Geophysical Research Abstracts
Vol. 12, EGU2010-6125-1, 2010
EGU General Assembly 2010


# Solar Thermal Energy Exploitation: An Opportunity to Enhance Conceptual Learning in Physics

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In a society mainly driven by Science and Technology it is becoming consensual the idea that scientific education should include three components: Education in Science, Education about Science and Education through Science. Some authors suggest that, in education, everyday objects should be used to illustrate scientific issues (e.g. Andrée, 2005).
Thus the goal of this study is two-fold: first, to develop a teaching and learning strategy, in the framework of Education for Sustainable Development (ESD), concerning the renewable energy issue, while showing the importance of using everyday situations in the improvement of students' motivation in Physics learning.

Energy is the core concept in this study. Energy conservation includes the concepts applied to sustainable balance between environment and the energy availability and use. Dias et al. (2004) stress that education is one of the best ways to transform the human behavior for the rational use of energy, which represents a long-term investment. In this work students become aware and recognize the importance and value of energy in everyday life, they identify energy transfer and transformation processes, confirm energy availability, relating these topics to present human needs and climate change issues.

A didactic model of a solar thermal panel has thus been built, using cheap, common materials, by 15-16 year-old Physics students, from a Portuguese secondary school. Students had to plan the experiments, in small groups, to identify and estimate physical magnitudes and to explore how to maximize the solar thermal panel efficiency. The experimental activities took place in the school's playground, in a place where there were no obstacles to capturing solar radiation.

Finally, students had to deal with experimental data acquisition and analysis, they had to prepare a report, as well as to answer a survey, to evaluate their learning success. Results show that students appreciated the proposed themes and activities, while having significant learning,namely in terms of conceptual evolution on concepts such as thermodynamic systems and energy transfer. We believe that these kinds of proposals contribute to improve students' literacy and knowledge in Science, to strengthen the student-teacher relationship, while contributing to raising conscious citizens.

References

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