

Environmental and Sustainability Studies for Pupils in Elementary Arabic School

H. Friman, Y. Sitbon, I. Banner, T. Shauli, and Y. Einav

Abstract—How should pupils in elementary school be taught about renewable energy, Sustainability, what is the air pollution and how does harming sea creatures affect all of us? In the last year 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 preserving the environment to fifth and sixth grade pupils in the Arabic elementary school "Alomaria" situated in the city of Ramle. The students from various faculties: design, engineering, technology management, learning technologies and computer science studied the environmental and sustainability issues themselves and the material they learnt was passed enjoyably to the pupils of the school. 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-pluralism 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 conversion and renewable energy mean etc. In order to illustrate the topics studied by the pupils, the students used a moveable laboratory containing demonstrations, experiments and creative activities. The results show higher rates of success and involvement due to an enriching and challenging experience of learning. Thanks to all these, the pupils turned more aware and learned an important lesson about the ways to preserve the environment.

Index Terms—Arabic, environmental education, elementary school, hebrew, sustainability.

I. INTRODUCTION

Throughout the years with the development of industry and technology, people have increased the environmental pollution. Generating much waste, using non-recycling materials, all these lead to an increase in environmental pollution. In an era in which technology is so developing at a dizzying pace, the demand for electricity is only increasing, this situation may bring to a crisis that will disrupt the economy's operations. These are severe problems that threaten the normal existence of Earth and of course, our life. We are approaching an "irreversible point". Environmental contamination, including air, water, soil, pollution, creating waste in huge amounts as well as waste of energy. This is reflected in damaging the sea, contaminating the ground water, increase in global temperature, global phenomena like "acid

rain" and the lessening of the ozone layer. There is no room for deliberation we must not remain indifferent- the earth's population must wake up and act quickly, unite and make a comprehensive change in order to reduce significantly the harm caused by the industry around the world.

One of the things that can help people reduce the environmental pollution is using renewable energy. This energy originates from the solar radiation, wind, biomass and non-consumable sources which are not fossil fuel. Using renewable energy and energy efficiency are vital steps to reduce energy consumption. Recycling is one way to decrease the amount of waste and that of the one which is transferred to landfills.

Awareness of all of these does indeed increase around the world, but it is still insufficient thus significant and decisive steps must be taken [1].

As part of this trend the course "green ambassadors" was set up. This course integrates work run by the Dean of the Students, the Social Involvement Unit and the "Israeli Spirit" in the academia activated at the HIT. Among the goals of the course are making the ecological and environmental issues knowledge accessible to the pupils themselves and the community, bringing to light the importance of keeping the quality of the environment and educating the next generation about basic energy efficiency.

The last course was a collaboration with an Arab community school "Alomaria" located in Ramle. The course included six groups of three to five students and pupils from six classes, fifth and sixth graders. The collaboration between the students and the HIT staff and the pupils and school staff was excellent and beyond reaching the course's goals of producing knowledge, skills and vision of energetic efficiency, the course contributed to the feeling of closeness and mediation between the Jewish and Arab community.

Throughout the course, the HIT students conducted 90 minute lessons each dealing with another important aspect of meaningful environmental issues. The pupils were given examples how to save energy by simple daily actions such as turning off the light when leaving the room and opening the shutters at day time. The lessons passed in a most enjoyable way. At the beginning of each meeting there was a quiz whose purpose was to check the children's initial knowledge of the topic. They got practical experience by the moveable lab which contained a number of demonstrating kits in various subjects: renewable energy, air pollution, waste and recycling, soil contamination and energy efficiency. On every team a group of students had been responsible who studied the topic thoroughly and prepared lesson plans. At the concluding questionnaire was administered which checked the pupils' level of knowledge after the activity. The children turn into

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more aware in protecting the environment in which they live. pass on the knowledge and warn the people around from the environmental damage and waste of energy- this serves the purpose of the course-training "green ambassadors" from a young age, who will minimize the damage and increase the global consciousness [2], [3].

