Evaluating School-Community Participation in Developing a Local Sustainability Agenda

Efrat Eilam[1] and Tamar Trop[2]

Abstract: Increasingly, international and national statements are calling for the development of local sustainability scenarios within partnerships between schools and their communities. The present study addresses the question of reciprocity in such partnerships, by comparing the sustainability agendas underlying schools' educational programs to the sustainability agendas of the students' parents. The study was conducted among four urban school-community systems in Israel, implementing sustainability education. The results revealed a lack of reciprocity. Schools and parents belong to two different populations, with different sources of influence. Schools' agenda seems to be mostly influenced by ministerial centralization. Schools' and parents' sustainability agendas were compared against the 15 perspectives of the United Nations Decade of Education for Sustainable Development International Implementation Scheme. Parents' agendas were highly compatible with the perspectives, whereas schools' educational programs, focusing mainly on environmental science, lacked compatibility with the perspectives. The suitability of the perspectives to school settings is questioned.

Keywords: *Community–based education; environmental education; school-community partnership; sustainability agenda; sustainability education; United Nations Decade of Education for Sustainable Development International Implementation Scheme*

[1] Victoria University, School of Education, VU Institute of Sustainability and Innovation (ISI), Victoria, PO Box 14428, Melbourne, Vic 8001 Australia.
Work: +61 3 99192975, Fax: +61 3 9919 2242, Email: Efrat.Eilam@vu.edu.au
[2] University of Haifa, Graduate School of Management, Natural Resource and Environmental Management Department. Haifa, Israel. tammy20@zahav.net.il

Introduction

The perception of sustainability education as a local partnership, in which schools and their communities participate in constructing the program's agenda, has been gaining prominence worldwide (Australian Government Department of Environment, Water, Heritage, and the Arts [AGDEWHA], 2009; Australian Government Department of Sustainability, Environment, Water, Population and Communities, 2011; Guevara, King, Harris, & Toomey, 2008; McKeown, Hopkins, Rizzi, & Chrystabridge, 2002; Tal, 2004). In recent years, schools accredited as "Green Schools" in Israel have been required to relate to and interact with the schools' local communities and have been assessed according to the degree to which their sustainability education programs fulfill this role (Israel Ministry of Environmental Protection, n. d.).

In the present study, we put forward the following question: To what degree do the sustainability education programs implemented among "Green Schools" in Israel promote construction of a local sustainability agenda within the schools' communities? To answer this question, we have applied a set of comparisons between the sustainability agenda underlying the schools' programs and the sustainability agenda of the parents of the schools' students. We approached these comparisons through four perspectives as described in what follows.

Why Form Sustainability Education Partnerships?

Environmental education theory and practice have progressed substantially since the models of the 1960s–1990s. Researchers during this period sought to put forward a unified model of education organized around a global concept of "environmental literacy" (Hines, Hungerford, & Tomera, 1986/87; Hsu & Roth, 1998; Marcinkowski, 1991; Sia, 1984). The early models assumed some set of predefined environmental literacy attributes (in most cases defined by the researchers), which included specific knowledge, attitudes, and, behaviors associated with the environment (Battles, Reichard, Rich, & Franks, 2001; Bogan & Kromrey, 1996;

Culen & Mony, 2003; Hsu, 2004; Hungerford & Volk, 1990; Marcinkowski, 1988; Marcinkowski & Rehring, 1995; Roth, 1992; Sia, 1984; United Nations Educational Scientific and Cultural Organisation [UNESCO]-United Nations Environmental Programme [UNEP], 1989; Wisconsin Center for Environmental Education, Wisconsin Department of Public Instruction, & Wisconsin Environmental Education Board, 1993). For example, Hungerford and Volk (1990) described three levels of environmental literacy, which include: entry level, ownership and empowerment. They defined major and minor variables for each level.

To assess the required sets of environmental literacy attributes, various instruments for standardized testing were developed. These instruments included, for example, the Middle School Literacy Instrument (MSELI) (Bluhm, Hungerford, McBeth & Volk, 1995; McBeth, 1997); the Secondary School Environmental Literacy Assessment Instrument (Marcinkowski & Rehring, 1995); environmental literacy surveys by The National Environmental Education and Training Foundation and Roper Starch Worldwide (1997, 1998); and the "New Ecological Paradigm" (Dunlap & Van Liere, 1978; Dunlap, Van Liere, Mertig, & Jones, 2000).

The turn of the century has seen subsidence of the generalist models of environmental education and a shift towards locally contextualized perceptions of environmental education (Breiting, Mayer, & Mogensen, 2005). These new perceptions arose side by side with the development of new understandings regarding the contents and pedagogies of a newly emerging term: "sustainability education". Sustainability education began to be perceived more in terms of locally constructed scenarios, rather than as a set of solutions to well-defined problems (Breiting et al., 2005; Fien & Tilbury, 2002; Mogensen & Mayer, 2005).

According to this perception, sustainability education needs to emphasize and reflect the culture of complexity in which it is embedded (Mayer, 2004; Mogensen & Mayer, 2005). Schools are called upon to take

part in a dynamic network of co-operations and exchanges, to be locally relevant and active, and to participate in constructing "local situational knowledge" (Breiting et al., 2005, p. 42). This shift in perception emphasizes the role of schools as relevant stakeholders in shaping their communities' sustainability agenda. With this view in mind, the answer to the question – "Why form sustainability education partnerships?" is: because only through partnerships between schools and their communities can the vision of sustainability education, as a dynamic process of constructing local scenarios, become meaningful.

Leading national and international strategies for implementing sustainability education have embraced this approach, which is expressed in various strategic documents. Some examples include the following: The United Nations Decade of Education for Sustainable Development (UN DESD) (2005-2014): International Implementation Scheme (IIS) calls for fostering links between schools and their communities (UNESCO, 2005, p. 20). Four years following the launch of the UN DESD, a review commissioned by UNESCO (Wals, 2009) reaffirmed the importance of the development of greater synergy between schools and communities in addressing sustainability education (p. 17). The United Nations Economic Commission for Europe (UNECE; 2009), in the concluding remarks of its policy document "The UNECE Strategy for ESD", stressed the importance of developing a participatory implementation process for schools and their communities (p. 44). The Australian Government's National Action Plan for Education for Sustainability (AGDEWHA, 2009) highlights the importance of building partnerships and relationships as a means for mobilizing change towards sustainability (p. 9).

Models of Partnerships and Output Measurements

In efforts to facilitate partnership development processes, researchers have suggested various models for school-community partnerships. For example, Uzzell (1999) proposed a model of social influence, named "the school as a social agent", or "dialogue model". The model is aimed at establishing a partnership between the child, the school and the local community, by encouraging effective environmental action and environmental change in the local community.

Posch (1999) advocated that schools should launch initiatives on three interconnected levels: the pedagogical level, the social/organizational level, and the technical/economic level. He termed this process "school ecologization" and claimed that by reshaping schools' internal and external interactions, schools would be able to gain status and ability to influence within their communities.

Kilpatrick, Johns, Mulford, Falk, and Prescott (2002) proposed a model for school-community partnerships based on a sequence of 12 characteristics of partnerships. The model incorporates indicators of the level of maturity of a given partnership. It classifies a partnership's maturity level as either early, middle, or late, according to indicators such as: who initiates the relationship (a relationship initiated by the school is considered to be "early", whereas relationships initiated by the community are more mature), or decision-making (an early relationship is characterized by decision-making weighted towards the school, whereas in a mature relationship the weight of decision-making is towards the community).

Armstrong and Bottomley (2003) designed an action research model that aims to ensure that the entire school community is committed to and takes ownership of the educational process. The school's role in this model is to act as a "center for action" and as a stimulus for local sustainable development (Gough, 2006).

Though the above models present comprehensive frameworks of relationships between schools and their communities, little empirical data exists regarding outputs and outcomes of sustainability education in the form of mutual local knowledge construction or other components of local sustainability agenda construction.

