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IMPROVING THE METHODOLOGY OF TEACHING GEOGRAPHY BASED ON THE INTEGRATION OF INFORMATION-COMMUNICATION AND PEDAGOGICAL TECHNOLOGIES

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Abstract: This article examines the issues of improving the methodology of teaching geography based on the integration of information and communication technologies (ICT) and modern pedagogical approaches. The study analyzes the didactic potential of using digital maps, geographic information systems — specifically the Google Earth and ArcGIS platforms. In addition, the article substantiates methods for developing students' spatial thinking, critical and analytical reasoning, and independent learning competencies through the integration of problem-based learning, the project method, and interactive techniques with ICT. The significance of introducing innovative technologies into geography education within the framework of digital education concepts promoted by UNESCO is revealed. The findings demonstrate that the integration of ICT and pedagogical technologies is a key factor in enhancing the effectiveness of geography lessons, visualizing the educational process, and developing students' practical research skills.

Keywords: information and communication technologies (ICT), geography education, pedagogical technologies, innovative approach, digital maps, geographic information systems (GIS), Google Earth, ArcGIS, interactive methods, project method, problem-based learning, spatial thinking, digital education, educational effectiveness.

The issue of improving the methodology of teaching geography based on the integration of information-communication and pedagogical technologies is one of the priority directions of the modern education system. In the context of digital transformation, the traditional lesson model is being replaced by interactive, student-centered, and technologically enriched education. Geography, as a discipline fundamentally grounded in the spatial analysis of natural and social processes, offers broad opportunities for the application of information and communication technologies. Therefore, the integration of ICT and modern pedagogical technologies serves as an important methodological foundation for enhancing the effectiveness of geography lessons.

A distinctive feature of geography education is that it requires students to work with maps, analyze statistical data, identify regional differences, and understand cause-and-effect relationships. In traditional methods, this process is largely limited to verbal explanation and

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printed maps. Modern technologies, however, make it possible to visualize, model, and interactively engage with these processes. For example, through Google Earth, students can not only observe geographic objects but also analyze indicators such as relief, climate zones, and population distribution in a real-world visual context. This has a positive impact on the development of spatial thinking.

Furthermore, geographic information systems such as ArcGIS allow students to study territorial data by layers, create thematic maps, and draw analytical conclusions. GIS technologies transform students from passive observers into active researchers. For instance, by identifying the relationship between population density and the location of industrial enterprises in a specific region, students can gain a practical understanding of the patterns of economic geography. The use of ICT is not limited to the mere application of technical tools — real effectiveness is achieved when ICT is integrated with pedagogical technologies.

In a lesson organized on the basis of problem-based learning technology, students are presented with a real geographic problem — for example, the analysis of desertification or global climate change. Using internet sources, digital maps, and statistical data, students identify causes and consequences and propose solutions. Such a process fosters critical thinking and independent decision-making skills in students. The integration of the project method with ICT is also of great importance. Students, divided into small groups, can work on projects such as studying the ecological condition of a specific region, analyzing demographic processes, or assessing tourism potential. In the process, they use digital maps, graphic programs, and online statistical databases. As a result, the lesson acquires a student-centered and practically oriented character.

In international practice, ICT integration has also been recognized as a key factor in improving the quality of education. In particular, digital education concepts developed by UNESCO designate the introduction of innovative technologies into the educational process, the development of digital competencies, and the use of interactive methods as priority tasks. This approach can be fully applied to geography, as the discipline relies on modern information resources in studying global processes.

As a result of the integration of ICT and pedagogical technologies, a number of positive changes are observed in geography lessons. First, the visual and illustrative quality of the lesson improves. Interactive maps, animations, and video materials make it possible to convey complex processes in a simple and comprehensible manner. Second, students develop independent working skills — they learn to search for, sort, and process information. Third, the assessment process is also improved: online testing systems and electronic platforms create opportunities for rapid and transparent evaluation of knowledge.

In the context of distance and blended learning, the importance of ICT increases even further. Through virtual laboratories, online maps, and videoconferencing platforms, geographic observations and analyses can be conducted remotely, ensuring the continuity of education. However, certain challenges also exist in the integration process. Insufficient technical resources, low internet speeds, and inadequate digital competencies among teachers can have a negative impact on effectiveness. Therefore, it is necessary to regularly conduct ICT training courses for teachers, develop methodological guides, and equip educational institutions with modern technology.

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The use of artificial intelligence technologies in improving the methodology of teaching geography is a promising future direction. For instance, adaptive learning platforms can offer tasks tailored to a student's level of knowledge, while big data analysis can provide deeper insight into regional processes. Virtual and augmented reality technologies can further consolidate knowledge by taking students on "virtual journeys" to mountain ranges, ocean floors, or desert regions.

In general, the integration of information-communication and pedagogical technologies elevates the methodology of teaching geography to a qualitatively new level. This approach develops students' spatial thinking, broadens their scientific worldview, fosters independent and creative reasoning, and serves to nurture active, competitive individuals capable of thriving in the modern information society.

Conclusion

The integration of information-communication and pedagogical technologies is an essential condition for modernizing the methodology of teaching geography. The effective use of modern digital tools — in particular platforms such as Google Earth and ArcGIS — develops students' spatial thinking, connects theoretical knowledge with practical activities, and forms research skills. When pedagogical technologies — problem-based learning, the project method, and interactive approaches — are combined with ICT, the student becomes an active subject of the educational process. The analysis shows that such an integrated approach increases the effectiveness of lessons, facilitates deep and lasting knowledge acquisition, and develops students' competencies in independent thinking, information analysis, and drawing conclusions. International experience, including digital education concepts promoted by UNESCO, also confirms the necessity of widely introducing innovative technologies into the educational process. Therefore, systematically applying ICT and modern pedagogical technologies in geography education, enhancing teachers' digital competencies, and strengthening educational institutions technologically remain urgent tasks. This approach not only improves the quality of geography education but also serves to shape a competitive, creative individual who meets the demands of the digital society.

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