II. ELEMENTARY SCHOOL IN ISRAEL

According to Ruth Wilson (1994), teaching environmental studies in the early childhood raises curiosity and the appreciation of beauty and mystery of the natural world. From an early age children acquire problem solving skills and develop understanding and appreciation of the world around us. Studies showed that most of the individual attitudes are formed at an early stage of life which means that teaching at that phase is mostly important from different perspectives [4]. In most schools the subject of energetic efficiency is not taught at all as well as the affective ways to preserve the environment. Since the national curriculum relates to specific issues, schools which do try to teach and to remind the theme of renewable energy and energetic efficiency. The program comprises of only theoretical lessons which do not give enough information. In order to assure effective learning, the pupils should be taught a short theoretical lesson supplying information about the basics integrated with practical and fun experiments illustrating scientific principles. This method of teaching encourages the pupils to investigate the issue by themselves looking for answers and solutions. This activity motivates the weak pupils and also those who have difficulty in concentrating to learn the material in an enjoyable way and get good results [5], [6]. At such lessons, the children really activate all the senses contributing to the preservation of knowledge in the long term so that it is much more likely that they use it in their daily life. After the lesson, the pupils turn into representatives among their family and friends. This intensifies the awareness and desire for environmental education in additional institutions and enables the spread of knowledge to a bigger part of the population within a short period of time [7].

III. HOLON INSTITUTE OF TECHNOLOGY

A. *Academia Community Ties*

Holon Institute of Technology, focuses on teaching Exact Sciences, Engineering, Learning Technologies, Technology Management and Design. In order to prepare the students for their future job, the institution collaborates tightly with the industry. The environmental involvement and contribution to society are reflected too in promoting environmental issues. As a result the Ministry of environment Protection has approved the Holon Institution of Technology as a green campus. In this frame there are courses for students on energetic efficiency and of course, also courses combining doing such as "The green ambassadors" and also raising certain budgeting for grants and scholarship for students who contribute in the field of environment studies In the technological institute the Unit of Social Involvement which

is part of the students' dean.

B. *A Course Combining Learning*

An Academic course entails academic learning with social activity. The course incorporates doing and deals with processes and social challenges, reveals different ideologies and develops critical thinking and pragmatic ideas. The students get credit and a certificate for taking part in such a course. The process of learning is enjoyable entailing classroom learning and practical social application. The experience of learning includes one meeting with social organizations, institutions and governmental authorities alongside with practical work with various populations. It is not 'a more of the same' course in which the students acquire knowledge and memorize it in order to pass the test and no more than that. It is a course in which the learners acquire vital, new life and social knowledge formalizing ethical attitudes towards reality, develop educational capacities, leadership and teaching and understand how they can affect their close environment in the first place, and even the whole world later.

C. *"Green Ambassadors" in the Community Course*

Under the guidance and supervision of Dr Hen Friman, The Holon Institute of Technology has set up an innovative course which puts together learning of students in the classroom and social doing- passing on material they have learnt to elementary pupils in an enjoyable way to boost awareness and accessibility to knowledge and information regarding environmentalism. The ultimate goal was that the young pupils would become "green ambassadors"- children with environmental awareness. In the frontal part the course familiarized the students with the Arabic society and ample knowledge in environmental spheres, introduction to ecology, electricity production, air pollution, renewable energy, water sector, waste and recycling. The students learnt what an effective and enjoyable method of teaching is based on the knowledge acquired and divided into working groups. In the practical part of the course each group planned, purchased and built samples and formed a teaching model exemplifying one scientific doctrine studied in the course. The students presented these enjoyable workshops to the fifth and sixth "Alomaria" Ramle school. Throughout the whole process efficiency test were taken. Every meeting the pupils were asked to answer a questionnaire related to issues learnt in class. In the beginning of the activity an opening questionnaire was passed on. The purpose was to know what was the basic level of control of the material studied by the pupils. At the end of the activity a final questionnaire was delivered which indicated the progress and the knowledge acquired as a result of the activity. The questionnaire was presented to the pupils as a trivia game program. The students analyzed statistically the pupils answers' of both the opening and final questionnaires in order to see the difference in the pupils knowledge following the course (Fig. 1). It can be noticed that in the opening quiz less than 50% of the answers to all the questions were correct, the pupils knowledge was not or was not accurate. Whereas in the final quiz after the experience and the experience it appears that about 80% of the responses were received correctly.

