

PRACTICI INTERNAȚIONALE

ENVIRONMENTAL EDUCATION IN ISRAEL

Rania SHALASH

Moldova State University

It is recognized worldwide that the Environmental Education is part of a national strategy for guarding the quality of life and environment. In the last few years, too many efforts and budgets were invested to develop Environmental Education programs in the educational system in Israel, but the success of these programs and the level of the existing Environmental Literacy were not sufficiently examined. This paper provides an introduction for a research, that will be introduced later, which deals with the evaluation of an environmental education programs in primary schools in the educational system in Israel.

Keywords: *environmental education, environmental literacy.*

EDUCAȚIA ECOLOGICĂ ÎN ISRAEL

Actualmente, se recunoaște la scară largă că educația ecologică este componentă a strategiei naționale pentru menținerea calității vieții și a mediului, în general. În ultimii ani, au fost investite solide eforturi și bugete pentru a dezvolta programe de educație ecologică în sistemul educațional în Israel, dar succesul acestor programe și nivelul de alfabetizare ecologică nu au fost suficient cercetate. Acest studiu reprezintă o introducere bibliografică analitică pentru o investigație, care va fi dezvoltată ulterior, dedicată evaluării programelor de educație ecologică în școlile primare din sistemul de învățământ din Israel.

Cuvinte-cheie: *educație ecologică, alfabetizare ecologică.*

Environmental Education

According to Benstein [2], in the field of environmental education, there are three main approaches towards nature and environment:

Wonderment approach - an approach that emphasize the unmediated experience in the meeting between student and nature. Proponents of this approach emphasize the importance of learning process and the wonderment experience as a central and essential component.

Moral Ecology approach - the ethical questions that arise in this approach, deal with considerations of conserving the environment as it is without the existence of the human being against fostering the environment and adapting it to the convenience of the human being, and social ecology that refers first to the man (ethno-centric) and asks to reconsider social values of productivity, consumerism, capitalism and scattering powers and duties of the human society against deep ecology that emphasizes the eco-centric approach and sees all nature effects and living organisms equally important.

Cultural Ecology approach - relates to community and link to place - includes technology, architecture, learning lessons from local cultures of indigenous from all over the world and recognition of the local culture of each of us as an indigenous culture. And in Israeli context: Zionism and multiculturalism.

In addition to these approaches other approaches must be added which emphasize particularly additional factors as main ingredients in the environmental education: environmental justice, environmental economics, environmental politics and other.

Orr [18] preaches that not education per se but education in a particular way will save the human race. According to Orr the deteriorating of the environmental situation which endangers basic conditions, that our health and chances of survival depend on them, is the result of the work of scholars and educated people who have spent years in the college and acquired higher education up to bachelor, an engineer, technician or doctor.

It is important to educate differently and emphasize values instead of theories, awareness instead of abstract thinking, questions rather than clever answers and conscience instead of technical efficiency.

Sauvé J. [21] unifies many approaches of environmental education when she determines that the environment and points of convergence between the environment and human culture are the center of the creation, in which, our being, our identity and our relationships with others are created. And therefore, according to Sauvé, environmental education is not just an educational tool for solving environmental issues or environmental management, but rather than that, it is also a fundamental dimension in education which focuses on the interactions that exist in the root of the personal and social development of human beings - Dimension of the relationship between us and around us, and as Sauvé calls it, the relationship between us and the home we all share: "home of life." She organizes different ways to relate to the environment in the environmental education:

- The environment as a nature: to evaluate, to honor and to preserve.
- The environment as a resource: to share and manage.
- The environment as a problem: to prevent in advance or resolve.
- The environment as system: to understand in order to improve your decision making capability.
- The environment as a place we live in: to recognize and improve.
- The environment as a biosphere: where all organisms live together for a long-term.
- The environment as a community project: in which people are involved actively.

It is difficult to implement environmental education, because of the breadth and the profound change it requires. Therefore Sauvé calls for cooperation and involvement of schools, museums, nature reserves, local authorities, companies and social organizations in environmental education.

