Investigating the Impact of a STEAM-Based Solar Energy Model on Primary Students' Learning

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Abstract

This study explores the impact of an innovative STEAM-based educational resource on primary students' understanding of renewable energy. The resource consists of a small-scale solar energy model featuring a house with a photovoltaic panel. The generated electricity can also power a lightbulb in a lighthouse, a buzzer, or a rotating wheel, allowing students to experiment with different energy applications and an electric circuit. Students will work in small heterogeneous groups of four to conduct hands-on experimentation, investigating how the photovoltaic panel's energy output varies depending on the angle of incident light. This process simulates real-world solar energy generation throughout the day. Using an angle protractor and a light source, they will measure electric current with a multimeter at different intervals, constructing a dataset that represents how energy production fluctuates from sunrise to sunset. The collected data will be analyzed using tables and graphs, integrating mathematical concepts into scientific inquiry. To assess the educational impact of this resource, a pre- and post-activity questionnaire will be administered. The study will analyze students' performance in data collection and interpretation, their approach to conducting the experiment, and their teamwork dynamics. This evaluation aims to measure conceptual understanding of solar energy, problem-solving abilities, and engagement in scientific inquiry within a STEAM framework.

Keywords: STEAM education; renewable energy; educational innovation; hands-on learning; multimeter