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TYPOLOGICAL FEATURES OF IMPROVING THE METHODOLOGY OF TEACHING NATURAL SCIENCES IN THE 6TH GRADES BASED ON AN INTEGRATIVE APPROACH

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ABSTRACT: The integrative approach in teaching 6th-grade natural sciences focuses on demonstrating the connection between students' acquired knowledge, skills, and competencies with real-life applications. This methodology emphasizes conducting educational research, performing experiments, and engaging in project-based activities both in and outside the classroom. It aims to foster creativity, develop students' interest in innovation, and encourage them to generate new ideas.

KEYWORDS: - Natural sciences, knowledge, skills, competencies, scientific competence, practical competence, researcher, integrative approach.

INTRODUCTION

With the Decree No. PF-4947 of the President of the Republic of Uzbekistan, dated February 7, 2017, titled “On the Strategy of Actions for Further Development of the Republic of Uzbekistan”, the State Program for 2017–2021 was adopted to implement strategic initiatives in five priority areas of national development. One of the key objectives outlined in this program was to strengthen the material and technical base of 367 general education schools by equipping them with educational laboratory tools and other essential inventory.

At the core of teaching natural sciences to 6th-grade students using an integrative approach lies the methodology of teaching natural sciences, which has developed over time in correlation with the evolution of the subject as an educational discipline.

The first methodologist in this field is considered to be F. Zuyev (1754–1794), who conducted natural science lessons in schools and delivered lectures at teacher training seminars. In 1786, he published a textbook titled "Illustrations of Natural History," which systematically presented the study of nature, covering the world of minerals (inanimate nature), plants (botany), and animals (zoology).

In the mid-19th century, K. D. Ushinskiy (1824–1870) emerged as one of the leading figures in progressive pedagogical thought. He identified observation as the most effective method for studying nature. Ushinskiy proposed that children's introduction to nature should begin by exploring their local environment, emphasizing the importance of direct observation over mere reading or reliance on a teacher's explanations. He demonstrated how students could develop logical reasoning skills through guided natural observations.

The first systematic approach to teaching natural sciences through observations, experiments, and excursions was proposed by A. Ya. Gerd (1841–1888). He emphasized that visual teaching methods must correspond precisely to the actual perception of learners, ensuring that students grasp concepts effectively through firsthand experience.

Gerd developed a system in which the study of nature begins with inanimate nature. He created a methodology for teaching the course on inanimate nature in primary grades. He authored the textbook "A Short Course in Natural Science", as well as the educational manual "Earth, Air, Water", and the methodological guide "Subject Lessons in Schools" (1883). This book remained a fundamental reference for teaching the inanimate nature course for a long time.

As early as 1917, A. Ya. Gerd's book "Natural Science as an Independent Subject" was published, in which he substantiated the necessity of teaching natural science as a specialized subject in schools. This approach required the urgent development of a new curriculum for natural science education. In 1919, a preliminary curriculum for natural sciences was developed and approved, with a strong emphasis on excursions and practical activities.

M. N. Skatkin, in his research, focused on the methodology for organizing extracurricular activities in natural sciences and emphasized activating students' cognitive engagement during nature-study lessons.

Since 1959, an annual publication titled "Observation Diaries" has been issued for students. The author of this publication, V. A. Valerianova, aimed to assist teachers in organizing systematic student observations of weather conditions, changes in plant and animal life, and human labor activity in agriculture (Figure 1.2.1).

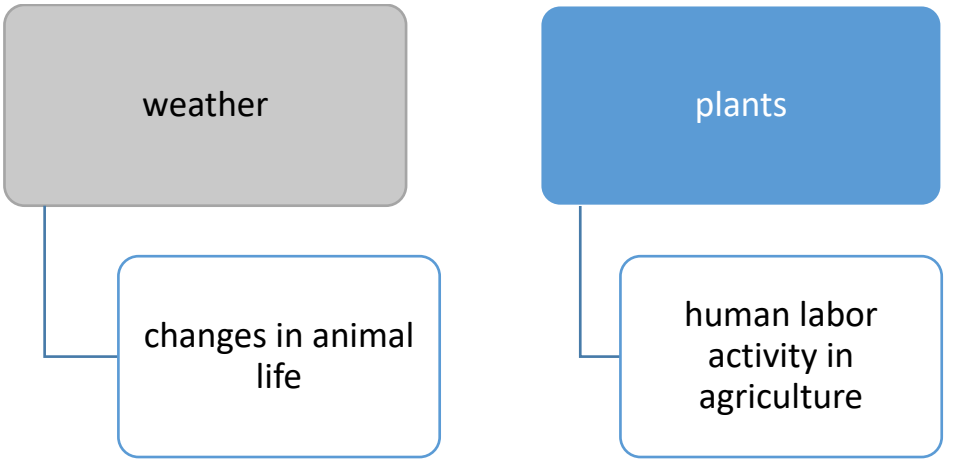

Figure 1: Description of "Observation Diaries" (V.A. Valerianova).

A prominent methodologist, S.A. Pavlovich (1884–1976), made significant contributions to the study of natural sciences. His works greatly assisted in the proper methodological organization of natural science lessons in primary schools. Some of his well-known works include:

- "The Practice of Teaching Natural Science in Primary School" (1939),
- "How to Teach the Concept of Inanimate Nature" (1948),
- "A Book on Natural Science: Basics of Nature and Its Methodology" (1969).

S.A. Pavlovich's books on equipping natural science lessons with teaching tools remain relevant even today.

From 1986 to 2021, lessons on the surrounding world were systematically taught. The study of this course was conducted in two directions (Figure 1.2.2).

Contributions of Central Asian Scholars to the Development of Natural Sciences

Scholars from Central Asia have played a significant role in the development of natural sciences. Their works and surviving manuscripts remain crucial for studying the history of natural sciences.

Abu Rayhan Beruni was born in 973 in Kyat (present-day Beruni district, Khorezm). A total of 152 of his works are known, of which only 27 have survived to this day. One of his greatest

discoveries was the invention of the globe, which he created to demonstrate that the Earth has a spherical shape.

Abu Ali Ibn Sina (980–1037) contributed to various fields of natural sciences. In addition to his medical knowledge, his works in physics and mechanics played a crucial role in the development of natural sciences. His books cover topics such as motion, force, atmospheric pressure, weather, snow, rain, hail, the nature of heat, lightning and its types, sound, light, solar and lunar eclipses, the causes of vision, and the significance of plants in the world. Ibn Sina is also renowned for his globally famous work, "The Canon of Medicine."

Abu Nasr al-Farabi, born in 873, was known to have mastered more than 70 languages. He was one of the leading medical theorists of his time, producing numerous scientific works in the field of medicine. Farabi emphasized that human health is based on an integrated and holistic system, demonstrating that many diseases are linked to dietary disorders.

Farabi established the scientific foundation for the development of primary and secondary signaling systems, a fundamental concept in physiology, over a thousand years before European scientists, particularly the Russian physiologist I.M. Sechenov.

The History and Current State of Natural Science Teaching Methodology

The first translated literature on natural sciences in the Uzbek language appeared in 1919. These included:

"Elementary Geography", a translation from Russian of A. A. Kruber's book,

"Turkestan", a translation of **A. A. Kruber's "Essays on the Geography of Russia"*,

"Fragments of Nature", a teacher's manual written by T. N. Qori Niyoziy.

Between 1927 and 1929, the first-stage school textbooks on regional studies were published, such as:

"The Little Turkestani",

"Our Land",

"Reading Book on Natural Science",

and other textbooks based on local natural science materials.

These publications played an important role in the development of natural science education in Uzbekistan.

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