Ruiz-Mallén, Barraza, Bodenhorn, and Reyes-Garcìa (2009) pointed out the lack of research regarding the relationship between the environmental knowledge gained inside schools and local environmental knowledge acquisition. In their study, the authors evaluated the relationships between the two sources of knowledge among indigenous adolescents in a Mexican preparatory school. Their results revealed a lack of correlation between school-based knowledge and local environmental knowledge. These results, though highly indicative, capture only a small segment of the numerous aspects of the reciprocities between schools and their communities with regard to sustainability education. Other important aspects include cognitive aspects not related to knowledge, affective aspects, values and ethics, and others.

Agenda Evaluation as an Output Measurement

In the present study we chose to evaluate the outcomes of schools' interactions with their communities by comparing the sustainability agenda of each school's sustainability education program with the agenda of its corresponding community, represented by the parents of the school's students. We considered this comparison to be an indicator that encapsulates the composite affective and cognitive aspects of sustainability education. The term "sustainability agenda" is a composite disposition comprising and reflective of attitudes, beliefs, knowledge and perceptions. These dimensions combine in complex relationships to form the agenda. The term is closely related to the term "worldview", which was described by Norton (1991) as follows: "The axioms of a worldview, while often inexplicit and hidden, represent rock-bottom commitments that the holders of a worldview would eventually cite as supporting the larger edifice of their beliefs..." (p. 75). A "worldview", or "agenda", is not a static construct. It continuously changes and develops, influenced by knowledge and new experiences that construct and reconstruct the worldview (Disinger & Tomsen, 1995; McKenzie, 1991).

Because of their dynamic and complex characteristics, agendas are particularly suitable as indicators for analyzing the nature of relationships formed between sustainability education schools and their communities. Schools that interact with their communities can do so through multiple pathways. These interactions can lead to various mutual constructions, which are beyond simple knowledge construction. Evaluation of agendas holds the potential for capturing some of the affective and cognitive pathways of interactions, through their expression in the resultant agenda. Specifically, if a school-community system forms a close, reciprocal and intimate relationship, we expect to find evidence of mutual construction of a local sustainability agenda. In contrast, in cases in which the relationships between sustainability education schools and their communities are unidirectional, instrumental and/or technical, rather than reciprocal, we would not expect to find mutual construction of a sustainability agenda, due to the lack of the required affective-cognitive interactions that could support development of this construct.

Agenda Evaluation in the Context of the Research

On the basis of the above premises, it becomes possible to gain useful insights into school-community partnership relationships by comparing the underlying sustainability agenda of the school's sustainability education program and the sustainability agenda of members of the community. In our study, the community is represented by the parents of school students.

The present article presents results of a set of comparisons that were carried out among four Israeli schools that implement sustainability education programs and their communities. All four studied schools are committed to implementing sustainability education through involvement in real-life community issues and interactions with their communities. These interactions are manifested in various ways, including the following: (a) natural ecosystem conservation projects, involving students' families and community organizations; (b) sending regular newsletters to parents, informing them about

environmental events and providing other environmental information; and (c) environmental incursions and excursions in which both students and their parents participated. The four schools were accredited as "Green Schools" by the Israeli Ministry of Environmental Protection. As part of their accreditation, the schools were required to provide evidence for community participation in their environmental educational programs (Israel Ministry of Environmental Protection, n. d.).

For the purposes of the present study, data comparison was carried out between the sustainability agenda of the schools' students' parents (who form the closest and most immediate circle of the schools' community members) and the agenda underlying the schools' sustainability education programs.

The UN DESD IIS (UNESCO, 2005) was used as a frame of reference for the contents of a sustainability agenda. This document presents 15 perspectives, which are organized in three spheres: socio-cultural, environmental, and economic. Each perspective (respectively) includes subtopics such as gender equality, climate change, and poverty reduction. The IIS directs that the strategic perspectives that constitute the scope of sustainability education, and the connections between them, should be addressed in the process of education and learning for sustainable development (UNESCO, 2005).

By comparing the schools' agendas with those of the parents, we were in effect comparing the outcome of sustainability-related influential interactive processes that take place among the following major stakeholders: the schools' teachers and administrators, the students, and the students' parents.

A school and its community can be regarded as an open system, nested within systems and interacting with other systems. This implies that there are many factors influencing agenda development. These include: the broader community, students' peers, the media, broader educational institutions and other institutions, personal and collective background and culture, etc. Comparison of schools' and parents' agendas

provides an assessment of the relative extent to which agenda development is influenced by interactive processes between schools and parents, as compared to other external factors that are co-active in exerting such influence. The comparisons presented below provide a path for gaining insights not only into the nature of the partnership between schools and their communities, but also into the nature of the sustainability education programs that are implemented in the observed schools.

Operational Definition of Terms

In the context of the present evaluation, the term "sustainability agenda" is defined operationally as follows:

- "Sustainability agenda of parents" - Degree of importance and interest that parents attribute to different sustainability issues;

- "Sustainability agenda of a school's program" - Degree of emphasis given by the program to different sustainability issues.

Methods

Participants

Four sustainability-education primary schools and their respective communities participated in this study. For each school-community pair, questionnaires were administered to the principal and leading sustainability education teachers (hereafter referred to collectively as "school heads") and to the parents of 5th and 6th graders.

Schools were chosen in accordance with the following criteria:

- The school has an established sustainability education program that has been implemented for at least 3 years, and it is certified as a "Green School" by the Israel Ministry of Environmental Protection.

- The school was recommended for its interactive relationships with its community, by sustainability education experts (mainly by heads of the Education Department at the Ministry of Environmental Protection). These professionals are in daily contact with the schools and have in-depth knowledge regarding sustainability education implementation within the formal education system.

• The school is located in a medium-to-large city that reflects the dominant urban life-style in Israel.

• The school's community belongs to cluster membership 6-8 (medium – high) in the socio-economic index (Israel Central Bureau of Statistics, n. d.).

To allow some generalization, we aimed to select schools from within the pool of Israel's mainstream governmental Jewish school-community systems located in urban locations. Such locations represent 92% of Israel's population. To minimize variation due to socio-economic variables, we limited our sample to a narrow range of socio-economic clusters.

Data Sources

The main data source for the present study was written questionnaires (written in Hebrew) collected from school heads and parents. Another source of information was non-pre-planned observations and discussions that the researchers held with some participants while visiting the schools at various points in time. The discussions were held with teachers, visiting parents and students. These non-formal observations and discussions assisted later on in shedding light on and interpreting the findings that arose from the questionnaires. It is important to stress, though, that the observations and discussions were anecdotal and therefore do not form an integral part of the study's planned methodology, data sources and analysis.

The participants ranked 44 issues on a Likert scale. The issues on the questionnaires for parents and school heads were identical. Following are the items that participants were asked to rank: human rights, peace and human security, social equity, cultural diversity and intercultural understanding, health and disease, governance and politics, climate change, sustainable cities, disaster prevention and mitigation, poverty reduction, corporate responsibility and accountability, market economy, alternative energy, ecology, environmental ethics, green building, green roofs, ecological gardening, protection of animals, marine environment, global warming, air quality, water and water quality,

soil pollution, ozone depletion, education for democracy, resource conservation, agriculture, urban ecology, environmental economy, biodiversity, organic food, recycling, cleanliness, bio-invasions, waste, consumption, radiation, noise, nature conservation, open space conservation, effluents and effluent recycling, transportation and sustainable industry.

Parents' questionnaire

Parents were asked two questions. In the first question parents were asked to rank the degree of attention given by them to each one of 44 listed issues, on a Likert scale ranging between 1 (no attention) and 5 (very high attention). The phrasing of the question included our definition for the term "attention", as follows: "Following is a list of issues that form part of the public debate and raise concern from time to time. The issues are related closely or remotely to a general term: 'sustainability'. We would like to know the level of attention given by you to each one of the issues listed below. By the term 'attention' we mean any kind of relatedness towards an issue, which can take the form of speaking, thinking, reading, observing, or finding interest in the issue."

