

ENERGY EFFICIENCY AND EDUCATION FOR SUSTAINABILITY WITHOUT THE INFLUENCE OF AGE AND SECTOR DIFFERENCES

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ABSTRACT

"Israeli Hope in the Academy" is a program designed by the President of the State of Israel, Reuven Rivlin. The plan is based on the perception that Israeli society changes from a clear majority and a number of minorities to a society composed of four main sectors of similar size: secular Jews, religious Jews, ultra-Orthodox Jews, and Arabs. Severe socio-economic gaps between the four major sectors of Israel's population led Israeli President Reuven Rivlin to launch the flagship program "The Israeli Hope." The goal of the program is to establish a sense of partnership between the sectors, to promote the qualitative integration of each sector in the Israeli economy, and to create cooperation between sectors in key areas such as education, academia, employment, local municipalities, and sports. The purpose of the program is to strengthen the sense of togetherness in Israeli society while respecting each unique group from which it is composed. As such, "Israeli Hope" has several sub-fields, each focusing on another aspect of society. "Israeli Academic Hope" promotes a diverse and culturally diverse academic world. The program promotes a higher and culturally diverse education system that promotes partnership. One of the means to achieve this goal is to create meaningful educational interactions between academics and the younger generation of the sectors.

Keywords: Environmental Education, Elementary school, Renewable Energy, Energy Efficiency, Israeli Hope.

INTRODUCTION

How should children be taught about Renewable Energy? In the last 4 years students from the HIT, Holon Institute of Technology participated in a course "Green Ambassadors" which combines practical work. As part of the course requirements, students were asked to conduct enjoyable lessons within the topic of Renewable Energy and Energy Efficiency to pupils in the elementary school. The students from various faculties: design, engineering, technology management, learning technologies and computer science studied the Renewable Energy and Energy Efficiency issues themselves and the material they learnt was passed enjoyably to the pupils of the school. Last year for the first time in the history of HIT the course worked in collaboration with an Arabic school, as part of a general trend in the college of multi-culturalism and cultural competence in the frame of "Israeli hope in the academia". During meetings held within the school, the students taught the pupils via games and activities what Renewable Energy means, how to turn waste into a resource, what Energy Efficiency mean etc. In order to illustrate the topics studied by the pupils, the students used a moveable laboratory containing demonstrations, experiments and creative activities.

ISRAELI SOCIETY

Israeli Hope is the flagship program of Israeli president Reuven (Ruvi) Rivlin, for strengthening statehood and establishing a partnership between the four main sectors comprising the Israeli society: Secular Jews, Religious Jews, Ultra-Orthodox Jews, and Arabs. Israeli Hope operates to promote a quality integration of all sectors into Israeli society and economy and to create collaborations between the sectors in key fields – education, academia, employment, local municipality and, sport. The program seeks to strengthen the sense of togetherness in the society, while giving respect and place to each group that comprises it, in order to ensure the fortitude and prosperity of Israel as a Jewish and democratic state. The program was first introduced in a speech that was given by the President of Israel in the Herzliya Conference in 2015, and got the name “The Tribe Speech”. From the President’s speech: “Demographic and cultural processes have been reshaping the face of the Israeli society in recent decades: from a society comprised of a clear majority and clear minorities, to a society made of four main sectors, or tribes, that are growing closer in size: Secular Jews, Religious Jews, Ultra-Orthodox Jews, and Arabs (Fig 1). This reality, is reflected by the composition of the first-grade classes, in which the Ultra-Orthodox and Arabs are nearing fifty percent. In this reality there are no longer clear majorities or minorities regarding core ideologic questions, and therefore a change in perception is required, from the conventional perception of majority and minority, to a new perception of partnership between the sectors in Israeli society (Israeli Hope, 2019; Arar, 2012).

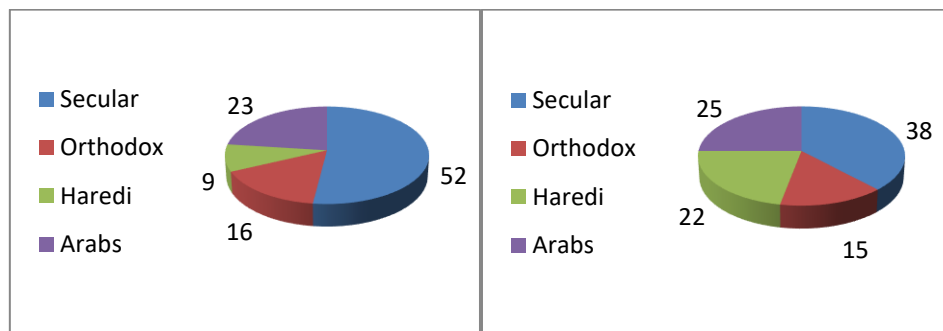


Figure 1: (a) Israeli society four sectors top graph describes 1990 and the (b) graph describes the year 2018[1]

