

An Investigation into The Conception Energy Conversion at Different Educational Levels

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Abstract

This paper describes an investigation of the conceptions and misconceptions of energy conversion held by students at primary and secondary schools and student teachers at a faculty of education. The study employed developmental research methodology. In order to collect the data, both a conceptual understanding test and semi-structured interviews were used. Before the main study, a pilot study was conducted with 45 students, thereby, some revisions could be done to improve the test's quality. A total of 95 students (35 from primary, 35 from secondary and 25 from university) responded to the test, which consisted of questions that require written answers. In addition, interviews were conducted with 15 students in total. The data from the test and interviews showed that the concept of energy conversion were not fully understood by the students. Misconceptions have been determined at all levels of education. Implications for curriculum and school education are drawn from the results.

Keywords: Energy Conversion, Understanding Levels, Misconceptions

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Extended Summary

The concept of conversion of energy from different disciplines in science concept and many of the concepts associated directly or indirectly. Associated with this concept that efforts to examine conceptual change occurring in different levels of education is very low. In this study, different disciplines and concepts related to energy conversion that depending on the educational level as a whole examining the changes in the framework of this concept better determined. In this study, the concept of energy conversion which adaptation and re-training programs for the teaching of the concept in question is considered to contribute.

Purpose

The aim of this study is investigation of the conceptions and misconceptions of energy conversion held by students at primary and secondary schools and student teachers at a faculty of education.

Method

Developmental research method, one of descriptive researches, were used in this study to determine the education levels of students who study at different levels of education levels about energy conversion concept. The research which aimed at determining the education levels of the energy conversion concept was made up of studies which were carried out at the same time on the sampling which was going to be equivalent of the sampling that will follow it rather than revealing the development level by working on the sampling for a long time. (Çepni, 2009). By this way, the study was completed in the earliest time by studying the samplings in different age groups rather than following the same sampling. When these features of the study are taken into consideration, the study bears the qualities of a cross-sectional study in developmental research method.

This research was carried out in a primary school, a high school and Fatih Education Faculty of Karadeniz Technical University located in the centre of Trabzon. Final year students randomly chosen from each primary school and high school and the teacher candidates in their final years in Biology Teaching Department of Fatih Education Faculty formed the sampling of the study. In order to collect the data, both a conceptual understanding test and semi-structured interviews were used. Before the main study, a pilot study was conducted with 45 students, thereby, some revisions could be done to improve the test's quality. A total of 95 students (35 from primary, 35 from secondary and 25 from university) responded to the test, which consisted of questions that require written answers.

Result

Generally, the concept examined was not understood at each education level. As expected, the higher the education level got, the higher the ratio of average total understanding level of the concepts increased. The use of energy conversion concept in daily life and its scientific meaning shows difference at changing ratios. The use

of energy conversion concept in daily life and its scientific meaning reveals dominance in changing ratios when energy conversion concept is understood by the students at different levels. While at primary education level, the meaning of the concepts related to their use in daily life stands out, scientific definition and school knowledge come into prominence at an increasing rate.

The data from the test and interviews showed that the concept of energy conversion were not fully understood by the students. Misconceptions have been determined at all levels of education. Implications for curriculum and school education are drawn from the results. Beginning at the 4th grade at primary education, the primary concepts about energy conversion must be planned by taking into consideration the education levels and in such a way to offer sustainability and also the milestones between the daily life knowledge and scientific knowledge must be determined. It is suggested that the teachers and the primary school students at the 5th grade should be considered to be included in the sampling group in the future studies to be conducted about energy conversion and these concepts should be studied separately.

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