In the second question, parents were asked to select and rank in descending order the five issues out of the 44 issues that they consider to be most important or in need of urgent attention.

School principals and leading sustainability education teachers' (school heads) questionnaire.

School heads were requested to rank the degree of emphasis given to each issue by the sustainability education programs implemented at their schools. The request was phrased as follows: "Following is a list of issues related to sustainability. The list includes a wide range of issues, well beyond what can usually be covered by a given sustainability education program. We would like to know the extent of emphasis, if any, that each of these issues receives in the sustainability education program implemented at your school." In the present context, the words "emphasis" and "attention" carry the same meaning, and in

the Hebrew questionnaires, the same word was used next to the numbering in the Likert scale, in questionnaires of both parents and school heads. The school heads were then asked to rank on a Likert scale ranging between 1 (no attention) and 5 (very high attention) the degree of emphasis given to each issue by the sustainability education program.

Data Collection

Data was collected from four schools located in the following Israeli cities:

- Haifa - located in northern Israel;

- Tel Aviv - The core of the Tel Aviv metropolitan area in the center of Israel;

- Rosh-Haayin - Located in the eastern section of the Tel Aviv metropolitan area;

- Modiin - A medium-sized city, southeast of Tel-Aviv.

The questionnaires to school heads were handed out and collected directly by the researchers. At each school the principal decided who would fill in the questionnaires. Since the questionnaires were seeking information regarding the school program, rather than personal opinions, we did not require many duplicates, but rather emphasized the importance of obtaining accurate information about the programs. The number of respondents per school varied from one to four.

The questionnaires to parents were delivered by the 5th and 6th graders at each school. The students were asked to give the questionnaires to their parents and return the filled questionnaires to school, where they would be collected by the researchers. Parents' response rate was 24%. Altogether we collected 157 questionnaires from parents.

Table 1 presents the distribution of returned questionnaires, by school.

Data Analyses, Results and Conclusions

An Overview of the Analysis Process

The process of analysis was constructivist. It began with a simple comparison between the questionnaire responses of school heads and those of parents. The results of this initial stage prompted a question that led to further analyses, which in turn prompted more analyses. Altogether, four stages of analysis were carried out in order to unfold the relationships between schools and their communities with regard to mutual sustainability agenda construction, to understand the different ways in which each of them perceives sustainability, and to gain insights into the nature of the schools' sustainability education programs. Following is an overview of the four constructivist stages.

The first stage of comparison between parents' sustainability agenda and the underlying sustainability agenda reflected in schools' curricula was carried out through analysis of the rankings of school heads and parents in the four participating schools. We began the process of analysis by calculating correlations between average rankings of school heads and parents for 44 sustainability items. Next, for the items that parents identified as "most important" (in the second question), we calculated correlations between parents' mean priority rankings for each item and school heads' mean rankings. Calculations were done for each school separately, using Pearson's correlation coefficients (Wilcox, 2005). The results revealed an overall low level of agreement

Table 1. *Number of Returned Questionnaires, by School*

School number	Number of participating school heads	Number of participating parents
1	4	52
2	3	28
3	1	22
4	2	55
Total	**10**	**157**

between school heads and parents.

In order to gain a better understanding of the gap between schools and parents, a second and more elaborate analysis was applied. The purpose was to find out whether the difference between parents and school heads in each school-community system is greater than the difference between all school heads across the four school-community systems (pooled together) and all parents across the four school-community systems (pooled together). In other words, we asked the following question: Can all school heads be pooled together to form one population? Can all parents be pooled together to form a separate population? To answer these questions, homogeneity tests based on variances (Menard, 2002) were applied to the rankings of the school heads and the parents for all four schools. The homogeneity tests revealed that with regard to sustainability agendas, there are two discrete populations: the parents' population and the schools' population.

These results prompted further investigation. If there are two different populations whose agendas are influenced by different sources, then who is "right" and who is "wrong"? Which population—parents or schools—deviates more from a standard reference point regarding the "expected" contents of a sustainability agenda? To answer this question there was a need to use a third agenda, external to the systems of schools and communities, as a reference point. The UN DESD IIS 15 strategic perspectives (UNESCO, 2005) were chosen as a frame of reference for comparing the contents of the two sets of sustainability agendas.

The comparisons to the IIS reference point were carried out as follows: The mean scores for each one of the 44 items were calculated for the parents' questionnaires and for the school heads' questionnaires. Each item of the 44 sustainability issues was then associated with one of the 15 DESD perspectives. Next, we isolated the items in which the rankings of parents and school heads were most dissimilar. We compared these items to the 15 DESD perspectives. In other words, when looking at the areas of

greatest disagreement between parents and schools, we attempted to find out which population's agenda was closer, in terms of the scope of its content, to the UN DESD sustainability agenda. This analysis revealed that parents are much closer than schools to the UN DESD sustainability agenda.

Given these results, another question arose for analysis: What do schools actually teach in their sustainability education programs? To answer the question from a broad outlook, we compared the 10 issues that schools had ranked highest to the three major themes of sustainability as defined by the DESD: "socio-cultural," "environmental," and "economic."

Following are the main questions addressed in the above constructivist analysis process:

1. How does the sustainability agenda underlying each school's program relate to the sustainability agenda of the school's parents, in the four school–community systems?

2. Do schools and parents form two separate populations?

3. Which of the two groups, parents or schools, deviates more from the chosen reference point of the UN DESD IIS perspectives?

4. What do the four schools actually teach with regard to sustainability?

The following sections present the analysis, results and conclusions for each of the above questions.

Question 1: Do Schools and Parents Relate to Similar Sustainability Agendas?

The first question was phrased statistically as follows: What is the level of compatibility between the rankings of schools and the rankings of parents, by school?

Methods of analysis

The analysis comprised the following two stages:

1. For each school-community system, correlations were calculated between average rankings of school heads and average rankings of parents, using Pearson's correlation coefficients (Wilcox, 2005). The analysis was applied to the 44 identical items

ranked by school heads and by parents. The results are presented in Table 2.

2. In order to refine the comparison, a second set of comparisons was applied. The second set compared the five items to which parents gave highest rankings to the mean scores of school heads in each of the above schools. The motivation for this second test was to see how these highly ranked issues compare with the schools' agendas, as expressed in school heads' rankings. A correlation between parents order score and school heads means was calculated using

The comparison between parents' priority rankings for the 5 issues that they considered "most important" and school heads' mean rankings shows low correlations for all four schools. In schools 2 and 4, the correlation is negative. In school 3 the correlation is low and significant.

Conclusion

There is very low agreement between the sustainability agenda of parents and the

Pearson correlation coefficients. The results are presented in Table 3.

Results

Table 2 presents the results of the correlation analyses between rankings of school heads and rankings of parents, by school. Table 3 presents the of correlation analyses between school heads' mean rankings and parents' priority items, by School.

In each school, there is low correlation between the average rankings of school heads and those of parents. In schools 1, 3 and 4 the correlations are significant with $P < 0.05$. The correlation in school 2 is non-significant.

sustainability agenda underlying the sustainability education program of each of the four schools.

Question 2: Do Schools and Parents Form Two Separate Populations?

The statistical question was phrased as follows: Is the difference between parents and school heads in each school-community system greater than the difference between all school heads across the four school-

Table 2. *Correlation Between Average Rankings of School Heads and Average Rankings of Parents, by School*

School number	N (number of questions)	Pearson Correlation Coefficients, Prob > |r| under H_0: Rh0o=0
1	44	r=0.32544 P=0.0311*
2	44	r=0.23474 P=0.1251
3	44	r=0.36339 P=0.0153*
4	44	R=0.30546 P=0.0438*

Table 3. *Correlation Between School Heads' Mean Rankings and Parents' Priority Items, by School*

School number	N (number of items)	Pearson Correlation Coefficients, Prob > |r| under H0: Rho=0
1	44	r=0.13451 P=0.3840
2	44	r=-0.12181 P=0.4309
3	44	r=0.36848 P=0.0139**
4	44	r=-0.00288 P=0.9852

community systems (pooled together) and all parents across all the four school-community systems (pooled together)?

