
The ways students, ranging in age from primary school through university, learn about energy and how this concept can be taught, have been productive subjects of physics education research (Duit, 1984; Goldring & Osborne, 1994; Solomon, 1992). Many proposals about how to teach the subject have been influenced by this research. Several researchers presented findings at a Symposium at GIREP 2008 in Cyprus that have implications for teaching energy concept. One of the conclusions reached at the Symposium was that no clear consensus exists regarding the structure of a vertically integrated curriculum for teaching energy. At the GIREP 2010 conference, a Workshop organized by Paula R.L. Heron and Marisa Michelini (with the contribution of Bat-Sheva Eylon, Yaron Leavi and Alberto Stefanel) took place and was attended by 25 colleagues from 9 countries. Three different groups discussed the issue for primary, lower secondary, and secondary schools, respectively. As a result, it was decided to form a GIREP Thematic Group on ENERGY that was charged to continue work on the subject both through electronic dissemination and through activities at GIREP conferences. The GIREP 2011 workshop on energy has been focused in particular on the primary school level. It consisted in the presentation of the position paper following the Reims Workshop and of two contributions about the construction of the concept of energy in primary school and in a course of teacher formation. This paper, as part of the Symposium “Teaching and learning the concept of energy from early childhood school through university”, reports on the discussion during the 2011 workshop and presents the points recognized to be important and fundamental for the introduction of the concept of energy at primary school level.

1. The symposium contents.

The 2011 Jyväskylä GIREP conference hosted the workshop “Teaching and learning the energy concept and teacher formation in primary school”, organized and led by Federico Corni, Marisa Michelini and Lorenzo Santi.

The program provided an introduction by Marisa Michelini followed by a synthesis of the Reims Position paper by Lorenzo Santi. Then, as object of discussion, two presentations were done about teaching and learning the concept of energy in primary school by Marisa Michelini and by Federico Corni.

1.1. Contribution by Marisa Michelini, Doriana Colonnese, Paula Heron, Lorenzo Santi and Alberto Stefanel.

Marisa Michelini presented an educational path with 6-12 primary school pupils (other authors were). Each step of the path was intended to lead logically to the “discovery” of a new type of energy or to the exploration of the variables associated with a particular type. At each stage, there was an attempt to direct students’ attention to the transformation of energy from one type to another. The idea of conservation was only hinted at (in a qualitative way) in an experiment, late in the sequence, in which an object bobs on the end of a spring. The intent was to lay the groundwork for a more quantitative treatment of energy in later studies in middle and high school. The sequence contains many activities that allow students to experiment. Most of the apparatuses consisted of toys. Therefore the materials are inexpensive and easy to find, as well as being familiar and engaging to students.