The breadth in understanding and defining environmental education is also expressed by various uses of basic concepts, such as "environment". In different articles which deal with researches on Environmental Education the concept environment was used focusing in one case on "nature" and the different ways people think about it, and on the other case focusing on people and on the ways in which they can improve themselves and the society they live in by the way they relate to the nature [10, p.335-343; 17, p.345-357].

On the other hand, the research methodologies which are used, differ each from the other, you may find qualitative methods, quantitative methods, intervention studies, combinations between them, and cogitation articles [30, p.391-401; 19, p.403-412].

The Importance of the Environmental Education

Environmental Education is a central component as part of a national strategy to maintain quality of life and environment [25; 28; 26; 27]. This matter is highlighted by the Israeli government from the day 14.5.03 [33; 32]. The ultimate goal of environmental education was defined as environmental literacy.

Environmental Literacy

There is not an accepted definition of the term 'Environmental literacy' for those who deal with it. Simmons [20] consolidates several definitions proposed over the years [12, p.42-47; 14; 6]. Definition includes seven basic components: emotional components: knowledge about environment and ecology, social-political knowledge related to the environment, knowledge of environmental issues, cognitive capacity to deal with environmental problems (problem identification, investigation and proposing solutions), additional components which are required to the responsible environmental behavior (such as the belief in the ability to influence) and responsible behavior towards the environment [20].

The Environmental Education organization in North America has set basic lines for excellence in Environmental Education [16] that highlights the importance of creativity, criticism and high order of cognitive ability, which allow analyzing cases and assessing possible solutions.

The importance of experiential learning and initial contact with the surrounding environment is also highlighted. The main goal of Environmental Education is therefore the effect on behavior, and in this it differs from the accepted Educational disciplines in the West, which highlight knowledge [13, p.289-304]. In traditional societies, Environmental Literacy is an integral part of social life and spirit in every culture [15, p.432-437]. Agenda 21, endorsed by UN member states, also recognizes the importance of traditional Environmental Literacy, which is taught as part of the lifestyle and does not need to be taught at school [26]. This Literacy is essential for the whole humanity in areas such as resource management, nutrition, agriculture and medicine [27; 3, p.1251-1262].

Environmental Studies in the Education System in Israel

The constant scientific innovation and the sheer scope of the knowledge gained in recent decades have brought profound change in perception of the teaching of science in education systems in many countries, including Israel. In light of these facts more importance is attributed to acquire learning skills such as understanding articles and teamwork in order to understand and solve problems [12, p.42-47].

In elementary schools, the subject that was called "nature" at the beginning of the educational system way has been changed to "nature sciences" and after that to "science" in a frame called "Mabat" (science, technology and society). In parallel to this, the subject "technology" was developed, and its origin was the qualification subject "professionalism". A few years ago "technology" was combined with "Mabat". New learning programs were published for this combined subject, for the junior classes [4] and also for the elementary school [33]. The environmental studies are included in the science and technology studies frame, and they contain multidisciplinary contents of the various science fields and they also contain economic, social, ethical and moral contents. In both programs, quarter of the defined goals relate to the influence of humans on the environment [4].

The evolution from nature to "Mabat" was not easy to realize in terms of preparing the needed human infrastructure. For example, teachers who teach science and technology "were not trained to teach with a focus on environmental sciences", and the Ministry of Education, that suffers from cuts in the recent decades, is having trouble finding the resources and programs that appropriate to upgrade teaching to a level that suits the standards and the tenure that it set to itself in the CEO Circular 1996 / B [4], in the standards document of 2004 [37], and in the CEO Circular 2004 5\b [33] "Implementing education for sustainable development - in the education system."

The purpose of the standards document [37] was to improve science-technology education in Israel and the CEO circular [33], was formulated according to the government decision No. 246 dated 14.5.03 [36] concerning the Strategic Plan for Sustainable Development in Israel.

