

Design based research of an oceanography course for high school earth sciences students

Carmit Cohen

Advisor: Nir Orion

Oceanography is an area of the earth sciences that focuses on the exploration and understanding of the oceans system and its interrelationships with the other earth systems. In this study the new unit in the program, "Oceanography and the earth systems", has been developed as a part of the environmental – based interdisciplinary of the earth science program. The development of this unit has been conducted as a design based research.

The module focuses on the understanding of authentic oceanographic phenomena such as global warming, ocean currents, climate changes, hurricanes, El-Nino, tsunami, sea pollution and artificial islands. This module includes two parts. The first part is an inquiry based unit that takes part in the lab and in the field. The second part is a project based learning unit where each student chooses a topic that interest him/her; write down a research question and answer it through a literature review and then present his/her findings orally with a power point presentation.

The study included more than hundred 12th grade earth sciences students and was based on a mix of qualitative and quantitative research tools that helped to understand the student knowledge and attitudes towards other sciences namely chemistry, physics and biology in order to design the unit to its current version.

Following the learning process the student passed through a meaningful conceptual change. They improved significantly their understanding of basic concept such as pressure, heat transfer, chemical composition of water, dissolution, food web and density.

Following our results it is suggested that the earth system approach could serve as a powerful platform for motivate students to study the complicated scientific concepts and processes from all scientific discipline.