Energy concept development using the U slope

ABSTRACT

Energy is an important concept in life, and is a basic theme of the three natural sciences; biology, chemistry, and physics. The concept of energy is introduced into the science curriculum at an early stage. The science education studies have shown that there are serious difficulties in understanding energy and its related concepts among students of all ages. This article reported a research on the conceptual development of energy in secondary school physics. This short-term learning progression research employs a method called developmental maieutics in order to answer the research question about how does a student develop an understanding of the concept of energy. There were six participants of 16 years old physics students involved in this research. The interview conducted was to analyze two developmental paths. First, it was on their levels of cognitive development based on Dawson 's developmental sequence in four stages: representational mappings, representational systems, single abstractions and abstract mapping level. The second path was, their conceptual content development addressing to form and source of energy, transformation of energy, energy transfer and conservation of energy. Overall, each participant showed a development in both of the paths. Their conceptual understanding of energy increased to the higher levels, but some of them still had misconception although after attending the instruction. The researchers found that some participants 'conception of energy were near to the scientific view of energy and almost had a complete understanding of energy conservation. Finally, this research contributed to a new perspective, particularly, in the conceptual development of energy research and, generally, in the learning progression study.