Elementary schools

In elementary schools, grades 1 through 6, the environment is one of the seven compulsory subjects in the curriculum in Science and Technology [34]. The standards document draft that was published in 2004 [37] lists the areas of the environmental knowledge that the system should instill in students. In the document there are five fields that were defined out of the seven subjects in the curricula of 1999:

1. Material Sciences- Materials and Energy
2. Life Sciences- world of living, health and quality of life.
3. Earth and Universe Sciences
4. Technology- Man-made world and information and communication
5. Environment Sciences- Ecological Systems and Quality of the Environment

The standards document defines and points to values and behaviors, and states that: "The curriculum in science and technology underscores the need to deal with the implications of science and technology on individuals and society now and in the future. The exposure for the moral and ethical implications that are related to the problems and topical issues will help in fostering values and behaviors, taking personal and social responsibility as students and as future citizens [37].

According to the lines outlined by the Standards document [37], the subject of environment is integrated in learning within the "combination" approach (infusion), in different subjects there is an affinity and addressing to the environmental aspect, therefore environmental aspects should be included in the areas that were defined.

From the formulation of the document it is clear that even those who do not learn about environment in a focused way will be exposed to the knowledge of environment out of the affinity and the addressing that connect between the topics. Without a doubt, an approach that combines between different contents can be fruitful for students, but it is not recommended as a substitute for teaching the environment as a separate unit [23].

The teachers training for teaching "Science and Technology" begins with this that most teachers in this field enter the education system with at least a bachelor's degree in scientific subject (mostly in biology, and less in chemistry and physics). Website of the Ministry of Education, journals, seminars, conferences and seminars are meant to provide updates and professionalism for teachers so they can teach the subject "Science and Technology".

However, Goldman [8] reported about a shortage of teachers who have appropriate training for teaching environmental studies and environmental education as a subject in the "combination" approach. Bloom [4] argues that the multiple fields of knowledge that teachers need, the reduction of training courses in recent years because of budget cuts and the fear from new teaching materials, slow down and disrupt the insertion of the new contents in the system.

The standards document that was published in 2004 instructs teachers to use only educational materials approved by the Ministry of Education. One of the standards document's goals (that was stated according to the government decision upon strategic plan for Sustainable Development in Israel) is encouraging the process of environmental education for pupils from first grade to ninth. The implementing of the document in the system is expected to be a long process. It should be noted that the CEO circular on sustainability since 2004 [33] have an impact today and many schools use it [1].

The Ministry of Education recommends that elementary students learn six hours of science and technology per week. Schools are asked to devote at least three hours per week for teaching the core in science and technology. In practice, there are schools that choose to completely give up on science and technology and devote these hours to other contents. Other schools teach less than six hours a week or devote six hours for science and technology but you can not know how much they discuss, if any, the environmental contents or the context of the contents on of the environmental subject, because there is no precise definition for the scope of study time that must be spent for each subject, and the teacher chooses by bias which subjects to teach and how. As a result of these circumstances, the national supervisor of science and technology does not know how many hours a week they teach science and technology in every school, and of course in the situation it is not known where and how they teach environmental studies which are included under the heading of science and technology. In 04.06.2007, a CEO circular's abstract was published with the title: "Environmental education - a key challenge in the education system in Israel, an action plan to promote environmental education". According to the circular, elementary schools and middle schools will emphasize in 2008 the environmental education, multidisciplinary format. Each student will be exposed to a yearly teaching of 30 hours, within the hours allocated for the relevant subjects (such as science and technology, agriculture and geography). There will be national training courses for leading teachers in this subject, who will later train other teachers, a reader will be written and other learning materials will be distributed.

Recently an Environmental Education program was formulated to complete the famous steps published in the new CEO circular. The program is a result of cooperation between the Ministry of Education and the Ministry of Environmental protection, and according to it the environment will be the basis in schools. The Ministry of Education found that the leading schools in the environment field are those who took up the subject as a basis and treated it as part of the school vision. The program will focus on school action for community and utilization of the close environmental resources, as well as on environmental issues such as biodiversity, alternative energy and open spaces. The program Committee includes the ministry representatives, the academy and the society for the protection of nature.