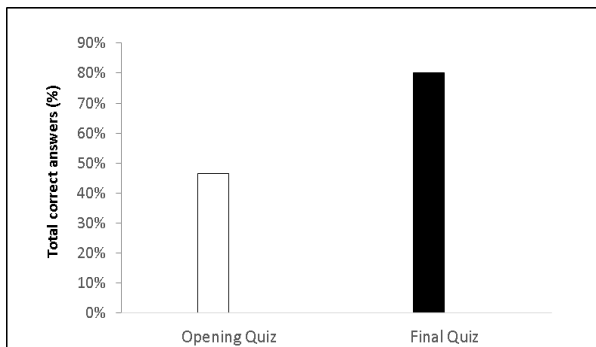


Fig. 1. The percentage of true responses in the opening and final quiz.

IV. MUTUAL FERTILIZATION

The overall purpose of the course has been to raise the awareness of environmental issues among the pupils, boost their affinity towards the importance of the subject, give them practical tools to preserve the environment and for energetic efficiency. Thus make them pass on the knowledge acquired to their surrounding, the Arab society at large, the country and the world. The students, on their part, learnt much from the pupils and the school's staff and got to know better the Arab society and its leaders [2], [3], [8].

The course methodology included "mutual fertilization", the pupils acquired knowledge while the students got familiar with the Arab society in an informal and unprejudiced way (Fig. 2).

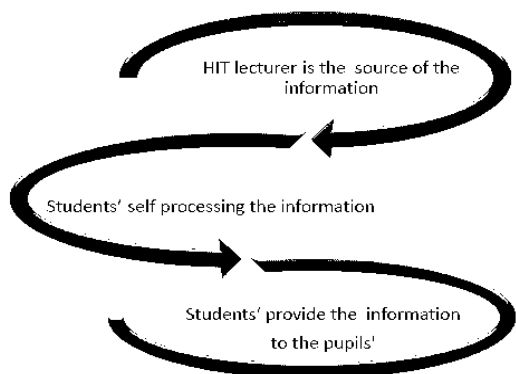


Fig. 2. Mutual fertilization in the course, passing on knowledge alongside with acquaintance with the Arabic society.

V. EXPERIENCE AS A BRIDGE BETWEEN CULTURES (ARABS/ JEWS) AND LANGUAGE DIFFICULTIES

In the last decades, there is an effort to meet Jews and Arabs (Israeli citizens), Jewish-Palestinian meeting and joint projects. In schools and communities have an effort to resist cultural and political differences to discuss them and propose strategies for coping and bridging gaps [2]. The environment is one of the most prominent areas of discussion and so are the meetings and joint projects between Jews and Arabs. This is because both Jews and Arabs have the same limited, natural resources. They drink the same water, nurture the same soil, breathe the same polluted air. The existing environmental situation is a good basis for a real, relevant and meaningful discussion and the understanding that environmental issues can be addressed regardless of the political conflict. Raising

awareness, the treatment and involvement in the shared environment will be beneficial for both groups in addition to playing a common role in the environmental arena which can serve as a point of reference for discussion and action for the resolution of cultural and political matters and others. Environmental education and environmental activism have become favorite fields of collaboration between communities. [5], [7]. The students in the course "green ambassadors" had to deal with a great deal of knowledge in vast environmental fields and the need to make it accessible to children. The students were also exposed to Arab society, overcame prejudices and they also had to overcome a linguistic barrier [3], [9]. The students have been Hebrew speakers and the pupils, Arab speakers.

