



DEVELOPING STUDENTS' SUSTAINABLE DEVELOPMENT COMPETENCE THROUGH THE STUDY OF INDUSTRIAL AND ENVIRONMENTAL PROBLEMS IN GEOGRAPHY EDUCATION

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Abstract. The article addresses the development of students' sustainable development competence through the study of industrial and environmental problems in geography education. It substantiates the possibilities of analyzing the impact of industrial enterprises on atmospheric, water, and land resources, identifying the causes and consequences of environmental problems, and developing sustainable solutions to address them. The effectiveness of using problem-based learning, case studies, project-based learning, and geographical research methods in geography lessons is demonstrated.

Key words: *geography education, industry, environmental problems, sustainable development, competence, environmental education, problem-based learning, project-based learning.*

1. INTRODUCTION

Today, the rapid development of industrial production is leading to increased use of natural resources and growing anthropogenic pressure on the environment. The emission of harmful substances into the atmosphere by industrial enterprises, water pollution, land degradation, and the accumulation of industrial waste are causing environmental problems [1]. Addressing these problems requires the integration of economic development with environmental safety.

Geography has broad potential for developing students' sustainable development competence through the spatial study of the location of industries, the use of natural resources, and their impact on the environment [2].

The aim of the study is to identify effective methodological opportunities for developing students' sustainable development competence through the study of industrial and environmental problems in geography education.

2. MATERIALS AND METHODS

The study employed theoretical analysis, pedagogical observation, interviews, problem-based tasks, case studies, the project method, and geographical research methods. Tasks aimed at developing students' knowledge of the impact of industry on the environment, as well as their ability to analyze environmental problems and propose solutions, were developed.

The following indicators were used as the basis for assessing students' sustainable development competence: knowledge of industrial and environmental problems; ability to analyze geographical data; ability to identify the causes and





consequences of problems; ability to propose environmentally appropriate solutions; and ability to substantiate and evaluate their decisions.

3. RESULTS AND DISCUSSION

Studying industrial and environmental problems in geography lessons based on real regional examples increases students' interest in sustainable development issues. For example, when studying the impact of the metallurgical industry on atmospheric, water, and soil resources, students can be presented with the following problem-based situation:

“An industrial enterprise is of significant importance to the regional economy; however, its activities are increasing the negative impact on atmospheric and water resources. What measures would you propose to reduce its environmental impact without closing the enterprise?”

This task encourages students to seek a balance between economic development and environmental safety. Students analyze the geographical location of the industrial enterprise, its use of natural resources, the amount of waste generated, and its environmental consequences, and propose sustainable solutions such as recycling waste, modernizing treatment facilities, and introducing resource-saving technologies.

In this process, using the sequence “identifying the problem → analyzing data → identifying causes and consequences → developing alternative solutions → selecting a sustainable solution → evaluating the results” develops students' independent thinking and decision-making competence.

Using the project method, students can be given a small research task on the topic “The Environmental Impact of Industrial Enterprises in My Region.” Students identify the industrial sectors in their region, study their impact on natural components, analyze existing environmental problems, and develop proposals for reducing these impacts.

In addition, the use of maps, statistical data, diagrams, and environmental indicators develops students' geographical thinking and enables them to assess industrial and environmental problems from a spatial perspective.

As a result of these activities, students develop not only environmental knowledge but also skills in analyzing problems, making responsible decisions, comparing alternative solutions, and applying the principles of sustainable development in practical situations.

4. CONCLUSION AND RECOMMENDATIONS

Studying industrial and environmental problems in geography education provides an effective methodological opportunity for developing students' sustainable development competence. By analyzing the impact of industry on the environment from a geographical perspective, students understand the interrelationship between economic development, environmental safety, and social interests.

It is recommended that problem-based learning, project-based learning, case studies, geographical research, and methods of working with maps and statistical



data be systematically used in geography lessons. In particular, organizing tasks based on local industrial enterprises and regional environmental problems contributes to the development of students' practical competence.

Thus, studying industrial and environmental problems from the perspective of sustainable development makes it possible to strengthen the practical orientation of geography education and develop students' environmental responsibility, geographical thinking, and competence in making well-founded decisions.

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