Secondary schools

Each year about 100,000 students finish their studies in the school system, of which 35 to 40 thousand students studied science and technology subjects [36]. One of the science and technology professions is the Bagrut program in Environmental Sciences. In about 200 high schools, 5,000 students are tested for Bagrut in a level of three or five units each Year [29]. The program started out in 1983, when a wide committee that included professionals from many fields set a curriculum [4].

Environmental studies at high schools are taught in an independent frame, in specific trends, in contrast to the 'combination' approach in the primary grades and junior school, it is not due to a world view, planning or systematic determining as a result of planning and thought but it is the result of historical circumstances [23].

An expression to the 'Independence' approach can be found in the professions of "Environmental Sciences," "Earth Sciences" and "Science and Technology in Society". These three professions provide an exposure to environmental studies, each at a different depth, but only about 10% of high school students learn in these three professions.

Many areas of science are interrelated. Therefore, in the curricula, there is a growing recognition that it is important that scientists and future leaders know to connect between different disciplines and understand the meaning of their actions in an environmental level. The understanding that there is a need for a broad know-

ledge that combines between different disciplines, seized beyond the environmental daily order. While in Europe, students in high schools, learn several science professions at the same time, in Israel, also the outstanding students, learn usually one science profession because of significant cuts in recent years. This can severely damage the scientific ability of Israel in the future [36]. In the report of the steering committee for science and technology [38], there is no reference of the environment at all. The only motives specified as relevant to determine learning trends and contents are economic impulses and technological military needs. A similar approach exist in the preparation document issued by the department of information and research in the kneset towards the meeting of the Education Committee with the Committee of Science and Technology on June 27, 2006 - the motives for opening trends and determining contents are related to economy and security.

The data show that more than half of the students complete their education without any scientific or technology knowledge. Moreover, students who acquire scientific or technological knowledge study it in a focused way that prepares them to specific academic studies or to a professional continuance, and not as a broad education for Environmental literacy. It seems that in high schools in Israel, less than 10% of the students have formal and systematic Environmental Education.

Subjects of Learning

Environmental Sciences

Environmental Sciences, as a trend for "Bagrut" tests (final tests in high schools), are offered in a limited format - 3 units, or broad format - 5 units. For three years, one hour a week is dedicated per unit. In the two levels students are required to take a theoretical learning unit that forms the core of the profession: "Ecosystems and Biodiversity" and a practical learning unit called "Environmental Workshop". Within the environmental workshop, students go out to three different sites and learn them by collecting ecological data by their own in technological methods, in order to conduct a discussion which in its summary the environment can be characterized in a systemic-integrative perspective that reflects all the factors and conditions studied. In the broad level of 5 units there is also an "Ecotop" unit (similar to the "Biotop" in Biological Studies) in which students go outdoor and characterize a conduction of a habitat. Most students choose 5 units. The rest of the learning units are theoretical and students can choose from six subjects: water resource, air resource, solid waste, noise and radiation, planning and environmental management and environmental ethics. Student who chooses this trend must take another scientific subject at least 3 units in chemistry, physics or biology (The "Mafmar" for Environmental Sciences' site, Ministry of Education; Vesensteirn 2004). School directors report that it is easy to get high scores in this "Bagrut" test and some students choose it for that reason. The contents and the teaching approach hardly relate to social and ethical sides that form an important part in the more advanced perceptions of the Environmental Education [23].

Science and Technology in Society

According to the CEO circular from June 1996 each student who doesn't study at least one subject from the natural sciences or technology need to learn the "science and technology in society" [4]. "Science and Technology in Society" result from the conclusions of Harary's committee, which calls to instill to each student scientific-technological literacy as part of the compulsory studying. "Science and Technology in Society" is taught in three units for "Bagrut" [43; 24; 43]. Only few students study today this profession but after the budget condensation, students' number is expected to be higher each year in the near future. One of the most prominent problems in teaching this profession is inadequate training, which enables teachers to instruct a broad profession that has many dimensions and multidisciplinary approach. According to Bloom [4], despite the fact that many efforts were made to activate "Science and Technology in Society" in the recommended scale, so far the implementation was delayed because of the realization that an extensive training course is required for teachers' training. Another view sees that the delay of the implementation is because the Ministry of Education didn't so far the exam in scientific subject for each student in Israel. It seems like there is a significant gap between the recommendations of the CEO circular from 1996 and the existing situation.