In The State of Israel, learning the Arabic written language is required in grades seven to nine since the study of Arabic as a foreign language is an inseparable part of the Ministry of Education curriculum. Arabic is the second official language in Israel alongside Hebrew, although the legal status is not necessarily expressed in everyday practices [5].



Fig. 3. Explains the pupils the layered structure of the soil with the help of a sample.



Fig. 4. Preparing a page of newspaper scraps during the activity.

Hebrew taught in Arab schools is not a spoken language but a literary language which makes it impossible to speak on a daily basis and the method of study deals with grammar rather than in actual Hebrew conversation. This is not only a lack of knowledge of Hebrew but also a cultural gap that is expressed in a lack of familiarity with the Israeli mentality: language in its broadest sense includes Jewish culture and mentality-Israeli which is often in turmoil with Arab culture and values, beyond the knowledge gap there is also a problem of self-confidence. The use of language in practice, in the usual

way in the Jewish society, for example, to speak with self-confidence and with a sense of self-worth, require an understanding of Israeli Jewish culture in addition to knowledge of the language. Pupils who are fluent in Hebrew, sometimes are afraid to talk: many times pupils find it difficult to express themselves fully and clearly. In addition to these issues, accent is sometimes an obstacle. In order to make it easier for the pupils with the challenge of bilingual learning, the students conducted lessons with little text also used images, animations, pictures and experiments (Fig. 3, 4).

The results of the knowledge questionnaires proved that despite the language gaps, new knowledge was acquired among the pupils (Fig. 5).

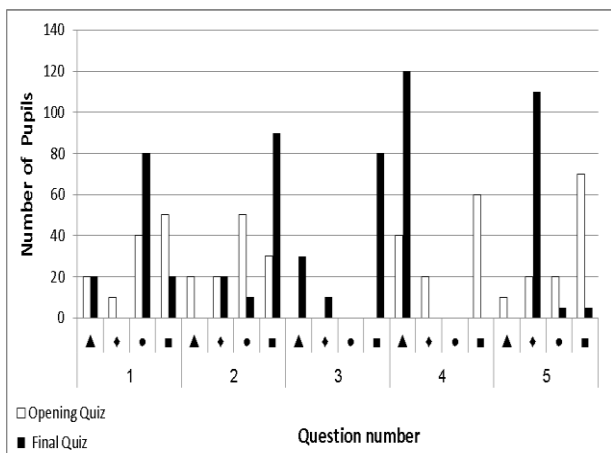


Fig. 5. The distribution of the responses in the opening and final quiz.

It can be seen (Fig. 5) that in the opening questionnaire there has been made a choice of various, possible answers. (large scattering) In the final questionnaire, the pupils underwent an experience and a much more targeted learning process. In question 4, for example, there is scattering between the four options in the opening questionnaire and the last. The choice has been one monovalent option.

VI. MEANINGFUL INTEGRATING LEARNING

Meaningful learning is learning that promotes learners and gives them a sense of growth, value and ability. The term incorporates the qualities of teaching and learning in relation to two main aspects: learning and the learner. Learning becomes meaningful in a situation in which it is important, valuable and significant to the learner in accordance with his world for cognition and emotion [10], [11].

In meaningful learning alongside social learning, personal learning will develop. School will no longer have a monopoly on learning. Thanks to access to free content, open, available to all and answering different styles of learning, the learner will progress on a personalized journey of learning. In the "green ambassadors" course, lesson plans were built that combine technological means, animation and videos alongside creative and experimentation activities- all these come to make learning meaningful and qualitative [12].

In January 2018, 160 pupils from "Al Omariya" school in Ramla gathered at an impressive ceremony held at HIT Holon Institute of Technology, where pupils received the certificate (Fig. 6) a child with high environmental awareness (Fig. 7).



Fig. 6. Certificate in two languages for the course participants.



Fig. 7. Pupils from the "Al Omariya" school in Ramla received the certificate.

VII. CONCLUSION

Concentrate efforts on the improvement of education for sustainable development marked the beginning of a serious reform to cover all types of education and training from preschool to vocational and post -university.

A Course Combing Learning "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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