12th Workshop on Renewable Energy and Sustainability (WREN2024)

Title. Interdisciplinaridade e o Ensino de Energias Renováveis e Sustentabilidade na educação básica

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The translational research presented discusses how to address some topics of Quantum Mechanics in high school, using Physics experiments, according to the didactic approach of Project-Based Learning (PBL) with a STEAM focus, having as a problematizing issue the generation and use of sustainable electric energy. The theme and the didactic approach chosen are justified by the importance of deepening in high school the study of concepts related to sustainable energy, which corroborated advances in society, especially when it comes to new technologies that are present in people's daily lives, bringing impacts of social, economic and environmental nature. In the practice of teaching physics over the last decades, it is common that the teaching of classical physics to be prioritized, causing the concepts of modern physics to be underdeveloped and, when approached, usually in a decontextualized and abstract perspective, not enhancing the learning of the subject. Therefore, with the intention of meeting the needs of the new perspectives of secondary education and developing quality education, here it is discussed some didactic sequences that seeks to facilitate the understanding of the concepts associated with the generation and use of electrical energy, using investigative methodology and engineering design design, in an ABP approach with a STEAM focus. The choice of this approach and methodologies aimed to enhance, thus, the development of skills associated with creative processes theoretically based on Critical Meaningful Learning. The methodological procedure of the didactics sequences followed the following steps: (a) delimitation of the problem: discussions and questions about the environmental impacts associated with the Brazilian energy matrix and study of physical quantities present in electric energy bills; (b) scientific investigation: understanding of the physical concepts related to the topic, through the socialization of students to build experiments and use computer simulators; (c) engineering project: team construction of mockups with photovoltaic lighting, with electronic resources and mini solar panels; (d) application in reality: calculation of energy consumption to reduce the real problems caused by energy factors.