Method of analysis

The phrasing of the section title and question 2 above implies application of an ANOVA to the data. In our case this was not possible, because the dependent variable (the ranking on the Likert scale) was not normally distributed. Thus, an alternative, indirect method of analysis was applied: logistic regression with overdispersion (Menard, 2002). This method can be used to evaluate the degree of homogeneity among school heads across the four schools and among parents across the schools.

Binary (or binomial) logistic regression ($Y_i \sim bin(n_i, p_i)$) is a form of regression that is used when the dependent variable is a dichotomy and the independent variables are of any type (Menard, 2002). In this case, the dependent variable is school heads' rankings or parents' rankings; and the independent variable is school number. The assumptions are as follows: $H_{0(1)}$ = There is no difference between school heads of different schools; $P \geq 0.05$. $H_{0(2)}$ = There is no difference between parents of different schools; $P \geq 0.05$.

All dependent variables (school heads' rankings and parents' rankings) were split into two to form a binary setup. Each one of the 44 rankings of school heads and parents was allocated to a group of 0, or alternatively to a group of 1: 0 if the item's ranking is 1, 2 or 3; 1 if the item's ranking is 4 or 5. This binary split enabled us to answer the following questions:

1. To what degree are school heads of all schools homogeneous regarding issues that are important to them?

2. To what degree are parents of all schools homogeneous regarding issues that are important to them?

The method's limitation is that it does not provide information regarding differences between school heads and parents in each school. The small number of questionnaires obtained from each school's principal and leading teachers (sample size of $N \leq 5$ in each school) creates a limitation in applying

analysis of variance. It is not possible to calculate variances between school heads and parents, and therefore, information on internal differences relies on the analysis of question 1 above, which found low correlations within each school-community system.

Four possible results and conclusions can be considered, as follows (see Table 4 below):

1. There are no differences between the school heads across the four schools and no differences between the parents across the four schools. This result leads to the conclusion that all schools can be pooled together as belonging to one population, and all parents can be pooled together as belonging either to a separate population or to the same population as the school heads. In both cases, the conclusion would be that it is impossible to determine compatibility on the basis of this result.

2. There are no differences between the school heads across the four schools, but there are differences among parents affiliated with different schools. This result leads to the conclusion that there is no compatibility between the agendas of school heads and parents. Parents belong to discrete populations that are not related to their respective schools, and therefore there is no mutual sustainability agenda construction between the schools and the parents.

3. There are differences between the school heads of each school, but no differences between parents across the four schools. In this case, the conclusion is that there is no compatibility between the agendas of school heads and parents and therefore, there is no mutual sustainability agenda construction between the schools and the parents.

4. There are differences between the school heads of different schools, and there are corresponding differences among parents affiliated with different schools. This result leads to the conclusion that there is compatibility between the agendas of school heads and parents, suggesting that schools and parents construct mutual sustainability agendas (pending further verification).

Results

Following are the results of the homogeneity tests:

- The school heads were homogeneous across the four schools with regard to the rankings of almost all issues ($P > 0.05$). The homogeneity of the rankings for 43 out of 44 items ranged between $F = 0.81$ and $F = 1.00$ (maximum). Lack of homogeneity was found in the rankings of one item, number 14

Item 31: "Biodiversity"; $F = 0.99$;
Item 11: "Corporate responsibility and accountability"; $F = 0.98$;
Item 10: "Poverty reduction"; $F = 0.97$;
Item 16: "Green building"; $F = 0.93$;
Item 32: "Organic food"; $F = 0.88$.

The results indicate that there are no differences between the school heads of different schools, and there are also no differences between the parents. The overall results indicate that the difference between

Table 4. *Matrix of Possibilities of Results and Conclusions Regarding Reciprocity in the Construction of Sustainability Agendas*

Are the differences between schools larger than the differences within schools, by school heads and by parents?

Possible results	Differences between larger than within		Statistical results	Analysis conclusions
	by school heads	*by parents*		
1	No	No	• All schools belong to the same population • All parents belong to the same population	Impossible to determine whether schools and parents mutually construct sustainability agendas.
2	No	Yes	• All schools belong to the same population. • Parents in different schools belong to different populations.	Schools and parents do not mutually construct sustainability agendas
3	Yes	No	• Each school belongs to a different population. • All parents belong to the same population	Schools and parents do not mutually construct sustainability agendas
4	Yes	Yes	• Each school belongs to a different population. • Parents in different schools belong to different populations.	It is possible that schools and parents mutually construct sustainability agendas.

("ecology") ($F = 0.0$; $P < 0.01$). Due to the small sample size, results were extreme.

- Parents were homogeneous across schools in terms of the rankings of almost all issues that were important to them ($P > 0.05$). In item 33 ("recycle"), the homogeneity was borderline ($F = 0.11$, at $P < 0.1$). In item 35 ("bio-invasions") parents were not homogeneous ($F = 0.03$, at $P < 0.05$). Parents were most homogeneous on the following 5 items:

school heads and parents within each school is greater than the difference between all school heads across schools and all parents across schools, regardless of school number.

Conclusions

With regard to sustainability agendas,

- the underlying sustainability education programs across the four schools belong to the same population; and

- parents across all four schools belong to the same population.

Two distinct populations were found, with a possibility that the two populations are influenced and informed by different sources.

Question 3: Which of the Two Groups, Parents or Schools, Deviates More from the Chosen Reference Point of the UN DESD IIS Perspectives?

The statistical question was phrased as follows: When examining issues on which schools and parents are least in agreement, which of the two groups is closer in agenda to

parents and school heads were least in agreement. In the second stage, the data was regrouped into five categories representing five levels of agreement with the 15 perspectives of the UN DESD IIS. The levels of agreement were totaled across all schools for school heads and for parents separately. For each perspective, the difference between the sum of scores of parents and that of school heads was calculated and plotted on a bar chart (see Figure 1).

Results

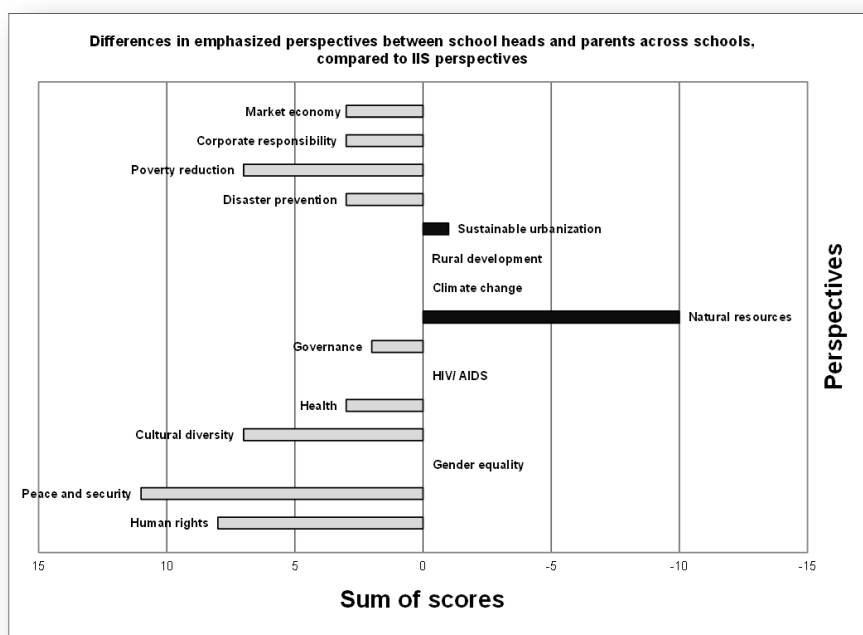Issues in which school heads and parents gave the most disparate rankings were

Figure 1. *Differences in disparate rankings of school heads and parents in reference to UN DESD IIS perspectives*

the chosen reference point?

