

## TRAINING “GREEN AMBASSADORS” IN THE COMMUNITY- ACTION LEARNING COURSE

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### ABSTRACT

The action learning course is an academic course which involves academic learning and social activities. The courses deal with processes and social challenges, reveal different ideologies, and develop critical thinking and pragmatic ideas. Students receive course credits and a grade for being part of such courses. Participating students enroll in courses that involve action and activities to engage in the experiential learning process, thereby creating a dialogue and cross-fertilization between being taught in the classroom and experiencing the reality in the real world. A learning experience includes meeting with social organizations, institutions, and state authorities and carrying out practical work with diverse populations. Through experience, students strengthen their academic skills, formulate ethical attitudes toward reality, develop professional and civilian perspectives, and realize how they can influence their surrounding in the present and the hereafter. This course is the beginning of a paradigm shift regarding energy usage in the modern society in Israel. The objective of the course is to expand worldwide and train the first and second-graders, and even pre-schoolers, in a wide scope to increase population awareness rate, both in Israel and all over the world, for a green future.

**Keywords**— air pollution, green ambassador, recycling renewable energy.

### INTRODUCTION

Over the years, there has been an increase in demand for electrical power. Such demands require the fossil-fuel power stations to burn more fuel. This causes heavy air pollution, which is detrimental to the environment and our health. We are rapidly approaching the point of no return in terms of air pollution. This is reflected in damage to the marine environment (such as fish, corals, sea water pollution) and groundwater contamination, a drastic 5 °C increase in global temperature, rainfall pollution and more. The conclusion is clear, the world population must unite and make a paradigm shift in order to significantly reduce the damage for electrical power worldwide. Such an effort must be made by the entire world population and not just by individuals. To address the problem, a course has been set up at the Holon Institute of Technology (HIT). The course is named “Green Ambassadors”, and its goal is to educate the next generation in energy efficiency. The course is divided into 7 groups; each group contains 2 to 3 students, whose aim is to provide information on energy efficiency to the school's first and second graders. The teams of first-graders and second-graders from “Revivim” school in Holon have been chosen to take part in the project. As a part of the course, the students of HIT give the school pupils several 90-minute lessons, focused on energy efficiency and ways to save energy. Those methods are described and detailed using demonstrations of simple every-day actions, such as turning off the light when leaving a room and opening the shades in daytime. In order to demonstrate the subject in a practical and experiential way, the students use a mobile laboratory. The laboratory contains several demonstration kits on various subjects, such as renewable energy, air pollution, waste and recycling, soil ecology and water sector. During the class, the children perform several experiments independently while supervised by HIT students. Using these kits, the students demonstrate the principles of energy efficiency in several ways, this helps to lead the children to the conclusion that energy efficiency can be achieved using simple ways and tools and confidence to preserve the knowledge of how to keep the environment safe. Such confidence enables the children to be more vigilant in protecting the environment where they live and gives them the moral privilege and the right to warn against environmental damage and energy waste. Using a combination of both theoretical and practical studies, the issue is better preserved in the students' memory. It provides knowledge for future use, even after the lesson. By that, the school pupils are becoming “Green Ambassadors” who want their surroundings to become more energy efficient. This course is the beginning of a paradigm shift regarding energy usage in the modern society in Israel. The objective of the course is to expand worldwide and train the first and second-graders, and even pre-schoolers, in a wide scope to increase population awareness rate, both in Israel and all over the world, for a green future.

## EARLY CHILDHOOD EDUCATION

These days, most schools in Israel and throughout the world are appraised by their ability to transfer a large quantity of information to the students over a 12-month period. As the amount of theoretical material is very large and the time teachers have to teach is minuscule, it is nigh impossible to ensure that students understand the material during the lesson. Such an issue of teaching a lot during insufficient time causes teachers to develop certain teaching patterns during the inaugural years of their teaching careers. Such a pattern is built by training teachers during their teaching studies. When a teacher approaches the class for the first time, he/she uses this specific pattern. If such a pattern does not work, the teacher changes and improves it according to how he/she supposes it will be more efficient in class. The pattern holds in the teacher's mind and nature and defines a path to his/her future lessons [1]. As teachers face time pressures, it is difficult for them to change and modify this pattern. Moreover, each individual is different, so many pupils fail to absorb the study materials—an aspect that affects the pupil later in his/her learning. Due to the lack of time and erosion of teachers, teachers' lectures are delivered in a monotonous, tedious, and even destructive manner in terms of curiosity and resourcefulness of the child [2].

Donald A. Schön, father of the training systems and conceptual learning in organizations and communities, once said that "a practitioner's reflection can serve as a corrective to over-learning. Through reflection, he can surface and criticize the tacit understandings that have grown up around the repetitive experiences of a specialized practice, and can make new sense of the situations of uncertainty or uniqueness which he may allow himself to experience" [3].

