



Methods For Developing Primary School Students' Creative Abilities Through The 5e Model In The Teaching Of Natural Sciences

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ABSTRACT

This article discusses the integration of the 5E instructional model into primary education and presents a classification of methods aimed at developing students' creative abilities.

Keywords: Method, 5E model, problem-based learning method, inquiry-based learning method, experiment, activity-oriented process, investigation, assessment criteria.

INTRODUCTION

In primary science education, one of the important pedagogical tasks is to guide students beyond the acquisition of ready-made knowledge and encourage them to observe, investigate, ask questions, formulate hypotheses, conduct experiments, and draw independent conclusions. In particular, the study of natural phenomena, living and non-living objects, ecological processes, and the relationship between humans and nature provides broad opportunities not only to stimulate students' cognitive interest but also to develop their creative thinking abilities. In this process, the integration of educational content, teaching methods, pedagogical techniques, and instructional resources is of particular importance. This is because the creative abilities of primary school students are developed not merely through the completion of individual creative tasks, but also through independent thinking, inquiry, problem recognition, the generation of alternative ideas, and the justification of decisions throughout the learning process. From this perspective, the 5E model represents one of the methodological frameworks that enables students to participate actively as subjects of the educational process.

The five phases of the 5E model—Engage, Explore, Explain, Elaborate, and Evaluate—are designed to help students acquire knowledge through active inquiry and practical activities rather than simply receiving it in a ready-made form. The purposeful selection of methods used at each phase contributes to the development of creative abilities such as curiosity, independent thinking, problem-solving, the generation of novel ideas, and self-assessment.

From this perspective, several criteria should be considered when selecting methods for teaching natural sciences through the 5E model. These include the extent to which a method encourages active student participation, provides opportunities for expressing independent ideas and hypotheses, promotes the investigation of natural objects and phenomena, encourages the exploration of multiple possible solutions, and creates conditions for students to produce original creative work.

Accordingly, problem-based learning, inquiry-based learning, project-based learning, and modeling can be identified as methods aimed at developing students' creative abilities in

science education through the 5E model. Although these methods differ from one another, their integration into a unified methodological system makes it possible to organize students' learning activities systematically, from initial curiosity to independent investigation, creative problem-solving, and the assessment of learning outcomes.

Problem-Based Learning Method

In science education, the problem-based learning method involves presenting students with a question or situation that cannot be easily resolved using their existing knowledge and encouraging them to seek solutions independently. In this method, the teacher does not provide ready-made answers but instead creates problem situations that enable students to think critically, make predictions, and justify their ideas.

This method is particularly effective during the Engage phase of the 5E model. For example, questions such as "Why do some plants grow toward sunlight?", "What would happen if there were no water on Earth?", and "Why does ice float on the surface of water instead of sinking?" encourage students to reconsider their existing knowledge and formulate new hypotheses. In this context, the emphasis is not on finding a single predetermined answer but on generating and considering different ideas.

The potential of problem-based learning to develop creative abilities lies in the fact that, while solving a problem, students ask questions, formulate hypotheses, compare alternatives, identify cause-and-effect relationships, and propose their own solutions.

The problem-based learning method can also be applied during subsequent phases of the 5E model. During the Explore phase, students observe and conduct experiments to find answers to the problem. For example, different fruits and vegetables are placed one by one into a container of water. Students directly observe which objects sink and which remain floating on the surface.

During the Explain phase, students justify their observations. They discuss why pumpkin, apple, and mandarin float, considering the possible role of air spaces within their structures, and why a grape sinks, taking into account its density in relation to water. The teacher guides the discussion and helps students develop scientifically accurate explanations based on their observations.

During the Elaborate phase, students apply their understanding to new situations and investigate additional possibilities. For example, the teacher removes the peel from a mandarin and places it in water. Students observe the change in its buoyancy and discuss how removing the peel affects its ability to float.

The teacher may also cut an apple and a pumpkin in half and place the pieces in water again. Students observe any changes in their behavior and discuss possible explanations. The teacher then summarizes the findings and clarifies the scientific principles involved.

Thus, the problem-based learning method is not limited to a single phase of the 5E model; rather, it contributes to the logical continuity and integration of the different phases.

Inquiry-Based Learning Method

In primary science education, the inquiry-based learning method encourages students to observe natural objects and phenomena directly, formulate questions and hypotheses, conduct



experiments, compare results, and draw conclusions. This method is closely associated with the Explore phase of the 5E model.

Through inquiry-based learning, students become active participants in the process of discovering and investigating information rather than passive recipients of ready-made knowledge. For example, the question "In which type of soil do plants grow faster?" can encourage students to observe different soil samples, plant seeds, and compare the results in order to formulate their own conclusions. Through such activities, students not only acquire scientific knowledge but also demonstrate creative qualities such as curiosity, independence, evidence-based reasoning, and a willingness to explore new possibilities.

When implementing inquiry-based learning, activities such as observation, experimentation, comparison, classification, question formulation, hypothesis generation, and conclusion drawing should be integrated into a coherent process. For example, the question "Under which conditions does water evaporate more quickly?" encourages students to formulate an initial hypothesis, conduct an experiment, observe the results, and ultimately reconsider their original assumptions in light of the evidence.

Therefore, inquiry-based learning is an important method for developing students' independent investigative skills and creative thinking. In particular, when students independently identify the causes of a phenomenon or discover a solution to a problem through experimentation, their sense of ownership and engagement in the learning process is strengthened.

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