

DEVELOPING SCIENTIFIC LITERACY IN STUDENTS: A FRAMEWORK FOR MODERN EDUCATION

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Scientific literacy is a crucial skill in the 21st century, enabling individuals to critically analyze information, engage in evidence-based decision-making, and participate in informed discussions about scientific and technological advancements. In an era dominated by rapid scientific progress and technological innovations, the ability to comprehend and apply scientific concepts is essential for both personal and societal growth. Scientific literacy extends beyond merely understanding scientific facts; it involves the capacity to think critically, assess evidence, and make informed decisions based on scientific reasoning.

According to Bybee (2013), scientific literacy is fundamental in preparing students for a world where science and technology influence almost every aspect of daily life. Without it, individuals may struggle to differentiate between credible scientific information and misinformation, leading to poor decision-making in crucial areas such as healthcare, environmental conservation, and technological adaptation. Moreover, scientific literacy fosters civic engagement by equipping individuals with the knowledge necessary to participate in debates and policymaking on scientific issues that affect society.

Despite its importance, developing scientific literacy among students presents several challenges. Traditional educational methods often emphasize rote memorization rather than conceptual understanding, which can hinder students' ability to apply scientific knowledge in real-world situations. Furthermore, the lack of interdisciplinary approaches in many curricula limits students' ability to recognize the relevance of science across different fields. Socioeconomic disparities also contribute to unequal access to quality science education, further widening the gap in scientific literacy levels among students (OECD, 2019).

To enhance scientific literacy, educators must adopt effective pedagogical strategies. One such strategy is inquiry-based learning, which encourages students to ask questions, conduct experiments, and engage in hands-on activities that deepen their understanding of scientific principles. Additionally, interdisciplinary teaching methods that integrate science with subjects such as mathematics, history, and language arts can help students see the interconnectedness of knowledge and improve their comprehension. The use of technology, including digital simulations and online resources, further enhances engagement by providing interactive and immersive learning experiences.

Moreover, fostering critical thinking and argumentation skills is essential in helping students evaluate sources, analyze data, and construct evidence-based arguments. Providing real-world applications of scientific concepts also strengthens students' ability to see the practical implications of science in their everyday lives and future careers. By incorporating these strategies into educational frameworks, educators can equip students with the tools necessary to navigate the complexities of the modern world.

Developing scientific literacy is essential for preparing students to thrive in a technology-driven society. By implementing inquiry-based learning, interdisciplinary teaching, technology integration, and critical thinking strategies, educators can cultivate a generation of scientifically literate individuals. Future research should focus on assessing the effectiveness of these strategies and exploring innovative methodologies for enhancing scientific literacy across diverse educational settings.

References:

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