Methods of analysis

The analysis included listing the 15 perspectives drawn out of the UN DESD IIS (2005-2014). The strategic perspectives were presented as main issues to be addressed in efforts to achieve sustainability through education (UNESCO, 2005). These perspectives were chosen as a useful reference point for comparing the rankings of school heads and parents on issues in which they were most dissimilar. The data underwent two stages of processing. In the first stage, we identified issues on which

analyzed in comparison to the 15 strategic perspectives of the UN DESD IIS. Figure 1 presents the difference in scores between parents and school heads for each perspective. The vertical X axis presents the 15 strategic perspectives. The horizontal Y axis presents the net difference between parents and school heads calculated over all schools. If, for a given perspective, parents over all four schools received higher scores compared with the school heads over the four schools, the difference is presented in a bar to the left of the vertical X axis. In this case the sum of scores on the Y axis appears as a

positive number (plus sign). If, for a given perspective, school heads received a higher score than did parents, the difference is presented in a bar to the right of the vertical X axis. In this case, the sum of scores on the Y axis appears as a negative number (minus sign). The title of each strategic perspective is written next to the corresponding bar on the plot.

Figure 1 reveals that in cases of strong disagreement between parents and school heads, an analysis of the disagreements vis-à-vis the framework of UN DESD IIS perspectives leads to the following observations:

• Across all four schools, parents ranked the following perspectives higher than did school heads: "human rights," "peace and human security," "cultural diversity and intercultural understanding," "health," "governance," "disaster prevention and mitigation," "poverty reduction," "corporate responsibility and accountability," and "market economy." The largest gap was found for the perspective "peace and human security" (11 points difference).

• School heads ranked the following perspectives higher than parents did: "natural resources" and "sustainable urbanization."

The largest gap was found for the perspective "natural resources" (10 points difference).

• Parents gave high rankings and school heads gave low rankings to most of the socio-cultural perspectives and all of the economic perspectives.

• School heads ranked two of the environmental perspectives higher than parents did.

Conclusions. When comparing the UN DESD IIS perspectives to the sustainability agenda issues of parents and the sustainability agenda issues underlying the four schools' sustainability education programs, the results indicate that the sustainability agenda of parents is much more aligned with the UN's perspectives than are schools' sustainability agendas. This implies that parents perceive sustainability along a much broader spectrum than schools do.

Question 4: What Do the Four Schools Actually Teach with Regard to Sustainability?

The statistical question was phrased as follows: For the issues that schools ranked highest, what is the frequency distribution of these issues across "socio-cultural," "environmental," and "economic" themes?

Table 5. *The ten most important issues in the sustainability education program, by school*

Degree of importance	School 1	School 2	School 3	School 4
1	Air quality	Recycling	Health and diseases	Water and water quality
2	Recycling	Ecology	Green building	Health and diseases
3	Nature conservation	Nature conservation	Animal protection	Climate change
4	Waste	Resource conservation	Climate change	Resource conservation
5	Ecology	Waste	Air quality	Recycling
6	Resources conservation	Animal protection	Water quality	Air quality
7	Ecological gardening	Biodiversity	Urban nature	Cleanliness
8	Water and water quality	Open space conservation	Recycling	Animal protection
9	Animal protection	Sustainable consumerism	Waste	Waste
10	Health and diseases	Corporate responsibility and accountability	Sustainable consumerism	Ozone depletion

Methods of analysis

To answer the above question and to gain insights into the main focuses of schools' sustainability education programs, we analyzed schools' agendas by comparing them to the three major themes of sustainability: "socio-cultural", "economic" and "environmental". We began by allocating each of the 44 items in the questionnaire to one of the three themes. We then evaluated how the sustainability issues that received high rankings from school heads were distributed across the three themes.

Results

Table 5 summarizes the 10 most important issues in the sustainability education program, by school.

Legend: Unshaded: Environmental issues; Light grey shading: socio-cultural issues; Dark grey shading: economic issues

Issue number 1 was ranked as most important; issue number 10 was ranked as the least of the 10 most important issues.

The distribution of rankings across sustainability themes in the four schools is as follows:

School 1: 1 item within the "socio-cultural" theme, 9 items within the "environmental" theme, and no items within the "economic" theme.

School 2: 1 item within the "socio-cultural" theme, 8 items within the "environmental" theme, and 1 item within the "economic" theme.

School 3: 1 item within the "socio-cultural" theme, 8 items within the "environmental" theme, and 1 item within the "economic" theme.

School 4: 1 item within the "socio-cultural" theme, 9 items within the "environmental" theme, and no items within the "economic" theme.

Only two schools (schools 3 and 4) ranked "climate change" as a main issue in the sustainability education program.

Figure 2 presents the distributions of the three major sustainability themes ("environmental," socio-cultural" and "economic"), by school.

Figure 2 shows that in each of the four schools, 80%–90% of the sustainability education program relates to environmental issues, whereas only 10%–20% of the program relates to "socio-cultural" or "economic" issues.

Conclusions

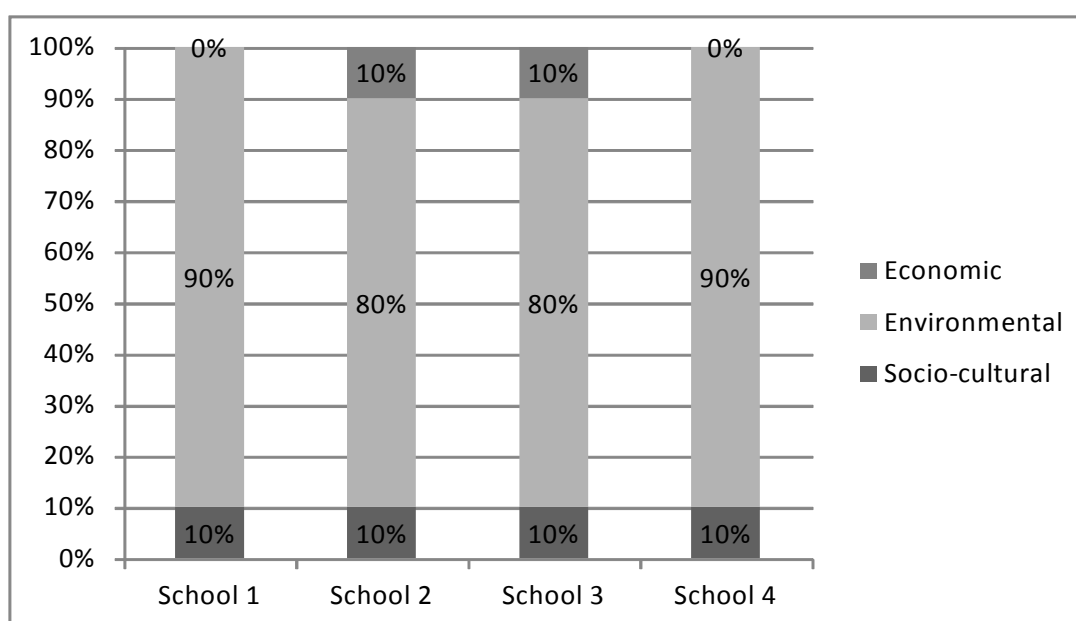The schools in our sample focus mainly on

Figure 2. *Percentage of each sustainability theme's presence within the learning program, by school.*

concrete environmental issues in their sustainability programs. The gap that was found between the agendas of parents and schools can be mostly attributed to predominance of environmental issues over other issues in the sustainability education programs that are implemented in the four schools. Compared with the relatively narrow agendas underlying schools' educational programs, the parents' agendas (or worldviews) are much more comprehensive.

