

METHODOLOGY FOR DEVELOPING STUDENTS' TECHNICAL CREATIVITY BASED ON THE STEM APPROACH (USING THE EXAMPLE OF TEACHING PHYSICS).

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Abstract: This article aims to study the methodology of developing students' technical creativity based on the STEM approach, using physics education as the main example. By exploring the intersection of these disciplines and highlighting best practices in STEM-based education, we outline strategies educators can implement to inspire innovation, spark curiosity, and ignite a passion for scientific discovery in students we strive to open.

Keywords: STEM approach, integration, innovative methods, physics.

In the rapidly evolving landscape of education, there is a strong focus on preparing students not only to consume knowledge, but also to create, innovate, and solve complex real-world problems. This paradigm shift has led to the emergence of the science, technology, engineering and mathematics - STEM approach - as a holistic framework for promoting interdisciplinary education and developing critical skills such as critical thinking, creativity and technical skills. When applied to physics education, the STEM approach offers innovative methodologies to develop students' technical creativity and enable them to think like scientists, engineers, and innovators. Physics is the foundation of STEM education, and the natural world and the principles that govern it provides a fundamental understanding of By integrating science, technology, engineering, and math concepts into physics, teachers have a unique opportunity to engage students in hands-on experiences, problem solving, and design projects that spark their interest,

develop, and deepen their creativity their understanding of the physical world. Through project-based learning, hands-on experiences, technology integration, engineering design challenges, interdisciplinary connections, critical thinking exercises, cooperative learning opportunities, and thinking-oriented practices, teachers help students integrate can create a dynamic learning environment that motivates with the practical application of theoretical knowledge, creative thinking to solve complex problems and education of their technical skills in the conditions of physics education. By delving into the methodology of fostering technical creativity in students through the lens of STEM, we see how educators can empower the next generation of scientists, engineers, and innovators to overcome challenges, experiment fearlessly, and envision a future that is their creativity we aim to show and technical acumen drives development and shapes the world around them. Join us on this enlightening journey into STEM-based physics education, where discovery knows no bounds and creativity reigns supreme. In today's fast-paced world, fostering technical creativity and innovation in students is critical to preparing them for the challenges of tomorrow. By integrating science, technology, engineering, and mathematics (STEM) principles into physics education, educators empower students to think critically, solve problems effectively, and apply what they learn in practical ways. This article examines the methodology of developing students' technical creativity based on the STEM approach in the example of teaching physics. One of the effective ways to develop technical creativity in students is project-based learning. By engaging students in hands-on projects, teachers are required to design, build, and test solutions to real-world problems. For example, students may be tasked with building a Rube Goldberg machine that demonstrates the principles of physics in action. Incorporating hands-on experiences and laboratory activities is another key component of developing technical creativity. By empowering students to conduct experiments, analyze data, and draw conclusions, teachers help bridge the gap between theory and practice. For example, students can design and conduct experiments to explore concepts such as acceleration, friction, or simple harmonic motion. Technology

plays a critical role in modern education, especially in STEM fields. Integrating technology tools such as sensors, data loggers, simulation software, and coding platforms into physics lessons can enhance the student learning experience. For example, students can use computer simulations to learn complex physics concepts such as quantum mechanics or astrophysics. By presenting students with engineering design problems that require the application of physics principles, teachers can stimulate their problem-solving skills and creativity. For example, students might be asked to design and build a device that demonstrates the principles of electromagnetism or build a model of a sustainable energy system. Encouraging students to make connections between physics and other STEM disciplines can deepen their understanding and foster interdisciplinary thinking. By exploring how mathematics, technology, and engineering intersect with physics, students can gain a more holistic view of the world around them. Developing critical thinking and problem-solving skills is essential to developing students' technical creativity. By asking open-ended questions, encouraging experimentation, and guiding students through inquiry, teachers help students become more independent and innovative thinkers are the main components. By fostering a collaborative learning environment where students can exchange ideas, work together on projects, and communicate effectively, teachers can develop important skills such as communication, teamwork, and leadership. Encouraging students to reflect on their learning experiences, evaluate their designs, and iterate on their solutions based on feedback is critical to fostering technical creativity. By promoting a growth mindset and a willingness to learn from failure, teachers help students develop resilience and perseverance in the face of adversity.

Conclusion.

Incorporating a STEM approach into physics education provides students with a rich and engaging learning experience that develops technical creativity, critical thinking, and problem-solving skills. By following the methodology outlined in this

article, educators can prepare students to be innovative thinkers and problem solvers, preparing them for success in the ever-changing world of science and technology.

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