IMPLEMENTATION OF THE “ISRAELI HOPE” PROGRAM IN ACADEMIA

The Holon Institute of Technology sees a great value in developing and promoting programs of social involvement of students in the community, in order to make technological knowledge accessible for the community, while developing awareness and social sensitivity of the students. The institute supports and encourages academic courses which combine social activity with theoretical learning, volunteering for society and the environment, and nurturing involvement in the Israeli society (Friman, 2018; Kerdpitak & Jermsittiparsert, 2020). The environmental crisis that we face today, forces us to deal with natural resources differently. Human society in our time recognizes that we live in an era of a global environmental crisis. The education system has a key role in shaping opinions, in changing behavioral norms, and in initiating actions of civil responsibility to protect the environment. The role of environmental education in the education system is strengthening (Shafir & Yagur-Carrol, 2019; National Bureau of Statistics (2018). The understanding that in order to ensure the future of generations to come, there is a need to share the knowledge and develop an obligation to protect the

environment today, is shared with both ministries – the Ministry of Education and the Ministry of environmental protection (Arar, 2012). Why are deal with environmental education? That question has many possible answers, and all are true. Here are some of them: Environmental education allows a deep familiarity with both the physical and the human environment. Environmental education develops a sense of caring for the environment and society. Environmental education causes a responsible behavior towards the environment. Environmental education is a multi-disciplinary topic, and therefore allows a holistic approach of teaching. Environmental education develops critical thinking. Environmental education allows for bridging social and cultural gaps. Environmental education constitutes a wholesome educational framework, relating to the learned content, the organization, and the pedagogy. Environmental education connects between schools and their society, and between the formal education framework and the informal education framework. In recent years, the informal education in Israel is going through a process of social and economic change. The new social dynamic provides a wider space for the personal expression of the individual, along with free time management possibilities that are growing wider as well. Informal education serves as a learning framework that completes the formal education. It is based on the perception of “life-long learning”, in which children and youth adopt a set of values that lead to self-fulfillment, contribution to the community, and to integrating into the joint life of Jews and Arabs in Israel (Israeli Hope, 2019). In its essence, informal education is democratic, and is based on values of equal opportunities, keeping human dignity, self-fulfillment, volunteering, activities that are accessible to all, and the ability to join freely. It is a flexible field that puts the participants at the center, and expresses their personal needs along with the unique needs of the community to which they belong. The informal education has a huge importance in Arab society, as it is a channel that has the power to accelerate equality and reduce gaps in Israeli society, to help implement democratic processes, to promote initiatives of joint life and to be the area in which professional training and preparation for academia and the labor market happen. Because of the teaching characteristics in the Ministry of education and the fixed methods that are implemented today, it was decided to approach the taught material with refreshing interactive and challenging teaching methods. The topic of the activity was water pollution and its influence on the ecologic environment and the animals of the sea. The students split the class into four groups, in order to let each child take part in the activity, to feel an ability to express themselves, to invoke interest in all pupils. This method increases the academic achievements, and teaches the pupils to work as a team, to give and receive criticism, and to be delegated authority. The students wanted to make all pupils participate during the lesson, to help the information get absorbed better and become a long-term memory. That way, the pupils could pass this information on to family members and friends, and thus spread it to a large number of people in a short period of time. The pupils would then become “green ambassadors” themselves (Reddan & Rauchle, 2012; Caine & Caine, 1997).

ACTION LEARNING COURSE

A new action learning course has started operating in recent years – training of “green ambassadors” in the community, under the guidance of Dr. Hen Friman, as a method to fulfill the vision of “Israeli Hope” in the Israeli society. The students of the course come from the various faculties of the institute – engineering, learning technologies, computer science, and design. They acquire knowledge in the topics of renewable energy, energy efficiency, water pollution, waste, and recycling. After gaining the knowledge, they conduct training workshops

in schools and use activities to train pupils to become “green ambassadors” (children with high environmental awareness) and pass the knowledge on. The course started in 2017 in “Revivim” elementary school in Holon, a national (Jewish) school (Friman, et al., 2018; BU et al., 2019). In 2018 it operated in the Arab school “Alomaria” in Ramla. In 2019, the course operated both in the national-religious school “Yeshurun” in Holon, and in the Arab school “Neve Shalom” in Lod. Two workshops are listed below, one of water pollution and one of energy efficiency, that was conducted by the students in an Arab school with a language gap, and in a Haredi school with a cultural gap and a high level of conservatism. Other workshops of renewable energy, air pollution, soil pollution, and ecology, which were also conducted, are not presented here.

