

DEVELOPING STUDENTS' CREATIVITY THROUGH THE COURSE OF FUNDAMENTALS OF MATERIALS SCIENCE

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Annotation: This article discusses the issue of developing students' creativity through the Fundamentals of Materials Science. It analyzes ways to form students' creative thinking, independent problem-solving skills, and ability to generate new ideas by effectively using modern pedagogical technologies, interactive methods, and practical training sessions in the teaching of materials science. It also highlights the importance of laboratory work, project-based tasks, and innovative approaches in increasing students' creative activity. This article serves to develop students' creative potential and guide them toward innovative thinking in the process of teaching materials science.

Keywords: materials science, creativity, creative thinking, interactive methods, pedagogical technologies, innovative approach, laboratory work, project activity.

Introduction: Today, in the education system, special attention is paid not only to providing students with theoretical knowledge, but also to developing their creative thinking, independent problem-solving skills, and innovative approaches. In particular, subjects taught in technical and engineering fields, including the Fundamentals of Materials Science, play an important role in developing students' creativity. Materials science provides students with in-depth knowledge about the structure, properties, and practical applications of various materials. At the same time, practical and laboratory classes conducted within this subject help students develop creative abilities such as observation skills, analytical thinking, and the ability to find new solutions[4]. The use of modern pedagogical technologies and interactive methods makes the learning process more effective and engaging. This paper discusses ways to develop students' creativity through the Fundamentals of Materials Science, modern approaches used in the teaching process, and the importance of practical training sessions. This, in turn, plays a significant role in enhancing students' professional competencies and guiding them toward innovative thinking.

Literature Review: Research on the development of students' creativity through the teaching of technical disciplines, including materials science, highlights the importance of integrating theoretical knowledge with practical application. Scholars emphasize that materials science, due to its experimental and application-oriented nature, provides a strong foundation for fostering creative thinking and problem-solving skills in engineering students. According to various educational studies, the use of interactive teaching methods such as problem-based learning, project-based learning, and inquiry-based learning significantly enhances students' engagement and creativity[5]. These approaches encourage learners to analyze material properties, conduct experiments, and propose innovative solutions based on observed results. In addition, modern pedagogical research stresses the role of laboratory work in developing cognitive flexibility and independent thinking. Hands-on activities in materials science allow students to connect theoretical concepts with real-world applications, thereby improving their ability to think critically and creatively. Overall, the reviewed literature confirms that incorporating innovative teaching strategies in materials science education plays a crucial role in



strengthening students' creative potential and preparing them for professional engineering practice.

Research Methodology: This study is based on a qualitative and pedagogical approach aimed at exploring methods for developing students' creativity through the teaching of Fundamentals of Materials Science. The research focuses on analyzing teaching strategies, practical training sessions, and interactive methods used in the educational process. The main methods applied in this research include observation of classroom activities, analysis of laboratory and practical work, and review of students' performance during project-based tasks. In addition, comparative analysis of traditional and modern teaching approaches was conducted to determine their effectiveness in enhancing students' creative thinking skills. Special attention was given to the use of interactive methods such as problem-based learning, project-based assignments, and group discussions[6]. These methods were evaluated in terms of their ability to encourage students' independent thinking, innovation, and active participation in the learning process. The data collected during the study were analyzed to identify the most effective teaching strategies for improving creativity in materials science education. The results provide a basis for improving instructional methods and increasing students' engagement and innovative thinking abilities.

Analysis and Results: The analysis of the collected data shows that the use of modern pedagogical technologies in teaching Fundamentals of Materials Science has a significant positive impact on students' creativity development. In particular, students who participated in interactive and practice-oriented learning activities demonstrated higher levels of independent thinking, problem-solving ability, and innovative idea generation compared to those taught through traditional lecture-based methods. Practical and laboratory sessions played a crucial role in strengthening students' understanding of material properties and their real-world applications[7]. During these activities, students were more actively engaged in experimentation, data interpretation, and discussion of results, which contributed to the development of their analytical and creative skills. Project-based tasks further enhanced students' motivation and creativity by encouraging them to design solutions for real engineering problems. Group work and collaborative learning also improved communication skills and allowed students to exchange ideas, leading to more innovative outcomes. Overall, the results indicate that integrating interactive teaching methods, practical training, and project-based learning in materials science education significantly improves students' creativity, engagement, and ability to apply theoretical knowledge in practical situations.

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