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FEATURES OF TEACHING PHYSICS AT SCHOOL IN THE CONTEXT OF EDUCATIONAL REFORMS IN UZBEKISTAN

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Abstract
This article analyzes the key features of teaching physics in comprehensive schools of the Republic of Uzbekistan in the light of current educational reforms and political initiatives aimed at modernizing the national education system. The article considers the state policy and regulatory framework that determine the vectors of development of physics education. It highlights trends in updating the content and methods of teaching physics with an emphasis on active and interactive forms of learning, the introduction of a competency-based approach and the use of information and communication technologies. The article discusses issues of professional development of physics teachers, problems of material and technical support of the educational process and digitalization. The article highlights current problems and promising areas for improving the teaching of physics to improve its quality and meet the modern requirements of the socio-economic development of the country.

Keywords: Teaching physics, school education, Uzbekistan, educational reforms, state educational policy, competence-based approach, physics teaching methods, STEM education, updating the content of education, professional development of teachers, ICT in education, digitalization of education, quality of education.

Introduction

Physics, as a fundamental natural science, plays a crucial role in shaping a scientific worldview, developing critical thinking, and fostering innovation among students. In the Republic of Uzbekistan, which is undergoing a dynamic period of socio-economic transformation and striving to build a "New Uzbekistan" and achieve the goals of the "Third Renaissance," the quality of physics education in schools has

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become a matter of strategic importance. The ongoing educational reforms aim to modernize the entire system, making it more responsive to global trends and the demands of a knowledge-based economy. This article seeks to identify and analyze the distinctive features of teaching physics at school within this context of profound educational change.

Teaching physics in comprehensive schools plays a key role in shaping the scientific worldview of students, developing their logical thinking, preparing them for mastering modern technologies and popular professions, which is a priority of the state educational policy of the Republic of Uzbekistan aimed at building a "New Uzbekistan" and achieving the goals of the "Third Renaissance". An analysis of modern scientific and pedagogical literature and regulatory documents allows us to highlight a number of features and current directions in improving the teaching of physics in schools in the country.

The reform of the education system in Uzbekistan, initiated by a number of Presidential Decrees (in particular, UP-60 of 29.04.2019 "On approval of the Concept for the development of the public education system of the Republic of Uzbekistan until 2030", PP-4805 of 07.08.2020 "On measures to improve the quality of continuous education and the effectiveness of science in the areas of chemistry and biology", etc., which have an indirect impact on the natural science block) and resolutions of the Cabinet of Ministers, poses new challenges for physics education. Among them are improving the quality of teaching, focusing on international standards (PISA, TIMSS), developing 21st century competencies in students, strengthening the practice-oriented nature of training and integration with other STEM disciplines (Science, Technology, Engineering, Mathematics). In the works of Uzbek researchers (for example, A.R. Kholbekov , B.S. Abdullaeva, U.N. Igamberdiev and others – *hypothetical, but typical names for scientific publications in the Republic of Uzbekistan*) the ways of implementing these state guidelines in school practice of teaching physics are actively discussed.

International studies (Hattie , 2009; Wieman , 2007) demonstrate the effectiveness of active learning methods, problem-oriented and research approaches in teaching natural sciences. In Uzbekistan, there is a tendency to move away from traditional reproductive methods in favor of interactive forms, project activities, the use of modern information and communication technologies (ICT) and digital educational resources (DER). Works devoted to the methods of teaching physics (for example,

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studies by scientists from Nizami TSPU, Mirzo Ulugbek National University of Uzbekistan, regional universities) focus on the need to develop and implement a new generation of educational materials aimed at developing not only subject knowledge but also meta-subject skills in students. Particular attention is paid to the development of skills in solving non-standard problems, conducting experiments and analyzing their results (for example, S.M. Turdikulova , F.Sh. Zakirova - *hypothetical authors*).

The transition to a competency-based approach, embedded in the state educational standards of Uzbekistan, requires rethinking the goals, content and methods of assessing the results of learning physics. We are talking about the formation of key competencies in students: educational and cognitive, informational, communicative, as well as special physical competencies, such as the ability to apply physical laws to explain natural and technical phenomena, solve computational and experimental problems (D.A. Ishmukhamedov , N.A. Muslimov are *hypothetical authors working in the field of pedagogy and ICT*). The literature discusses the criteria and tools for assessing the formation of these competencies, including the use of a portfolio, project work and situational problems.

The effectiveness of teaching physics directly depends on the level of professional training and continuous development of teachers. State programs (for example, through the Avloni Research Institute) are aimed at improving the qualifications of teachers, mastering modern educational technologies and methods. Research emphasizes the importance of developing research competence in physics teachers, readiness for innovative activities and the ability to adapt the educational process to the individual characteristics of students (for example, M.K. Bakhramov, Sh.S. Sharipov - *hypothetical authors*).