Earth and Environment Sciences

Another profession of 5 learning units in high schools that focuses on environmental education is "Earth and Environment Sciences". The purpose of this study program is to develop environmental insight. The program is based on the Earth systems approach and focuses on developing systematic thinking as a basis for developing the environmental insight.

Additional Initiatives in the field of Environmental Education in schools

There are local initiatives in hundreds of schools where parents, teachers or community seek to instill environmental contents. Such schools can find training, information resources and study programs in a variety of places: The Ministry of Environment and the Ministry of Education offer an information center and school coordinators that accompany "green" schools. Many academic centers and also non-governmental organizations offer educational programs, such as the Society for the Protection of Nature, "Heschel Center" and "Karev Foundation". There are also some schools that cooperate with private organizations which have special interest in these programs. For example, Intel has funded training courses about environment in several schools, and "Tevaa" company has activated programs for teaching chemistry in Beersheba, often with a link for environmental contents. The "Israel Electric Corporation" and "Makhteshim" also support educational initiatives. The initiatives in this area are diverse and sometimes temporary, therefore making an accurate mapping of what is happening in schools across the country is a complex task.

Three leading programs across the country:

- "Environment savers" by the Society for the Protection of Nature.
- "Green Network" on behalf of "Karev" foundation and "Heschel" center for Environmental Learning and Leadership.
- "green schools" by the Ministry of Environment and the Ministry of Education. The purpose of the three programs is to inspire environmental activism, often with parents and different community factors. The programs include theoretical studies, study of problems in the immediate vicinity and practical experience to solve them, and also formulating leadership by taking responsibility among children for their actions and their surroundings [39; 40; 41; 6; 1]. The programs "Environment Savers", of "the Society for Nature Protection", and "Green Network", of the "Karev Foundation" and "Heschel Center", are dependent with the support of thousands of dollars a year for guiding and accompanying schools, funding from donors and fund-raising in schools. The two frames are built from an array of guiding for students and teachers. The activities include going outside and getting to know the school area, the children's residence, and the community. However, the Ministry of Environment and the Ministry of Education provide "green" schools the sum of 10,000 shekels to assist in the process of the certification for "Green School". The activity in such schools requires investment and greater initiative of the teachers. The training that the ministry gives focuses on training teachers by educational materials provided by the Ministry of Environment and the Ministry of Education in regional learning centers.

Dozens of schools are members in the "Environment Savers" and "Green Network" programs and hundreds are members in the "Green Schools" program. There are duplicates of schools which are members in the "Green schools" program and also in one of the two other frames. In all, only several hundreds of primary schools of all the elementary schools in Israel benefit from additional instruction and enrichment program on the environment. The following describes the three programs mentioned above.

The society for the Protection of Nature: "Environment Savers"

Since 2000, the Society for the Protection of Nature operates a multi-year program: "Children Make a Change" The program requires commitment and a lot of involvement from the school staff and the parents, and it was built in accordance with learning materials and topics of study programs recommended by the Ministry of Education. The program objectives are to promote closeness to nature and built heritage, promoting behavior change that encourages active citizenship among the school community: teachers, parents and students, creating environmental awareness and responsibility among children.

The ultimate goal is to internalize environmental values so that students take an active part in the action for the environment as part of an active citizenship at two levels:

- Dissemination of knowledge to the community through parent training, press reports, information pages and the like.
- Field activity by children and with the collaboration of the community - for example the establishment of a community garden.

As part of the "Children Make a Change" program, a Green Council of Students is selected, with the cooperation of an accompanying teacher, to encourage behavioral changes at school and to participate in activities throughout the country.

Every year, at the end of the school year, a national conference is held, each time on a different subject, aiming to bring together children from different societies and places in Israel. The program aims to empower the children who work for the environment and to increase awareness and cooperation of the authorities through engaging in a topical environmental issue. The conference is considered as a peak point in the annual education program. The Environmental program "Environment Savers" works within formal and informal education frameworks at central cities and outlying areas in order to make contact between the child and his environment in order to stimulate the child to an active involvement in environmental issues. The rationale is that teachers and students have to go through a practical process with the community. The program includes a collaboration between the Society for Protection of Nature, the local authority, the Ministry of Environment and the teachers at the school.