Based on the 2012 results of the PISA commission, the Organization for Economic Cooperation and Development (OECD) recommended investing more effort and focus on the improvement of educational programs, teacher trainings, and a coherent system of teaching and professional improvement to enhance the quality of teaching and knowledge [2].

Accordingly, many researches have demonstrated that a large variety of teaching techniques have been developed for use with pre-schoolers and first graders. Most research indicates that four- to six-year-olds have the highest concentration level during the first 20 minutes of the lesson, after which their level of concentration decreases drastically. In order to maintain a pupil's high concentration level, the instructor has to excite the students through experiential activities. Such efforts are intended to draw pupils out of their regular zone of reading, writing, or listening and induce them to exercise an activity of the same theme. Doing so violates the students' routine and allows the instructor to verify understanding through a game; thus, pupils can return to a high concentration level in order to continue and succeed in their studies.

### Environmental Education

According to Ruth Wilson (1994), teaching environmental education in early childhood includes the growth of a sense of curiosity as well as appreciation of the beauty and mystery of the natural world. Education also includes developing problem-solving skills and developing an understanding and appreciation of the world around us. The goal of environmental education is to develop a population that recognizes environmental topics. Studies have shown that most individual positions are formed at a very early stage of life, meaning the teaching environment in early childhood is of great importance [4].

Advances in elementary school curriculums supply theoretical lessons about energy efficiency; such an approach does not hold much information according to the topic, indicating that younger pupils' level of knowledge is really depressed. In order to ensure effective learning about energy efficiency, students—especially younger age groups—must be taught utilizing a short piece of theoretical lesson that only offers the fundamentals and provides experiential experiments that illustrate scientific principles. Based on a teaching activity that motivates students to analyze and research the subject of energy efficiency, it is possible to search for answers and solutions about the environment. Such activity gives even the weakest students the motivation to study the subject in a fun way [5] and allows the students to learn at different levels—namely, hearing, feeling, and sight—thereby providing them with a practical and theoretical understanding of the material that, by the end of the process, is stored in their long-term memory for future use in their everyday lives. After the lesson, the pupils become representatives among their family and friends circles. Such representation is a significant persuasive power related to environmental education for pupils' circles in their various institutions, making it possible to spread the knowledge and information to a big portion of the population in a short time.

### Awareness and Education for Change

Patrick Ness, the author of *A Monster Calls*, described the world in which we live as follows:

"One hundred and fifty years ago, the monster began, this country had become a place of industry. Factories grew on the landscape like weeds. Trees fell, fields were up-ended, rivers blackened. The sky choked on smoke and ash, and the people did, too, spending their days coughing and itching, their eyes turned forever toward the ground. Villages grew into town, towns into cities. And people began to live on the earth rather than within it" [6].

Over the years the world population has evolved and reached advanced achievements in a technological subject. Along with the development of technology, considerable significant increases in pollution have mainly been due to smoke emissions into the air and sewage water poured into water reservoirs. Most smoke emissions from industrial plants spew greenhouse gases and acids, thereby leading to increases in global temperatures and the oxidation of rainwater. Such pollution has dangerous health implications for humans, animals, and plants. This pollution has increased rapidly over the years to the point of no return. The conclusion is clear: The production of energy from fossil fuel pollution is increasing, creating a substantial risk to the environment and human growth.

Studies on the subject indicate that man alone cannot change the state of air pollution. To address pollution issues, the world population must unite and make a paradigm shift in the way in which they live. Therefore, there is a need to educate the community on the principles of environmental protection and energy efficiency. At the same time, there is a demand to acquire renewable energy sources that do not pollute and are environmentally friendly [7]. To this end, the UN established its climate change commission, called the Conference of the Parties (COP), which aims to bring about global agreement on the reduction of climate change. This agreement includes at least 55 major countries representing at least 55 percent of global greenhouse gas emissions [8]. The Israeli government approved the COP in 2002, encouraging the development of technologies for the effective utilization of renewable energy to cut dependence on imported fossil fuels and reduce environmental pollution.

### **HOLON INSTITUTE OF TECHNOLOGY**

The Holon Institute of Technology (H.I.T) focuses on teaching exact sciences, engineering, educational technologies, technology management, and design. It performs theoretical and practical research. The institute trains scientists, engineers, managers, and designers. To prepare students for these positions, it promotes close cooperation with the industry.