The schools showed a tendency to avoid complex issues involving multiple themes, such as the topic of climate change. Two schools did not teach the topic at all, and two schools that reported teaching climate change in effect taught about the technical mechanism of the "greenhouse effect" (information obtained through interviews). This result is surprising in light of the fact that climate change is currently considered to be the world's most urgent threat to the resilience of societies, economies, cultures and the environment (Ban, 2007; Intergovernmental Panel on Climate Change, 2007; Klemperer, 2009; The World Bank, 2010a; The World Bank, 2010b). Evidence indicates that climate change is already affecting and is expected to have increasing effects on the lives of billions in aspects of health, security, economy, culture and other areas related to human existence (Cooper, 2000; UNEP, 2012).

Discussion

The present study provides empirical results regarding the outcomes of school-community partnership in sustainability education programs. Specifically, it compares schools' sustainability agendas with those of students' parents, as an indication for reciprocal processes within the partnership.

The results indicate that there is no compatibility between the sustainability agendas of schools' programs and the sustainability agendas of parents. Schools and parents in our sample belong to two different populations with regard to their sustainability agendas. Furthermore, we find that while schools mainly teach environmental topics, parents' sustainability agenda is more aligned with the perspectives of the UN DESD IIS

(UNESCO, 2005). In what follows, we will discuss the major findings of the study, as follows: the barrier between schools and parents; the meanings that can be drawn from the proximity between the parents' agenda and the IIS perspectives; the contents of the schools' sustainability education programs; and the characteristics of the school-community partnerships evaluated in this study.

Analyzing the Barrier Between Schools and Parents

This study found no evidence of mutual school–community construction of a local sustainability agenda. The analyses revealed two distinct populations of parents and schools, with a "barrier" of interactive influences between them. This result raises the following questions: How can the two populations be characterized with regard to the sources of influence on their agendas? Following are some suggested explanations.

School population

Schools were overall highly homogeneous with regard to their underlying sustainability agenda. This finding is surprising due to the schools' dispersed geographical locations and the differences in their local activities with their communities.

Each of the participating schools was obligated by Israel's "Green School" accreditation system to relate to its local community and made efforts to do so. The schools also related to their local environments. For example, school 1 made regular visits to a nearby farm; school 2 adopted a nearby creek; school 3 adopted an urban park that was maintained as a nature reserve; and school 4 made frequent visits to a nearby hill. These differences and others were not reflected in the schools' agendas. Rather, schools were implementing a unified program with regard to the 44 analyzed sustainability issues.

One possible means of explaining this uniformity could be from an organizational point of view. Organizationally, schools are subject to the supervision of the Ministry of Education. The sustainability education program is subject to the supervision of the Ministry of Environmental Protection. These

are the two main sources from which schools derive their educational agendas. From an administrative point of view, it is likely that schools will be more influenced by their ministries than by their communities. In terms of sustainability agenda, all four schools reflect in their sustainability education programs the agendas of their ministries, as conveyed to them by the accreditation system, administrative directives, written programs, teachers' workshops, and other means. It is therefore suggested that the four schools belonged to a single population defined by the ministries' sustainability education agenda.

The UNECE Strategy for Education for Sustainable Development (UNECE, 2009) highlighted the limitations caused by centralistic approaches to sustainability education in formal education systems. The strategy stressed this problem particularly in reference to Eastern Europe, the Caucasus and Central Asia, in which "[s]ubjects, approaches and methods are directed by high-level bodies, leaving little room for …schools.. to create and follow a path leading to a more emancipatory, multi-stakeholder process" (p. 39). The present study's results provide grounds to extend the UNECE observation to the Israeli sustainability education implementation system, as well. The current centralized approach could be contributing to diverting schools' attention and energy towards fulfilling the ministerial requirements and expectations, thus emptying the school-community partnership of any real meaning. From a school's perspective, it is the ministerial requirements that count, rather than the local community's input and interests.

Parents' population

Parents affiliated with the four schools were highly homogeneous, despite their dispersed locations. The lack of expression of local community agendas in the study's results raises questions regarding a community's geographical and social boundaries in the context of sustainability agenda. The families affiliated with the four schools were all members of middle- to high socio-economic clusters. Thus, the parents of the students,

though geographically remote, shared many of their influence sources, such as the media, workplaces, educational background, culture and experiences. In addition, the study was carried out in Israel, which is geographically a small country. All urban communities that participated in the study share many of the problems that are typical to urban life in Israel. It seems that the number of shared characteristics was much greater than the variables that could potentially distinguish one group of school-community parents from the others. This effect was probably exacerbated by the above effect of centralized administration, which distances schools from their communities, as well as by the nature of schools' interactions with their communities, as discussed in what follows.

The sampling criteria combined with the study's findings allow us to characterize the parents' population affiliation, as follows: (a) ranging between secular to religiously observant (the sampled schools were non-religious Jewish state schools); (b) middle- to high socio-economic cluster (defined by the schools' location and the parents' socio-economic cluster membership); (c) living in urban communities with loose local ties (as revealed by the study's results); and (d) possessing high connectedness to the state's affairs and to global affairs (as revealed by the strong compatibility between parents' agendas and the perspectives of the UN DESD IIS).

In light of these findings, it is possible to assume that the scale in which we are searching for local contextualized agendas could be too small. Perhaps differences can only be observed on a larger scale or by comparing communities characterized by more extreme social differences, such as Arab communities versus Jewish communities, or rural communities versus urban communities.

Analyzing the Proximity Between the Parents' Agenda and the IIS Perspectives

The findings revealed that the parents' sustainability agenda was very closely related to the UN DESD IIS perspectives, whereas the schools' programs were mainly confined to environmental perspectives. Gough (2006) has drawn attention to the gap between the

IIS perspectives and schools' education programs. In the presented context, the observed gap between the programs' implemented agenda and the expected agenda as defined by the IIS raises a question regarding the applicability of the UN perspectives to school settings. In particular: to what degree do the perspectives form realistic expectations of primary schools? The findings give credence to the idea that the IIS perspectives were written by adults and for adults. They seem to resonate strongly with the sustainability agenda of the adults in the present study, but are almost completely unrelated to the reality of the primary schools in the sample. This substantial gap calls into question the value of the IIS as a directive for the DESD (UNESCO, 2005) with regard to implementing sustainability education within primary-school settings. Future global initiatives for sustainability education strategic planning might benefit from implementing more participatory approaches, involving school teachers and students, thus perhaps increasing the chances of schools to actually achieve the goals outlined in national and international strategic documents.

It is interesting to note that in a few interviews that we held with parents regarding their worldviews, none of them mentioned the term "sustainability" with reference to their agenda. But when we interviewed school heads, they all referred to their schools' educational programs as "sustainability education". In effect, the study suggests a different perspective. We found that our sampled schools teach mainly environmental science, whereas parents contemplate sustainability. The schools' perspectives regarding sustainability education are elaborated in the following section.

The Contents of the Schools' Sustainability Education Programs

The findings from the four sampled schools in our study reaffirmed findings of previous international reports regarding the contents of schools' sustainability education programs. The UNECE Strategy for Education for Sustainable Development (UNECE, 2009) reports that "*with regard to the type of themes, it is the environmental component of*

[education for sustainable development (ESD)] that is largely addressed" (p. 33). The UNESCO Review of Contexts and Structures for Education for Sustainable Development (Wals, 2009) reiterates these findings, specifying the main school topics as follows: "*Key content themes which are emphasized within ESD-related frameworks all over the world are the more traditional environmental ones such as: health, water, natural resource management (water, soil, mineral and fossil fuel) and loss of biodiversity*" (p. 49). The present study confirms these findings once again (see Table 5). Only two of the schools in our sample teach climate change. Analysis of the contents of the teaching in these schools reveals that climate change is mentioned briefly as a term, with no in-depth discussion of drivers and processes.

These findings raise two major questions: (a) What can be considered to be reasonable expectations from primary sustainability education in terms of children's cognitive and emotional preparedness to deal with the world's highly complex challenges? (b) What are the possible barriers towards achieving the expected sustainability curricula?