"Karev Foundation" and "Heschel Center": "The Green Network"

The purpose of "Green Network" is to give children the ability to shape their world out of an environmental awareness, to strengthen and lead teachers and students to take responsibility, so as to stimulate an active citizenship into them. The Green Network, encourages creating relationships for educational-environmental activism within the school community, between communities of different schools, between environmental actives and between different professionals and educators. As a result of the joint activity of some schools close to each other, the connection element gets stronger between various elements in the community and students at schools. During work, students focus on the external environment and leave the classroom to the real life environment. Working is done in small groups in order to increase the sense of responsibility among teachers and students in each group and to allow growth of local leadership.

Ministry of Environment and the Ministry of Education: "green schools"

Green schools were established as part of the national initiative for promoting sustainable development. In this program many parties take a part in guidance and direction such as the Ministry of Education, the Nature and Parks Authority, the Green Network, the Technion University and the Society for the Protection of Nature.

Green schools, receive financial support of about 10,000 shekels during the year of performing the program in cooperation with the student council and parents. The objectives of the program include three areas: curriculum, community contribution (adopting a site, activities against the authorities, etc.), economical use of water and energy resources consumed at school and reducing waste.

Summary

In recent years there has been significant growth in Environmental Education in the education system, new programs have been developed in the Ministry of Education and the Ministry of Environment and in parallel, hundreds of schools use educational programs of nongovernmental organizations. However, despite this positive trend, a review of the progression of the environmental education shows that there is no systemic vision behind these developments [9; 23]. The existence of two different approaches in the curriculum ('combination' in grades 1 to 9 and independent profession in high school) is the result of historical circumstances [23]. This trend is noticeable in Bloom's review [4] that describes the development of Environmental Education in the education system during 35 years. Apparently, despite the year of Environmental Education (1994) in the education system, the situation has not improved significantly. Goldman et al. [9], indicate that it is difficult to get from the Ministry of Education a clear picture that reflects the reality both of the current situation and of the future trends regarding Environmental Education in the education system. This reality reflects the lack of the systematic vision and the coordination between the various factors and the tensions around the issue. Most students complete their education without receiving direct exposure to environmental studies. Review of Environmental Education in the education system indicates discrepancies between the regulations prescribed by the Ministry of Education and the implementation in the field. Schools that do not teach according to the recommended teaching hours and the shortage of educational materials and teaching staff who have appropriate training, make it difficult for the system to sustain the Environmental Education.

"Bagrut" exams in environmental sciences are considered "easy" and only a few students are examined (5%). The "Science and Technology in Society" program that is supposed to give a wide response to everyone who do not study science and technology, and more to refer to environment, also reaches for only a few percent of students.

The education programs that were surveyed before, provide a response only to schools who choose on their own to expand Environmental Education beyond the core program of the Ministry of Education (hundreds of schools). In addition there are many other initiatives, in a smaller scale, some of them are temporary, some are funded by private organizations, and some are encouraged by local councils and municipalities. Review of teaching materials, teaching methods and allocation of teaching hours shows that the approach of the Ministry of Education is that it is possible to educate for environmentalism by providing students with knowledge and almost ignore the social and ethical aspects of the Environmental Education. The teaching approach and contents of the "environmental sciences" for "Bagrut" almost do not refer to the social and ethical aspects of Environmental Education and emphasize the scientific aspect which aims to provide learners with formal knowledge on environment and scientific skills that enable to understand and analyze data [23]. The teaching process and the contents of the subject "science and technology", for grades 1 to 9, are taught by the STS approach (Science, Technology, Society). Opponents of this approach claim that there is a lack of valuable and behavioral components, which are considered important in education [31].

