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[Lecture]

Is climate sufficiently present in the classroom? An analysis of content and outcomes on climate change in Geography curricula in primary schools

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Abstract: The aim of the paper is to examine climate change content representation by analysing the programme and the results of the study of content on climate change in the teaching of Geography in the second cycle of basic education in Serbia. The research is based on an analysis of the content of valid Geography curricula and the identification of learning outcomes that are directly or indirectly related to climate change, its causes, consequences and mitigation options. The results show that climate change content is present in the analysed programmes, but that its representation is insufficient and uneven, and that it appears through specific content and learning outcomes. The findings indicate the need for a more systematic inclusion of climate change in Geography curricula, a clearer connection with learning outcomes, and the development of more concrete methodological guidelines for its treatment in teaching.

Keywords: climate change, Geography curricula, outcomes, primary school

Introduction

Climate change education is an increasingly important part of contemporary educational policies and curricula, with its representation and treatment varying between education systems and subjects. Research covering several countries shows that climate change is not equally represented in Geography curricula, which indicates the importance of analysing their content and learning outcomes (Dawson et al., 2022). The special role of geography lies in its ability to connect natural processes with the spatial, ecological and social consequences of climate change (Enke, Budke, 2023). At the same time, the treatment of climate change content requires an interdisciplinary approach that recognises the specific contribution of different subjects to understanding this complex problem (Eilam, 2022). Due to this complexity, there is an increasing need for the correlation of scientific disciplines that address these issues. Interdisciplinarity can be seen as a way to increase the efficiency of the pedagogical process in all subjects, with the aim of independent acquisition of knowledge, improving the quality of functional knowledge and forming the well-rounded personalities of students (Živković et al., 2017). Within overall institutional education, primary school is considered the most important because children attend it at an age when they are most open to new knowledge (Živković, Jovanović, 2011). In this context, analysing how content and outcomes related to climate change are represented in Geography curricula is a significant step towards understanding the place of this topic in primary education.

Methods and data

The school system is shaped by legal acts, Geography curricula and educational standards in the domain of student achievement, which are binding for all participants in the teaching process (Živković, Jovanović, 2011). The empirical structure of the work includes determining the representation of the content and outcomes of learning about climate change in Geography curricula for elementary

schools. By analysing the Geography curricula in the second cycle of primary education in Serbia, a comprehensive insight is gained into the extent to which the content of climate change is studied. The tasks of the research were:

- analysing the representation of educational outcomes for the end of primary school, programme content and instructions for implementing programmes in the field of climate change;
- formulating proposals that can contribute to greater representation of content on climate change and its treatment in Geography curricula in primary schools.

The sample consisted of the Regulations on the teaching and learning plan for the fifth and sixth grades of primary education and the teaching and learning programme for the fifth and sixth grades of primary education (Official Gazette of the Republic of Serbia, 15/2018-77, 18/2018-1, 3/2019-83, 3/2020-3, 6/2020-94, 17/2021-1, 16/2022-1, 13/2023-458, 14/2023-384, 3/2024-1, 6/2025-7, 1/2026-219), and the Regulations on the teaching and learning plan for the seventh and eighth grades of primary education (Official Gazette of the Republic of Serbia, 18/2018-1, 13/2023-469, 1/2026-339).

The paper used a descriptive method, which involves comparing, evaluating and interpreting the results obtained through content analysis of the Geography curricula in elementary school, as well as drawing conclusions.

Results and discussion

Given the importance of primary education in acquiring knowledge and forming attitudes and values, the inclusion of climate content in the Geography curricula is one of the key prerequisites for developing students' environmental awareness. The modern Geography curriculum for the fifth to eighth grades of primary school is based on learning outcomes, which represents a significant change compared with previous programmes that were focused primarily on teaching content. The focus of teaching is on student achievements, that is, the knowledge, skills and competences that students need to

develop, while the teaching content is provided as a recommendation for achieving these outcomes.