Environmental involvement and contribution to the society are also reflected by the promotion of environmental protection. Consequently, the Ministry of Environment authorized HIT as a green campus. In this context, activities are used to teach students about energy efficiency, including the recruitment of a given budget for scholarships and grants for students acting in the sphere of environmental community, as well as courses involving the community in providing theoretical and practical knowledge presented through exciting activities that highlight the importance of energy efficiency and the growth of green systems.

#### **Social Involvement Unit**

One of the many goals of the Social Involvement Unit, which is a part of Dean of Students Office, is to promote social involvement of students and staff in the community. It also promotes weak applicants and students at the institute by offering mentoring, tutoring, emotional support, guidance to learning, and adjustments in school. Over the years, the unit has worked in many education and welfare arenas to promote immigrants, youth, and more. The Social Involvement Unit serves as a professional center to encourage and promote the social impact of students and staff and to leverage knowledge, expertise, and human capital for the benefit of the community through social involvement projects and course actions involving meaningful activities.

#### **Action Learning Course**

The action learning course is an academic course which combines academic learning with social activities. These courses deal with processes and social challenges, reveal different ideologies, and develop critical thinking and pragmatic ideas. Students receive course credits and a grade for being part of such course. Participating students enrol in courses that involve action and activities to engage in the experiential learning process, thereby creating a dialogue and cross-fertilization between being taught in the classroom and experiencing the reality in the real world [9, 10]. A learning experience includes meeting with social organizations, institutions, and state authorities and carrying out practical work with diverse populations. Through experience, students strengthen their academic skills, formulate ethical attitudes toward reality, develop professional and civilian perspectives, and realize how they can influence their surrounding in the present and hereafter.

### **TRAINING "GREEN AMBASSADORS" IN THE COMMUNITY**

Advances in elementary school curriculums supply theoretical lessons about energy efficiency; such an approach does not hold much information according to the topic, indicating that younger pupils' level of knowledge is really depressed. In order to ensure effective learning about energy efficiency, students—especially younger age groups—must be taught utilizing a short piece of theoretical lesson that only offers the fundamentals and provides experiential experiments that illustrate scientific principles[5]. Based on a teaching activity that motivates students to analyze and research the subject of energy efficiency, it is possible to search for answers and solutions about the environment. Such activity gives even the weakest students the motivation to study the subject in a fun way [6] and allows the students to learn at different levels—namely, hearing, feeling, and sight—thereby providing them with a practical and theoretical understanding of the material that, by the end of the process, is stored in their long-term memory for future use in their everyday lives. After the lesson, the pupils become representatives among their family and friends circles. Such representation is a significant persuasive power related to environmental education for pupils' circles in their various institutions, making it possible to spread the knowledge and information to a big portion of the population in a short time [7].

Under the guidance and supervision of Dr. Hen Friman, "HIT" has built an innovative course that combines action and activities to increase the awareness and accessibility of the community in an experiential way [6, 8]. The end goal is to create "Green Ambassadors"—children with a high level of environmental awareness. This course is divided into two parts. The course methodology (Fig.1), first part, focused on frontal teaching, delivers knowledge from extensive environmental fields to students. The second part of the course shows how the theory becomes practical and concrete. At this stage, students are asked to introduce to the first- and second-graders of "Revivim" School in Holon a lesson of 90 minutes focused on presenting the environmental issues: Energy efficiency (saving), solar energy, energy conversion, air pollution, water pollution, waste, recycling.

In whole-class instruction, only one person can speak at a time, and shy or slow-learning pupils may be reluctant to speak at all. When pupils work in groups of two to four, however, each group member can participate extensively, individual problems are more likely to become clear and to be remedied, and learning can accelerate. With justification, co-operative learning has become widespread. Not only can it increase academic achievement, but also it has other virtues. By working in small groups, pupils learn teamwork, how to give and receive criticism, and how to plan, monitor and evaluate their individual and joint activities with others. It appears that modern workplaces increasingly require such partial delegation of authority, group management and co-operative skills. Like modern managers, teachers may need to become more like facilitators, consultants and evaluators, rather than supervisors (Fig.2).