In the near future I will bring the results of the research on Environmental Literacy in primary schools in my city. It will include the detailed preparation of the represented samples, the performing of the research and its results, dimensions of Environmental Literacy and the relationship between them. Other factors will also be examined such as: the relationship between the background data of the schools (size of locality, sector, socio-economic status and level of study) and the level of Environmental Literacy, the relationship between activism and Environmental Literacy, and the distribution of the responses to open-ended questions that examine cognitive thinking of high order.

Bibliography:

1. BAUM, D., DORON, D. & BAR-ON, B. Education for Sustainable Development - Ministry of Environment. In: *National priorities in the environmental field in Israel, environmental education in Israel*, vol. A. Published by the Institute of Shmuel Neaman, 2004.
2. BENSTEIN, J. *Place for thought - Reader in thinking and contemporary environmental philosophy*. Second edition - Tel Aviv. Production: the Society for the Protection of Nature, Heschel Center, Ministry of Environment, 2001.
3. BERKES, F., COLDING, J., and FOLKE, C. *Rediscovery of Traditional Ecological Knowledge as Adaptive Management. Ecological Applications*. 2000, 10(5), p.1251-1262.
4. BLOOM, A. 35 years of developing curriculum in environment in Israel, reflective assessment of the exploited and missed opportunities. In: *Rule of thumb*, Issue 18, Department of Curriculum Planning and Development, 2003.
5. DISINGER, J. F., and ROTH, C. E. *Environmental Literacy*. Ohio State University, ERIC Clearinghouse, 1992.
6. DUNITZ, D. The Social Aspect of Environmental Education: What is between education for multicultural and environmental education? In: *National priorities in the environmental field in Israel, environmental education in Israel*, vol. A. Published by the Intitute of Shmuel Neaman, 2004.
7. GAN, D. Environmental Education - Between Formal and Non-Formal: school relations, community and environmental organization. In: *National priorities in the environmental field in Israel, environmental education in Israel*, vol. A. Published by the Intitute of Shmuel Neaman, 2004.
8. GOLDMAN, D. Teacher Training for Environmental Education in Israel. In: *National priorities in the environmental field in Israel, environmental education in Israel*, vol. A. Published by the Intitute of Shmuel Neaman, 2004.
9. GOLDMAN, D. et al. *The Policy in Environmental Education in Israel - a growing gap between the available and the desirable*, submitted by the National Council for the Environment, Education and Community Committee, 2003.
10. GOUGH, S. Locating the environmental in environmental education research: what research—and why? In: *Environmental Education Research*, 2006, 12(3-4), p.335-343.
11. HARARY, H. *Tomorrow 98: Report of the Supreme Council of Scientific and Technological education*. Jerusalem: Israel Ministry of Education, 1992.
12. HUNGERFORD, H., PEYTON, R., and WILKE, R. Goals for curriculum development in environmental education. In: *Journal of Environmental Education*, 1980, 11(3), p.42-47.
13. HUNGERFORD, H. and VOLK, T. Changing Learner Behavior through Environmental Education. In: H. HUNGERFORD, W. BLUHM, T. VOLK and J. RAMSEY (eds.). *Essential Readings in Environmental Education*. Illinois: Stipes Publishing L.L.C., 1998, p.289-304.
14. IOZZI, L., LAVEAULT, D., and MARCINKOWSKI, T. *Assessment of Learning Outcomes in Environmental Education*. Paris: UNESCO, 1990.
15. KIMMERER, R. Weaving traditional ecological knowledge into biological education: a call to action. In: *Bio-Science*, 2002, 52(5), p.432-437.