With regard to the first question, research in cognitive psychology provides some initial boundaries for the extent of age-appropriate complexity. According to Piaget, the formal operational stage would only begin to appear towards the end of primary school (Piaget, 1995). It could therefore be argued that young children are not yet ready to deal with the full complexity of climate change (Eylon & Linn, 1988; Hassard, 1992) and other complex sustainability issues.

As regards barriers to implementation, extensive research has been carried out with the goal of identifying barriers. These include issues of teachers' preparedness (Cutter-Mackenzie & Smith, 2003; Robinson & Crowther, 2001; Taylor, Nathan, & Coll, 2003) and others. In the present context we would like to draw attention to the nature of school-community interactions as an additional possible source of barriers, as well as a plausible direct cause for the school-community sustainability agenda gap. The nature of the partnerships between schools

and their communities is discussed in what follows.

School–Community Partnership

Regardless of the fact that all sampled schools were interacting with their communities, fundamental gaps were found between school and community sustainability agendas. Schools and parents formed two distinct populations that each traversed geographical boundaries. Our informal observations during the study enable us to suggest an explanation, requiring further investigation. In observed interactions between schools and parents, schools perceived themselves as experts. Their interactions with their communities can be characterized as imparting information and expectations to parents in a top-down unidirectional manner, leaving parents at the receiving end. We have not witnessed bi-directional discussions or parents' involvement in the development of the sustainability education program. Using Arnstein's scale of participation, the observed participation was at the lower end of the scale, referred to as "tokenism" (Arnstein, 1969), or "artificial involvement" as described by Tal (2004). Churchman and Sadan (2003) claim that feedback from the participating party is what creates participation. Bi-directional participation can increase education, social change, and personal change (Alterman & Churchman, 1991). We suggest that the lack of bidirectional approaches within the partnerships may have constituted a barrier, inhibiting mutual local sustainability agenda development and enrichment of the curriculum.

Offsetting this track of polarization requires concerted efforts on the part of multiple entities involved in establishing sustainability education programs. It requires changes deriving both from the top down and from the bottom up. On the upper managerial level, the highly centralized management system in Israel needs to move towards increasing schools' autonomy and towards allowing a localized curriculum development. Schools, in turn, need to develop more participatory relationships with their communities in order to become locally

relevant. Schools need to move away from the role of experts and adopt a discursive relationship in which local issues are perceived as complex and debatable.

Applicability and Limitations of the Study's Results

The high level of disparity found in the present study, between primary schools' sustainability curricula and the sustainability agendas of the broader communities in which schools operate, needs to draw attention to the relevancy of school curricula and to the roles schools take on within their communities. The study's results may inform education practitioners and researchers regarding the impact of rigid curricula on transformative approaches in sustainability education.

The present study was carried out among a small sample of four Israeli urban schools and their communities. The applicability of the results is therefore limited. Yet, we assume that the four school-community systems do provide important insight into the nature of the relationships between many other Israeli urban schools and their communities. This assumption is supported by two main sources. The first is the very high levels of homogeneity that we found among schools at different locations and among parents living in different cities. The second source is a study by Ruiz-Mallén and colleagues (2009) comparing Mexican students' local knowledge to the school knowledge. Though the two studies were carried out in different countries, used different methodologies, and investigated different aspects of sustainability education, similar results were obtained. Both studies reveal significant gaps between schools and their communities with regard to sustainability education.

The present study's results provide grounds for further investigation of questions such as:

1. What is the extent of applicability of the results, obtained from urban communities, to other school-community settings in Israel and worldwide?

2. In cases in which large gaps exist between schools and their communities, what

are the conditions that nurture these gaps and enable their perpetuation?

3. What are the implications of profound sustainability agenda gaps with regard to the effectiveness of sustainability education programs carried out by schools?

4. How do gaps in sustainability agendas between parents and schools affect students' constructivist processes of "making meanings" related to sustainability issues?

Further investigation is also required in order to elucidate the relationships between highly centralized educational administration and schools' positioning within their communities. Such investigation will contribute to the understanding of the various conflicting forces that shape today's schools' internal learning environments and their external relationships.

In order to provide answers to the above questions, it is recommended that future studies include samples from diverse groups representing diverse segments of society. Analysis based on such samples would lend itself to broad generalizations and would afford better understanding of the various ways in which schools and their communities may construct their sustainability agenda.

References

Alterman, R., & Churchman, A. (1991). *Israel's neighborhood renewal program: The great experiment and its lessons*. [Hebrew]. Haifa, Israel: Samuel Neaman Institute Books, Technion.

Armstrong, P., & Bottomley, E. (2003). Sustainable schools program – A one-stop shop for sustainability education. Paper presented at the Annual Conference of the North American Association for Environmental Education, Anchorage, AK. Retrieved 10 March, 2011 from http://naaee.org/conferences/alaska/procee dings_2003.pdf.

Arnstein, S. (1969). A ladder of citizen participation. *Journal of the American Institute of Planners*, *4*, 216–224.

Australian Government Department of Environment, Water, Heritage, and the Arts. (2009). *Living sustainably: The Australian Government's national action plan for education for sustainability*. Canberra, Australia: Commonwealth of Australia, Department of the Environment, Water, Heritage and the Arts.

Australian Government Department of Sustainability, Environment, Water, Population and Communities. (2011). *The Australian Sustainable Schools Initiative (AuSSI)*. Canberra, Australia: Commonwealth of Australia. Retrieved on 10 March, 2012 from http://www.environment.gov.au/education/ aussi/index.html.

Ban, K.-M. (2007). *My priorities as Secretary General*. Retreived 28 September, 2011 from http://www.un.org/sg/priority.shtml.

Battles, D., Reichard, J. S., Rich, F. J., & Franks, M. E. (2001). Environmental literacy for all students: assessment of environmental science courses in a new core curriculum. Paper presented at Geographical Society of America Annual Meeting, Statesboro, GA, USA.

Bluhm, W., Hungerford, H. R., McBeth, W., & Volk, T. L. (1995). The middle school report: A final report on the development and pilot assessment of the middle school environmental literacy instrument. Unpublished research paper, Southern Illinois University at Carbondale, Carbondale, IL.

Bogan, M. B., & Kromrey, J. D. (1996). Measuring the environmental literacy of high school students. *Florida Journal of Educational Research, 36*(1). Retrieved on 6 February, 2013 from http://www.coedu.usf.edu/fjer/1996/1996_ Bogan.htm.

Breiting, S., Mayer, M., & Mogensen, F. (2005). *Quality criteria for ESD-schools: Guidelines to enhance the quality of education for sustainable development*. Vienna, Austria: SEED - Austrian Federal Ministry of Education, Science and Culture.

Churchman, A., & Sadan, E. (2003). *Participation: Your way to make a difference*. [Hebrew]. Tel Aviv, Israel: Hakibbutz Hameuchad.

Cooper, R. N. (2000). International approaches to global climate change. *World Bank Research Observer*, *15*, 145-172.

Culen, G. R., & Mony, P. R. S. (2003). Assessing environmental literacy in a nonformal youth program. *Journal of Environmental Education*, *34*, 26-28.

Cutter-McKenzie, A., & Smith, R. (2003). Ecological literacy: The 'missing paradigm' in environmental education (part one). *Environmental Education Research*, *9*, 497-524.

Disinger, J. F., & Tomsen, J. L. (1995). Environmental education research news. *Environmentalist*, *15*, 3-9.

Dunlap, R. E., & Van Liere, K. D. (1978). The "new environmental paradigm": A proposed measuring instrument and preliminary results. *Journal of Environmental Education*, *9*, 10-19.

Dunlap, R. E., Van Liere, K. D., Mertig, A. G., & Jones, R. E. (2000). Measuring endorsement of the new ecological paradigm: A revised NEP Scale. *Journal of Social Issues*, *56*, 425-442.

Eylon, B. S., & Linn, M. C. (1988). Learning and instruction: An examination of four research perspectives in science education. *Review of Educational Research*, *58*, 251-301.