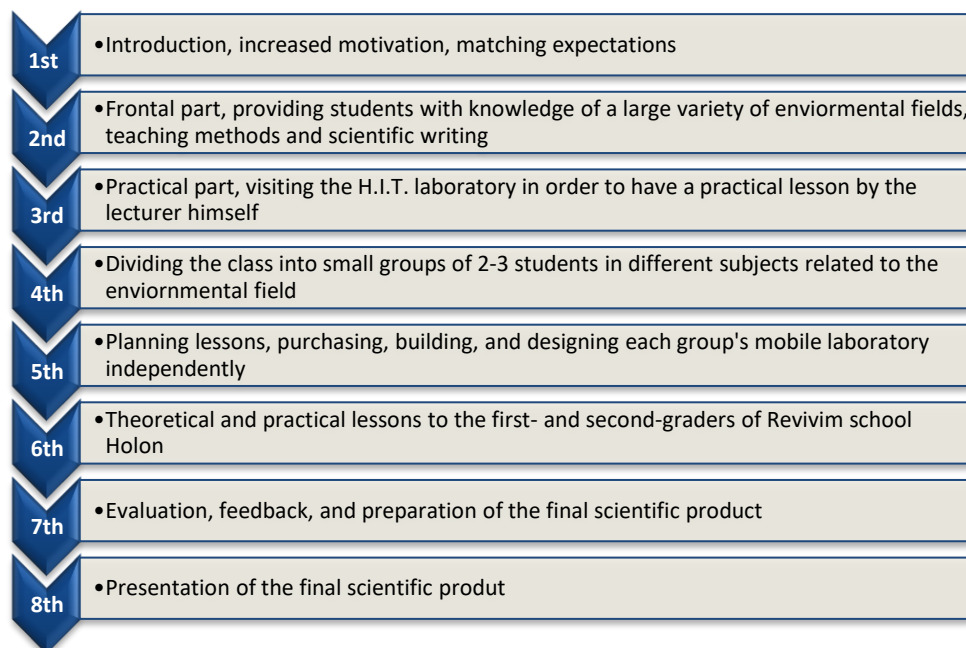


Fig.1: "Green Ambassadors" methodology





Fig.2: Presenting the principles (a) Hydroelectric energy  
(b) Solar energy (c) Wind energy (d) Energy from organic matter

These lessons serve as a milestone for the students, who can pass their knowledge on to the pupils. By the end of the course, the pupils have been authorized by HIT as "Green Ambassadors" and receive certification giving first- and second-graders the obligation to act in accordance with rules to increase renewable energy and energy efficiency and protect the environment, such as turning off lights when leaving the room, shutting all windows when the air conditioner is operating, opening the shades to let in sunlight instead of switching on lights, and turning off the water when brushing their teeth. In addition, pupils have to present and disseminate the importance of the issue to their surroundings. The last stage of the course is an efficiency test conducted by statistical examination of the students' answers to questions on the questionnaire presented to students as a related trivia game show.

#### Evaluation of teaching efficiency

The action learning "Green Ambassadors" course is experimental method of teaching, it is important to know the pupils appreciation for it. Each pupil fills an anonymous computerized feedback questionnaire at the end of the course. In this questionnaire they are asked about the overall satisfaction from the new experimental teaching method (Fig.3).

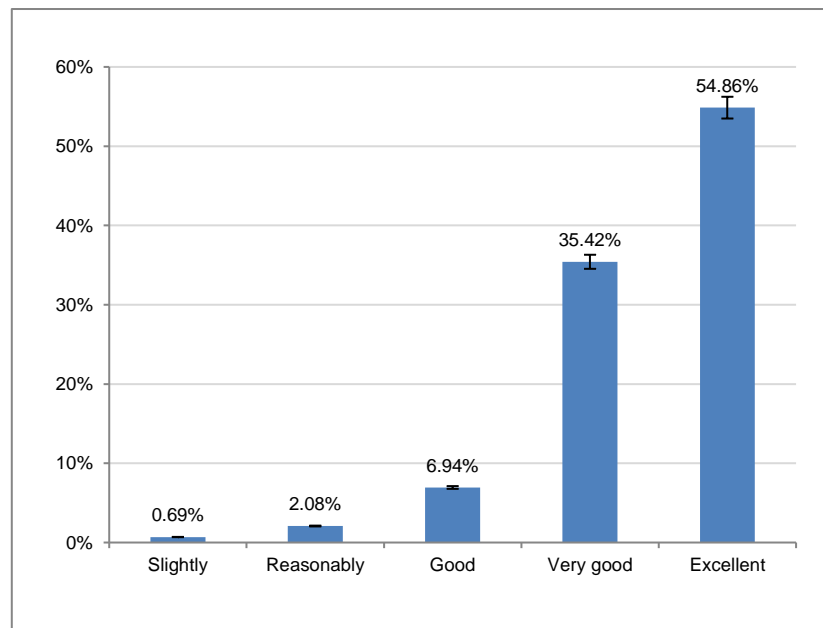


Fig.3: Pupil general satisfaction

### CONCLUSION

This paper presents a new learning program at the Faculty of Electrical Engineering. The program gives the students technical and practical aspects of energy use and energy efficiency and also deals with minimizing the environmental impacts of energy use, as well as with energy economy and environmental policy. The action learning course Training "Green Ambassadors" in the Community powered by the Social Involvement Unit HIT that in this way we can contribute to society and future generations.

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