaches contribute to the development of moral, intellectual, and social awareness. The integration of innovative technologies transforms students from passive recipients into active participants, enhancing their analytical and communicative skills. Overall, modern pedagogy creates a holistic and engaging learning environment that supports the comprehensive development of children.

Keywords: interactive learning, pedagogical technologies, primary education, project-based learning, scientific worldview, creativity, student activity.

Xülasə

Məqalədə müasir pedaqoji texnologiyaların ibtidai sinif şagirdlərinin elmi dünyagörüşünün formalaşmasındakı rolu araşdırılır. Qeyd olunur ki, interaktiv təlim metodları, İKT-dən istifadə və layihəəsaslı yanaşma şagirdlərin fəal iştirakına, yaradıcılıq və tənqidi düşünmə bacarıqlarının inkişafına şərait yaradır. Tədqiqatda vurğulanır ki, diferensiallaşdırılmış, ekoloji və dəyəryönümlü yanaşmalar mənəvi, intellektual və sosial şüurun inkişafına xidmət edir. İnnovativ texnologiyaların inteqrasiyası şagirdləri biliklərin passiv alıcısından fəal iştirakçıya çevirərək onların analitik və kommunikativ bacarıqlarını inkişaf etdirir. Ümumilikdə, müasir pedaqogika uşaqların hərtərəfli inkişafına şərait yaradan bütöv və cəlbedici tədris mühiti formalaşdırır.

Açar sözlər: interaktiv təlim, pedaqoji texnologiyalar, ibtidai təhsil, layihəəsaslı öyrənmə, elmi dünyagörüş, yaradıcılıq, şagird fəallığı.

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Аннотация

В статье рассматривается роль современных педагогических технологий в формировании научного мировоззрения младших школьников. Подчеркивается, что интерактивные методы обучения, использование ИКТ и проектного подхода способствуют активному участию учащихся, развитию их креативности и критического мышления. В исследовании отмечается, что дифференцированные, экологические и ценностно-ориентированные подходы способствуют развитию морального, интеллектуального и социального сознания. Интеграция инновационных технологий превращает учащихся из пассивных получателей знаний в активных участников учебного процесса, развивая их аналитические и коммуникативные способности. В целом современная педагогика формирует целостную и увлекательную образовательную среду, способствующую всестороннему развитию детей.

Ключевые слова: интерактивное обучение, педагогические технологии, начальное образование, проектное обучение, научное мировоззрение, креативность, активность учащихся.

Introduction

One of the most important issues in modern pedagogy and teaching practice is the activation of students' learning activities. The realization of the principle of activity in learning holds particular significance, as both learning and child development are inherently active in nature. The quality of learning as an activity depends on students' learning outcomes, development, and upbringing. In the modern era, the education system is no longer limited to traditional approaches; the application of innovative technologies in the pedagogical process has come to the forefront [8]. These technologies ensure not only the acquisition of knowledge by students but also the formation of their worldview and the development of creative and critical thinking skills.

Modern pedagogical technologies include interactive teaching technologies, the use of ICT (Information and Communication Technologies), project-based learning, differentiated and individualized instruction, as well as ecological and morally oriented technologies.

Interactive methods (discussion, debate, brainstorming, role-playing, teamwork, etc.) are based on the active participation of students. These technologies develop children's social skills and communication culture, allowing them to evaluate events from different perspectives. As a result, students learn to justify their viewpoints, accept alternative opinions, and this contributes to the enrichment of their worldview.

The teacher must have a good command of all interactive methods and be able to adapt them according to the age characteristics of younger students. The application of these methods in "Life Skills" lessons provides great opportunities.

In the book *"Interactive Technologies,"* the author presents the following classification of interactive methods [4]:

1. Interactive methods of cooperative learning. These include: paired learning, rotating (changing) trios, two–four–all together, and the "carousel" technique.

2. Interactive methods of cooperative–group learning. These methods include: discussing a problem in a general circle, the "microphone" technique, incomplete sentences, brainstorming, "learning by teaching," and problem solving.

3. Methods of situational modelling. These include: simulations, simplified court sessions, and role-playing of situational cases.

4. Methods for developing discussion questions. These include: the press method, "take a position," "changing positions," continuous feedback scale, discussion, and debate.

The purpose of these methods is to engage students in active learning, develop their social skills, and make the learning process more effective, interesting, and connected to real life.

Learning activities organized in groups have a more complex structure. In this case, interactions in the educational process occur not only between the teacher and students but also lead to the formation of productive relationships within the class community itself. Therefore, from the perspective of interactivity, the group form is considered more effective and enriching, although it may influence the efficiency of the educational process in various ways [9].

Group work, as a form of collective learning activity, is a method of solving educational and cognitive tasks set in the lesson through the joint efforts of students [6].

In the teaching process, three main tasks are accomplished during group work [5]:

- a specific cognitive task, which is related to the learning situation;
- a socially oriented task, which fosters the development of civic qualities in students;
- a communicative and developmental task, which contributes to the formation of proper communication skills.

Many types of group work formats have been developed for use in lessons. Examples include "finding matches," "trap," "rotation" ("carousel"), "treasure hunt," "aquarium," "brainstorming," and others. These forms become more effective when students already have some prior understanding of the topic discussed, either from

lessons or everyday life. Each teacher can also create new forms of group work [7]. Some types of group work are briefly reviewed below.

"Finding Matches" method. This method is used to help students determine whether a given word corresponds to its description. The task should be completed before working with a complex text. This approach is very useful for reinforcing the meanings of concepts.