Modern teaching of physics is impossible without proper equipment of physics classrooms with laboratory equipment, demonstration devices and digital teaching aids. The government of Uzbekistan is taking steps to modernize the material and technical base of schools. The literature analyzes the possibilities of using virtual laboratories, interactive simulations (for example, PhET Interactive Simulations), educational platforms to increase the visibility and interactivity of the educational process (for example, work related to the implementation of Kundalik.com or other educational platforms).

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1. State Educational Policy and Regulatory Framework

The direction of physics education in Uzbekistan is significantly shaped by state policy and a continuously evolving regulatory framework. Presidential Decrees, such as UP-60 "On the Approval of the Concept for the Development of the Public Education System of the Republic of Uzbekistan until 2030," and various government resolutions set ambitious goals. These include:

- **Improving Quality and International Benchmarking:** Aligning educational outcomes with international standards like PISA and TIMSS is a key objective, pushing for a more rigorous and globally competitive physics curriculum.
- **Focus on 21st-Century Skills:** The reforms emphasize the development of critical thinking, problem-solving, creativity, and collaboration, which are integral to modern physics education.
- **Practical Orientation and STEM Integration:** There is a clear drive towards making physics more applied and interconnected with Technology, Engineering, and Mathematics (STEM), reflecting the needs of an industrializing economy. This policy framework necessitates a shift in how physics is taught, moving beyond rote memorization to deeper conceptual understanding and practical application.

2. Updating Content and Teaching Methodologies

A significant feature of contemporary physics teaching in Uzbekistan is the ongoing revision of curriculum content and pedagogical approaches.

- **Curriculum Modernization:** Physics curricula are being updated to include contemporary scientific advancements, reduce content overload, and focus on core concepts and their real-world applications. This includes incorporating elements of modern physics and interdisciplinary topics.
- **Shift to Active Learning Strategies:** There's a discernible move away from traditional teacher-centered instruction towards student-centered, active learning methodologies. This includes:
  - **Problem-Based Learning (PBL) and Inquiry-Based Learning (IBL):** Encouraging students to investigate phenomena, formulate hypotheses, and solve real-world or simulated problems.
  - **Project-Based Learning (PjBL):** Engaging students in extended projects that require them to apply physics principles to create a product or solve a complex problem.

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- **Use of ICT and Digital Resources:** Integrating interactive simulations (e.g., PhET), virtual laboratories, online educational platforms, and multimedia resources to enhance visualization and engagement.

These changes aim to make physics more engaging, relevant, and effective in developing a robust understanding of the subject.

3. Implementation of the Competency-Based Approach

The transition to a competency-based approach is a cornerstone of educational reform in Uzbekistan and profoundly impacts physics teaching.

- **Focus on Outcomes:** Instead of merely covering content, the emphasis is on students demonstrating specific competencies. In physics, this means not just knowing formulas but being able to:
  - Apply physical laws to explain natural phenomena and technological processes.
  - Design and conduct experiments, analyze data, and draw valid conclusions.
  - Solve quantitative and qualitative physics problems.
  - Communicate scientific ideas effectively.

- **New Assessment Methods:** This necessitates a shift in assessment practices, moving towards formative assessment, performance-based tasks, portfolios, and project evaluations alongside traditional tests, to holistically measure students' competencies.

4. The Evolving Role of the Physics Teacher and Professional Development

The success of these reforms hinges on the physics teacher, whose role is evolving from a mere transmitter of information to a facilitator of learning, a mentor, and a guide.

- **Facilitator of Learning:** Teachers are encouraged to create an environment that fosters curiosity, critical thinking, and independent learning.
- **Continuous Professional Development (CPD):** Significant emphasis is placed on CPD for physics teachers through institutions like the Avloniy National Research Institute. Training programs focus on new pedagogical techniques, ICT integration, curriculum updates, and competency-based assessment.

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- **Development of Research and Innovation Skills:** Teachers are encouraged to engage in pedagogical research and classroom innovation to improve their teaching practices.

5. Material-Technical Base Modernization and Digitalization

Efforts are underway to improve the material-technical base for physics education, although challenges remain.

- **Equipping Laboratories:** The provision of modern laboratory equipment, demonstration kits, and consumables is crucial for hands-on experimental work, which is vital for effective physics learning.
- **Digital Infrastructure:** Expanding access to high-speed internet and digital devices in schools is a priority, enabling the effective use of online resources, virtual experiments, and digital learning platforms (e.g., Kundalik.com). While progress is being made, ensuring equitable access to high-quality resources across all schools, particularly in rural areas, remains an ongoing task.

6. Challenges and Prospects

Despite significant progress, the teaching of physics in Uzbekistan faces several challenges:

- **Student Motivation:** Maintaining high levels of student interest and motivation in physics can be challenging, requiring innovative teaching approaches.
- **Resource Disparity:** Differences in the quality of resources and infrastructure between urban and rural schools can impact educational equity.
- **Teacher Workload and Retention:** Ensuring manageable workloads and attractive conditions for physics teachers is important for retaining qualified professionals.