1. Sustainability and Water Pollution

Students planned to present students with general information about Sustainability and water pollution through a trivia questionnaire, which will create an initial familiarity with the material, motivate students to become interested in the topic and create competition between the groups. Subsequently, the planned activities involved mainly materials that students know and use on a daily basis to show students their impact on the environment. Designed to show which materials float in water and which sink, using pictures and a distribution diagram. In order to teach students about dealing with water pollution, students helped them build a water filter, much like any commercial water filter. The last activity was a scientific experiment to clean contaminated water using a water filter. The students were asked to build a water filter with the help of the students. The filter was made of cut plastic bottles, activated charcoal, sand, gravel, and cotton. Initially, the students were asked to think about the proper arrangement to put the ingredients into the bottle. After a few minutes of discussion, one of the students explained the correct order and the students put the materials into the bottle accordingly. The students also explained why this arrangement was true, and in what way each material helps the filter function. Each group received a glass of contaminated water from the previous activity and poured it into the filter (Figure 2). A few minutes later, the students saw the water coming out of the filter in a clean state.



Figure 1: A miniature water filter on a keychain

2. Energy Efficiency

The team of students that taught energy efficiency dealt with a special challenge, which was explaining the term and giving a practical tool for everyday implementation. Energy efficiency is a general term for reducing the energy consumption required for the operation of electrical appliances, artificial lighting, etc. The official definition of energy efficiency is “using less

energy to provide the same service”. The best method for understanding this concept is through examples: Thermal isolation of structures allows the air conditioning systems to use less energy to achieve the desired temperature. Installment of multiple windows allows avoiding usage of artificial lighting during daylight hours, by letting the natural sunlight get into the building. In Israel, the government gives grants and launches educational projects, which are designed to present the Israeli industry with the potential benefits of industrial processes of energy efficiency. The main reason for the great effort put by the government in industrial energy efficiency is that most of the wasted energy comes from improper management of energy consumption in factories and industrial workplaces. In conclusion, there is no professional person responsible for energy efficiency. The responsibility for making the world more efficient falls on many various professionals such as mechanical engineers, chemists, electricians, mathematicians, computer scientists, and physicists. These people work in order to make the products and processes of modern civilization more efficient. The students emphasized to the pupils the importance of using LED light bulbs over incandescent light bulbs. When the cards showed a picture of a toothbrush, the students discussed how water usage means electricity usage as well, because of the need to pump the water. Then, each pupil created an hourglass by gluing two test tubes together. The sand that was inserted into the hourglass measured two minutes – the recommended time for teeth brushing.

CONCLUSIONS

The head of social involvement and action learning courses at the Dean of Students office at HIT said: “The Green Ambassadors course was presented in several academic platforms in Israel and in the world, and was also defined by the Council of Higher Education as a meaningful, ground-breaking course. It is funded by the Council of Higher Education. Managing the course is a very complex logistical task, but when I visited the school and saw the anticipation of the pupils for the arrival of the students, and their smiles when they experienced and learned something new, I understood that the effort was definitely worth it”. The Institute’s appointee of the “Israeli Hope” program said: “The course corresponds with ‘Israeli Hope’, by operating each semester at a different tribe of the four tribes – we were in secular, religious and Arab schools. The students of the course go through a one-hour introductory workshop on the Society in Israel, receive background on the ‘Israeli Hope’ program and the meaning of ‘choosing the other’. Meeting pupils from different tribes is very meaningful to the students”. A first-year student of computer science who participated in the course said: “The studies for the degree at the institute are mostly practical. In this course, I received new tools, from the worlds of environmentalism and ecology, and was exposed to community-related matters”. A second-year student of learning technologies who participated in the course said: “In the Green Ambassadors course, I met with students from other faculties and got to know new parts in Israeli society. In addition, I had the privilege to teach, which is something I did not expect to experience during my studies”.

In this paper, "Green Ambassadors" case implementing the Israeli Hope national program in academia and elementary schools in Israel were presented. This was developed and executed with great success by the Social Involvement Unit at the Dean of Students office at HIT.

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