16. NAAEE. *Environmental Education Materials: Guidelines for excellence*. Washington DC, 2004.
17. O'DONOGHUE, R. Locating the environmental. *Environmental education research: a review of research on nature's nature, its inscription in language and recent memory work on relating to the natural world*. In: *Environmental Education Research*, 2006, 12(3-4), p.345-357.
18. ORR, D.W. *Erth in Mind: On Education, Environment, and the Human Prospect*. Washington DC: Island Press, 1994.
19. RUSSELL, L.C. Working across and with methodological difference in environmental education research. In: *Environmental Education Research*, 2006, 12(3-4), p.403-412.
20. SIMMONS, D. Education Reform, Setting Standards, and Environmental Education. In: H. HUNGERFORD, W. BLUHM, T. VOLK and J. RAMSEY (eds.). *Essential Readings in Environmental Education*. Illinois: Stipes Publishing L.L.C., 1998, p.65-72.
21. SAUVÉ, L. *Environmental education: possibilities and constraints*, 2005. http://www.scielo.br/pdf/ep/v31n2/en_a12v31n2.pdf
22. Supervision of "Motav", February. *Science and Technology in Society*. Update brochure no' 3. Ministry of Education, Pedagogical Secretariat, Department of "Maphmarim" Jerusalem, 2006.
23. TAL, R. Environmental Education for All: a comprehensive educational approach. In: *National priorities in the environmental field in Israel, Environmental Education in Israel*, vol. A. Published by the Intitute of Shmuel Neaman, 2004.
24. *Teaching Science and Technology in Society - "Motav"*. Reflective Document, Ministry of Education, Pedagogical Secretariat, Department of "Maphmarim", 2005.
25. UN. *Declaration of the United Nations Conference on the Human Environment*. Stockholm, 1972.
26. UNCED. *Agenda 21, the United Nations Program of action from Rio*. New York: UN, 1992.
27. UNEP. *Convention on Biological Diversity (Third meeting) Buenos Aires, 1996*.
28. UNESCO. *First Intergovernmental Conference on Environmental Education final report*. Tbilisi, USSR. Paris: UNESCO/UNEP, 1977.
29. VESENSTEIRN, Y. The "environmental sciences" profession in the education system. *National priorities in the environmental field in Israel. Environmental Education in Israel*, vol. A. Published by the Intitute of Shmuel Neaman, 2004.
30. WALKER, K. Doing research in environmental education: touchstone theory and shaking things up. In: *Environmental Education Research*, 2006, 12(3-4), p.391-401.
31. ZANDVLIET, D. *Developing an ecological framework for environmental education*. Paper presented at the annual meeting of the National Association of Research in Science Teaching, April, Vancouver, BC, Canada, 2004.

Documents:

32. Abstract of CEO circular 06/04/2007: *Environmental Education - A key challenge in the Education System in Israel, an action plan to promote Environmental Education*.
33. CEO Circular 2004 5/b - *Implementation of Education for Sustainable Development in the Education System*.
34. *Curriculum - Science and Technology in elementary school Ministry of Education, Culture and Sports*, Jerusalem 1999.
35. *Education for Science and Technology*, presented to the science and technology committee and the Committee of Education, Culture and Sport. The Knesset - Department of Information and Research. (26.6.2006).
36. Government's Decision No. 246, regarding sustainable development - (14/05/2003) Protocol of the Knesset Education Committee June 2006, Professor Rami Rahamimov's words (Chief Scientist - Ministry of Health and Head of the Biology Profession Committee - Ministry of Education).
37. Standards document. 2004. Ministry of Education, Culture and Sport. / http://cms.education.gov.il/EducationCMS/Units/Tochniyot_Limudim/Portal/HaarachaMechkarim/Standarts.
38. The Committee report for examining trends and technological professions. December 2004. <http://www.csit.org.il>.

Internet Sites:

39. Green Schools Site, Ministry of Environment Site: <http://www.sviva.gov.il/bin/en.jsp?enPage=BlankPage&enDisplay=view&enDispWhat=Zone&enDispWho=greenschools&enZone=greenschools>
40. Home Page of the Green Net: http://www.karev.org.il/info_inner.asp?pgId=5784&catId=186
41. Internet Site of the Society for the Protection of Nature: <http://www.teva.org.il/?CategoryID=194&ArticleID=288>
42. "Maphmar" Site for "Bagrut" in Environmental Sciences. [1] (last reading) 23.8.2006. <http://cms.education.gov.il/NR/rdonlyres/8F7C2FD3-F017-4AD1-B7FA-F57C3980A6A0/10440/mavo.pdf>
43. "Science and Technology in Society" Site: <http://telem.openu.ac.il/mutav>

Prezentat la 28.11.2013