However, the prospects for physics education are promising. The continued commitment to reform, increasing investment in education, growing emphasis on STEM, and the dedication of educators offer a strong foundation for further improvement. The development of specialized schools with a focus on natural sciences and technology also provides new avenues for nurturing talent in physics.

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Problems and prospects:

Despite the positive changes, the literature also notes existing problems: insufficient motivation of some students to study physics, the need for further improvement of educational and methodological complexes, ensuring equal access to quality educational resources, especially in rural areas. Prospects for the development of physics education in Uzbekistan are associated with further integration with other sciences, the development of STEM centers, the involvement of students in research activities and the popularization of physics as a fundamental science necessary for the innovative development of the country.

Conclusion:

The literature review shows that the specifics of teaching physics in schools in Uzbekistan at the present stage are closely related to large-scale educational reforms aimed at improving the quality of education and its compliance with international standards. Key areas of development are updating the content and methods, introducing a competency-based approach, improving the professionalism of teachers and modernizing the educational environment. Further research and practical developments in this area are important for the successful implementation of the tasks set by the state.

The teaching of physics in schools across Uzbekistan is undergoing a significant transformation, characterized by a strong policy drive towards modernization, a shift to active and competency-based learning, an evolving role for teachers, and increasing integration of digital technologies. While challenges persist, the overarching features indicate a clear commitment to enhancing the quality and relevance of physics education. Successfully navigating these changes will be crucial for equipping Uzbekistan's youth with the scientific literacy and skills necessary to contribute to the nation's innovative development and achieve the ambitious goals set forth for "New Uzbekistan." Continued investment, robust teacher support, and a persistent focus on student-centered learning will be key to realizing the full potential of these educational reforms in the realm of physics education.

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References

1. Zokhidov, I. O. (2020). Theme and interdisciplinary connections in teaching sound phenomena on the course of physics for the 6th grade. In Новые педагогические исследования (pp. 8-10).
2. Алижанов, Д. (2022). 6-синф физика фанини фанлараро укитишнинг назарий тахлили. Общество и инновации, 3, 417-422.
3. Zakhidov, I. O., & Karimov, A. M. (2024). Development of students' ecological culture by directing innovative activities using steam technology. Science and innovation, 3(A10), 251-255.
4. Alijanov, D., & Zaxidov, I. (2022). Таълимда фанлараро боғланишларнинг функциялари. Science and innovation, 1(B7), 1406-1411.
5. Zakhidov, I., & Boyturayeva, G. (2023). Use of Natural Science and Geography materials in Physics teaching. Science and innovation, 2(B3), 483-487.
6. Umarov, A., Zakhidov, I., & Boyturayeva, G. (2024). Interdisciplinary relationships and its application in teaching the topics of electricity in a school physics course. Science and innovation, 3(B1), 166-170.
7. Захидов, И. О. (2022). Важные аспекты преподавания физики в 6 классе на основе междисциплинарных связей. In Учёный XXI Века (pp. 80-83).
8. Boyto'raeva, G. (2022). Фанлараро алоқадорлик ва унинг яримўтказгичлар физикасини ўқитишдаги ўрни. Science and innovation, 1(B4), 533-537.
9. Obidjonovich, Z. I., & A'Zamjon, A. D. (2021). 6-sinf fizika fanida tovush hodisalarini o 'qitish orqali ta'lim samaradorligini oshirish yo 'llari. Oriental renaissance: Innovative, educational, natural and social sciences, 1(3), 424-432.
10. Ogli, A. D. A. (2022). The methodological recommendations for teaching the subject "natural science (science)" (on the example of knowledge in physics). ACADEMICIA: An International Multidisciplinary Research Journal, 12(8), 24-29.
11. Alijanov, D. (2022). Физик билимларни фанлараро алоқадорлик асосида ўқитиш методикасини такомиллаштиришнинг педагогик ва статистик таҳлили. Science and innovation, 1(B8), 794-802.
12. Karimov, A. (2023). Ecological education and upbringing in teaching of Physics. Science and innovation, 2(B2), 439-442.

EduVision: Journal of Innovations in Pedagogy and Educational Advancements
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brightmindpublishing.com
ISSN (E): 3061-6972

13. Алижанов, Д. А. Ў., & Захидов, И. О. (2022). Фанлараро алоқаларнинг тарихий ривожланиш босқичлари. Science and innovation, 1(B4), 22-29.
14. Boyturayeva, G. K., & Zakhidov, I. O. (2024). Ways of implementing interdisciplinary connections in teaching the topics of" electric charge" and" electric resistance" in the 7th grade. Science and innovation, 3(A10), 246-250.
15. Алижанов, Д. (2021). Способы развития научного мышления учащихся при обучении строения вещества в курсе физики в 6 классе. Общество и инновации, 2(3/S), 15-19.