"Carousel" method. In this activity, students form two circles — an inner and an outer one. Students in the inner circle remain seated, while those in the outer circle change places every 30 seconds. During this time, they exchange information and try to convince their partners of their viewpoints.

"Aquarium" method. In this method, a group of students enacts a specific situation in a circular arrangement, while the rest of the class observes from outside and analyses their reactions.

"Two Feet Rule" method. If a student feels that they are not learning anything or cannot contribute to a particular group, they can "use their own two feet" and move to another group — where they can either be helpful or gain new knowledge.

The **"Case Study"** method is an effective approach that develops students' ability to make choices and decisions in real-life situations. A specific situation is presented to the students, and they are required to analyse it, identify the problem, and propose their own solutions. Afterwards, the most successful solution among the proposed ones is selected [11].

A practical example describes a specific situation, event, or the development history and outcomes of a particular subject (such as a company, enterprise, or organization). The method is based on the practical analysis of concrete situations and recreates them in a form as close to reality as possible. Therefore, the case study method is sometimes referred to as the "method of real learning situations."

The main advantages of the case study method are as follows:

- theoretical knowledge is easily connected with real situations;
- elements of mystery and interest are present in the learning process;
- the analysed situation carries no personal risk for students.

The **"Brownian Motion" method** – in this technique, students move around the classroom collecting the necessary information on a given topic proposed by the teacher.

The **"Decision Tree" method** – in this approach, the class is divided into several equal groups. Each team receives a specific topic and discusses it while making notes on a "decision tree." Afterwards, the groups switch places and add their own ideas to the trees created by their classmates.

The **"Candle" method** – in this method, a candle is lit and passed around in a circle. When students receive the candle, they share their thoughts on various aspects of the lesson.

The most effective form of interactive learning is considered to be discussion. Although it is challenging to conduct in primary school, it becomes possible to organize intergroup communication when applied systematically. This helps to clarify the overall picture, establish structure, generalize knowledge, and create opportunities for reflection and mutual assessment. Discussion also broadens communication among children, which contributes to the development of speech culture, logic, and argumentation skills.

By using the interactive methods mentioned above, the teaching process can be organized in a way that enhances students' attention, cognitive activity, and thinking. Lessons conducted through interactive teaching methods should not only ensure that students acquire solid knowledge but also develop their ability to independently apply this knowledge to solve problems in various situations.

A modern lesson should purposefully develop students' intellectual, physical, emotional-volitional, and cognitive abilities. The successful fulfilment of this task is possible only when students take an active role in the learning process [3].

Teaching in primary school should be based on the age characteristics of students. It is well known that play is the leading type of activity at the primary school level. Therefore, the teacher should use a wide variety of engaging, game-based didactic materials. These include various games, crosswords, riddles, quizzes, puzzles, and other forms of activity [1].

The main characteristics of interactive methods are the presence of a problem, mutual learning and interconnectedness of all participants, direct involvement and creativity, the ability to make decisions, and flexibility of thinking [10]. The emotions that arise in this process activate and motivate a person, directing them toward action.

An important factor for developing the innovative potential of interactive learning is creating an atmosphere of psychological comfort for different groups of teachers (innovators, advanced teachers, the "golden mean," and moderates). According to I.A. Zimnyaya, this represents a "psychological contact" based on mutual interest and trust between the parties [12]. The term "interaction" (from English *interaction* — mutual influence, mutual connection) first appeared in sociology and social psychology. In the theory of symbolic interactionism (founded by the American philosopher G. H. Mead), the development and activity of personality are viewed through the process of communication and mutual influence between individuals, during which a person forms their sense of self — their *"I."*

One of the main principles of the learning process organized through the use of interactive teaching methods is student activity. This refers to a quality of

participation characterized by a high level of motivation, a conscious need to acquire knowledge and skills, diligence, and adherence to social norms [2]. Such a form of activity rarely arises spontaneously; it is the result of purposeful interaction and the organization of the pedagogical environment, that is, it is formed through the use of pedagogical technology (the teacher's system of work).

The use of digital resources, multimedia tools, virtual laboratories, and simulations increases students' interest in learning. Knowledge obtained through the Internet broadens their worldview and enables them to comprehend scientific information in both visual and practical forms.

Project-based learning technology allows students to investigate real-life problems, find solutions, and present their results. This approach helps younger learners gain experience, connect their knowledge with practical activities, and better understand the surrounding world.

Modern pedagogical technologies take into account students' individual characteristics, interests, and abilities. A differentiated approach provides children with opportunities to realize their potential and perceive the world from different perspectives. This, in turn, contributes to the more effective development of their moral, intellectual, and social worldview.

Ecological projects, social campaigns, and pedagogical technologies based on moral and cultural values foster a sense of responsibility toward nature, society, and culture in students. This contributes to the formation of a correct worldview regarding both the environment and human relationships.

Modern pedagogical technologies transform students from passive recipients of knowledge into active participants. The application of these technologies helps younger learners develop qualities such as analytical thinking, creativity, social responsibility, and tolerance. As a result, their worldview becomes broader, more systematic, and harmonious.

Conclusion

The study confirms that modern pedagogical technologies play a decisive role in shaping the scientific worldview of younger schoolchildren. The integration of interactive, digital, project-based, and value-oriented methods ensures that students become active participants in the learning process rather than passive recipients of knowledge. These technologies enhance children's motivation, analytical and critical thinking, creativity, and communication skills. Moreover, they foster moral and social responsibility, helping students connect theoretical knowledge with real-life contexts. Thus, the implementation of innovative pedagogical approaches contributes not only to the intellectual and personal development of learners but also to the creation of a modern, dynamic, and human-centred educational environment.

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Rəyçi: dosent İlham Cavadov