Fien, J., & Tilbury, D. (2002). The global challenge of sustainability. In D. Tilbury, R. B. Stevenson, J. Fien, & D. Schreuder (Eds.), *Education and sustainability: Responding to the global challenge* (pp. 1–12). Gland, Switzerland: IUCN, 2002.

Gough, A. (2006). A rhetoric-practice gap: The DESD Agenda and sustainable schools. Draft paper presented at the 10th APEID International Conference on Learning Together for Tomorrow: Education for Sustainable Development, Bangkok, Thailand, 6-8 December.

Guevara, J. R., King, J., Harris, J., & Toomey, R. (2008). ResourceSmart schools. Working paper.

Hassard, J. (1992). *Minds on science*. New York, NY: Harper-Collins.

Hines, J. M., Hungerford, H. R., & Tomera, A. N. (1986/87). Analysis and synthesis of research on responsible environmental behavior: A meta-analysis. *Journal of Environmental Education*, *18*, 1-8.

Hsu, S. J. (2004). The effects of an environmental education program on responsible environmental behavior and associated environmental literacy variables in Taiwanese college students. *Journal of Environmental Education*, *35*, 37–48.

Hsu, S. J., & Roth, R. E. (1998). An assessment of environmental literacy and analysis of

predictors of responsible environmental behavior held by secondary teachers in the Hualien area of Taiwan. *Environmental Education Research*, *V*, 229-249.

Hungerford, H.R., & Volk, T.L. (1990). Changing learner behavior through environmental education. *Journal of Environmental Education*, *21* (3), 8-21.

Intergovernmental Panel on Climate Change (IPCC). (2007). Climate change 2007: Synthesis report. Contribution of working Groups I, II and III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change. Geneva, Switzerland: IPCC.

Israel Central Bureau of Statistics. (n. d.). Retrieved on 13 September, 2012 from http://www.cbs.gov.il/reader.

Israel Ministry of Environmental Protection. (n. d.) *Education*. Retrieved on 13 September, 2012 from http://english.sviva.gov.il/bin/en.jsp?enPage=e_BlankPage&enDisplay=view&enDispWhat=Zone&enDispWho=sub_edu&enZone=sub_edu.

Kilpatrick, S., Johns, S., Mulford, B., Falk, I., & Prescott, L. (2002). *More than an education: Leadership for rural school-community partnerships*. Canberra, Australia: Rural Industries Research and Development Corporation.

Klemperer, P. (2009). What is the top priority on climate change? In H.-J. Schellnhuber, M. Molina, N. Stern, V. Huber, & S. Kadner (Eds.), *Global sustainability* (pp. 233-242). New York, NY: Cambridge University Press.

Marcinkowski, T. J. (1988). An analysis of correlates and predictors of responsible environmental behavior. Unpublished doctoral dissertation, Southern Illinois University, Carbondale, IL.

Marcinkowski, T. J. (1991). The relationship between environmental literacy and responsible environmental behavior in environmental education. Unpublished paper, Florida Institute of Technology, Melbourne, FL.

Marcinkowski, T. J., & Rehring, L. (1995). *The secondary school report: A final report on the development, pilot testing, validation, and field testing of the Secondary School Environmental Literacy Assessment Instrument*. Cincinnati, OH: Office of

Research and Development, U.S. Environmental Protection Agency.

Mayer, M. (2004). What can we do in schools for ESD? Reflections and proposals from the ENSI International Network. In *Quality environmental education in schools for a sustainable society: Proceeding of an international seminar and workshop on environmental education* (pp. 135–151). Cheongju, China: Cheongju National University of Education.

McBeth, W. C. (1997). An historical description of the development of an instrument to assess the environmental literacy of middle school students. Unpublished doctoral dissertation, Southern Illinois University at Carbondale, Carbondale, IL.

McKenzie, L. (1991). *Adult education and worldview construction*. Malabar, FL: Krieger.

McKeown, R., Hopkins, C. H., Rizzi, R., & Chrystabridge, M. (2002). Education for sustainable development toolkit. Knoxville, TN: Energy, Environment and Resource Center, University of Tennessee.

Menard, S. W. (2002). *Applied logistic regression analysis*, 2nd ed. Thousand Oaks, CA: Sage Publications.

Mogensen, F., & Mayer, M. (2005). *ECO-Schools - Trends and divergences: A comparative study on ECO-School development processes in 13 countries*. Vienna, Austria: Austrian Federal Ministry of Education, Science and Culture.

Norton, B. G. (1991). *Toward unity among environmentalists*. New York, NY: Oxford University Press.

Piaget, J. (1995). *Sociological studies*. London, UK: Routledge.

Posch, P. (1999). The ecologisation of schools and its implications for educational policy. *Cambridge Journal of Education*, *29*, 341-348.

Robinson, M., & Crowther, D. (2001). Environmental science literacy in science education, biology, and chemistry majors. *The American Biology Teacher, 63*, 9-14.

Roth, C. E. (1992). *Environmental literacy: Its roots, evolution and direction in the 1990s*. Columbus, OH: ERIC Clearinghouse for Science Mathematics and Environmental Education.

Ruiz-Mallén, I., Barraza, L., Bodenhorn, B., & Reyes-Garcìa, V. (2009). School and local environmental knowledge, what are the links? A case study among indigenous adolescents in Oaxaca, Mexico. *International Research in Geographical & Environmental Education*, *18*, 82-96.

Sia, A. P. (1984). An investigation of selected predictors of overt responsible environmental behavior. Unpublished doctoral dissertation, Southern Illinois University, Carbondale, IL.

Tal, R. T. (2004). Community-based environmental education - A case study of teacher-parent collaboration. *Environmental Education Research*, *10*, 523-539.

Taylor, N., Nathan, S., & Coll, R. (2003). Education for sustainability in regional New South Wales, Australia: An exploratory study of some teachers' perceptions. *International Research in Geographical & Environmental Education*, *12*, 291-311.

The National Environmental Education & Training Foundation (NEETF), & Roper Starch Worldwide. (1997). *The National Report Card on Environmental Knowledge, Attitudes and Behaviors*. Washington, DC: NEETF.

The National Environmental Education & Training Foundation (NEETF), & Roper Starch Worldwide. (1998). *The National Report Card on Environmental Knowledge, Attitudes and Behaviors*. Washington, DC: NEETF.

The World Bank. (2010a). *Urban development and local government. Cities and climate change: An urgent agenda*. Washington, DC: The World Bank.

The World Bank. (2010b.) *World Development Report: Development and climate change. The international bank for reconstruction and development*. Washington, DC: The World Bank.

United Nations Economic Commission for Europe (UNECE). (2009). *Learning from each other: The UNECE strategy for education for sustainable development*. New York, NY, and Geneva, Switzerland: United Nations.

United Nations Educational Scientific and Cultural Organisation (UNESCO). (2005). *United Nations Decade of Education for Sustainable Development 2005-2014:*

Draft International Implementation Scheme. Paris, France: UNESCO.

United Nations Educational Scientific and Cultural Organisation-United Nations Environmental Programme. (1989). Environmental literacy for all. *Connect, XIV*, 1-2.

United Nations Environmental Programme (UNEP). (2012). *GEO5 global environmental outlook. Environment for the future we want*. Vallenta, Malta: UNEP.

Uzzell, D. L. (1999). Education for environmental action in the community: New roles and relationships. *Cambridge Journal of Education*, 29, 397-413.

Wals, A. (2009). *Review of contexts and structures for education for sustainable development. United Nations Decade of Education for Sustainable Development (DESD, 2005-2014)*. Paris, France: UNESCO.

Wilcox, R. R. (2005). *Introduction to robust estimation and hypothesis testing*. Amsterdam, The Netherlands: Academic Press.

Wisconsin Center for Environmental Education (WCEE), Wisconsin Department of Public Instruction (WDPI) and Wisconsin Environmental Education Board (WEEB). (1993). *Environmental survey of high school students in Wisconsin*. Stevens Point, WI: Wisconsin Center for Environmental Education, University of Wisconsin-Stevens Point.