Of a total of 46 outcomes specified in the Geography curriculum for the *fifth grade* of primary school, seven are directly related to climate change content, which accounts for 15.2%. They include developing students' ability to distinguish between responsible and irresponsible use of natural resources, recognising the causes and consequences of atmospheric and water pollution, explaining the occurrence and consequences of floods and torrents, knowing appropriate behaviour during and after floods, understanding the impact of human activity on threats to plant and animal species, and providing examples of measures to protect living things.

Compared with the fifth grade curriculum, the *sixth grade* places greater emphasis on research-based learning and project-based teaching, which encourages students to participate actively in the teaching process and apply the knowledge they have acquired in analysing problems in their immediate environment. Of the 17 outcomes prescribed by the programme, two, or 11.8%, are directly related to content on climate change and sustainable development. Students are expected to relate the spatial distribution of economic activities to environmental quality, and to assess the possibilities of applying the principles of sustainable development in the local community, the Republic of Serbia, Europe and the world.

Of the 20 defined outcomes in the Geography curriculum for the *seventh grade* of elementary school, three (15%) are directly focused on environmental issues, including content on climate change. Students are expected to analyse examples of positive human actions aimed at protecting nature and preserving the environment, and to compare them with examples from their own environment. They should also evaluate possible solutions for the use of clean energy sources in countries whose economic development is traditionally based on the exploitation of fossil fuels, primarily oil and coal.

In the Geography curriculum for the *eighth grade* of primary school, four of the 22 outcomes envisaged by the programme are directly

related to climate change, which accounts for 18.2%. By the end of the eighth grade, the student should be able to participate in proposing and implementing a research project in the local environment. In addition, the student should be able to analyse the impact of climate factors and elements on the climate of Serbia. Finally, the student should be able to recognise the effects of physical and geographical processes on humans, as well as the effects of the production and use of various energy sources on environmental quality, and to respond appropriately in the event of natural disasters.

Based on an analysis of curricular content and learning outcomes related to environmental protection in geography education in the second cycle of primary education, several proposals have been formulated that could contribute to a greater representation of climate change content and its treatment in the Geography curricula in primary schools.

The first proposal concerns the need for a more systematic and continuous inclusion of climate change content across different grades. Climate change content should not be addressed only within individual teaching topics or grades; rather, its inclusion should be planned in such a way that students gradually broaden and deepen their understanding of the causes, consequences, and spatial dimensions of climate change.

The second proposal involves establishing clearer links between climate change content and learning outcomes. In addition to acquiring factual knowledge, learning outcomes should encourage students to analyse the spatial and temporal dimensions of climate change, interpret relevant geographical data, critically evaluate different sources of information, and consider possibilities for adapting to and mitigating the consequences of climate change.

The third proposal concerns the need for more specific methodological guidelines for teachers regarding the teaching of climate change content. Such guidelines could include the use of geographical data and maps, analysis of local and regional examples,

interpretation of climate change-related trends, comparison of different geographical areas, as well as the application of problem-based and inquiry-based learning. The aforementioned proposals do not imply the introduction of a separate school subject or an entirely new thematic area. Rather, they call for the more systematic integration of climate change content into the existing Geography curricula, accompanied by more clearly defined learning outcomes and appropriate methodological guidelines for their implementation in teaching practice.

Conclusions

Based on the analysis of the programme and the results of the study of climate change content in the teaching of Geography in the second cycle of primary education in Serbia, the paper highlights its insufficient representation. Bearing in mind the identified shortcomings, it is necessary, in order to improve the educational value of the Geography curricula in elementary school, to increase the number of outcomes related to the study of climate change content. To improve teaching practice, proposals were formulated for modifying the existing Geography curricula for elementary school. These proposals include a more systematic and continuous integration of climate change content across different grades, clearer alignment of such content with learning outcomes, and the provision of more specific methodological guidelines for teachers. The practical implications of the research lie in the fact that the presented results and conclusions can encourage textbook authors to change their approach when designing content on climate change.

The subject of climate change deserves continuous analysis, in order to determine more precisely the criteria for designing the Geography curricula in accordance with the goals and tasks of education. A limitation of this study is that the analysis focuses on the education system of the Republic of Serbia and on the second cycle of primary education, which limits the direct generalizability of the findings to other education systems and educational cycles. Future research

could extend the analysis to other educational cycles, as well as to the curricula of other countries.

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