



From “Hesitant” to “Environmental Leader”: The Influence of a Professional Development Program on The Environmental Citizenship of Preschool Teachers

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ABSTRACT

This study investigated the influence that the “Environmental Leadership Professional Development” program had on preschool teachers. The program’s aim is to enhance environmental awareness, thus developing environmental citizenship and leadership. The program offered experiential and reflective learning, meetings with environmental researchers and educators, discussions, a course website, and most uniquely, an environmental venture exemplifying active environmental leadership and citizenship conducted by the learners and accompanied by intensive professional support. Data sources included questionnaires presented before, immediately after, and one year after the program, and the portfolios documenting the venture’s processes and outcomes. The qualitative evidence attests to affirmative change among the participants, who demonstrated personal growth and empowerment as educators and leaders, even a year after the program ended. The results indicate that the “Environmental Leadership Professional Development” program may serve as a professional development model for empowering teachers to become both environmental leaders and environmental citizen role models.

Keywords: early childhood education, environmental citizenship, environmental leadership, preschool teachers, professional development, self-empowerment.

INTRODUCTION

Nowadays, early education frameworks are expected to incorporate Environmental Education (EE). However, little is known about early childhood educators’ preparation, knowledge, and attitudes about EE, or their confidence in implementing such educational practices (Crim, Desjean-Perrotta, & Moseley, 2008; Rice, 2003). Our study aimed to investigate the processes of change experienced by preschool teachers who took part in a unique professional

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State of the literature

- It has been suggested that to foster environmental citizenship successfully in pre-schoolers, teachers require constant guidance and extensive training to enhance their environmental knowledge, awareness, and dispositions. However, little work in early childhood education has examined professional development for preschool teachers to this aim. This study presents recommendations for an efficient professional development course design.
- Even when a change in attitude is detected following a professional development environmental course, actual implementation of pro environmental actions on the part of the teacher is rare.
- Studies concerning actual activism and circles of influence among preschool teachers are scarce.

Contribution of this paper to the literature

- Well-designed professional development programs that stress professional growth and self-efficacy can empower preschool teachers to become leaders in environmental education. Studies concerning actual environmental activism and circles of influence among preschool teachers are scarce.
- Our PD program was unique as it included not only lectures and workshops, but involved participants in a venture program supported by environmental professionals and that affected their communities.
- When teachers discover within themselves the ability to make change and achieve higher-order goals, they exhibit long-term commitment, not only to environmental education but to extra-role behavior dedicated to making real change within their "circles of influence."

development (PD) program that sought to develop environmental literacy among the participants and to steer them not only toward classroom implementation, but also toward activism and environmental citizenship and leadership.

Environmental citizenship

Environmental citizenship involves both human nature and inter-human relationships (Dobson, 2003; Mason, 2009; Middlemiss, 2010). Various researchers and theorists have emphasized different attributes of environmental citizenship (e.g. Bell, 2013; Berkowitz, Ford, & Brewer, 2005; Dobson, 2010). There is agreement that an environmental citizen is a person who is aware of environmental issues, has relevant knowledge and skills, understands cause-response relationships in the environment, and takes responsible environmental action (Dono, Webb, & Richardson, 2010; Machin, 2012). However, studies show that it is not easy to shift from willingness-to-act to actual activism (Skamp, Boyes, & Stanisstreet, 2013), especially when one has to define what constitutes activism. Stern (2000) suggested four types of environmentally significant behaviors: (1) environmental activism – active involvement in environmental organizations and demonstrations; (2) non-activist behaviors in the public sphere – behaviors that affect the environment indirectly, by influencing public policies (e.g.,

petitions, donating to environmental organizations); (3) private-sphere environmentalism - having an environmental impact through the purchase, use, and disposal of personal and household products; and (4) other environmentally significant behaviors - influencing the actions of organizations to which an individual belongs.

Environmental educators, researchers, and policy makers are uncertain which factors influence pro-environmental behavior (Gottlieb, Vigoda-Gadot, & Haim, 2013; Togridou, Hovardas, & Pantis, 2006), or which tools are most effective for implementing environmental citizenship. Dietz and Stern (2002) classifies "command and control" and "market-based policies" as "old tools," while "education," "provision of information," and "voluntary measures" are considered "new tools."

In considering how to encourage environmental citizenship, Dobson (2010) proposes a number of policy opportunities, including providing greater opportunities for individuals to take part in local, environmental decision-making; creating more opportunities for civic engagement and volunteerism; supporting new tools for community connections; providing greater opportunity for grassroots innovation; increasing the stock of social capital; re-thinking local regulations; making greater use of agents of social change; and bringing the impact of environmental change closer to home.

In this study, we sought to integrate the second of Dobson's (2010) policy opportunities into a preschool teachers' training program, by creating more opportunities for civic engagement and volunteerism. Specifically, the program would direct educators to take pro-environmental action as part of their educational efforts in preschool, and to develop their self-perception as environmental leaders. This approach is based on the value-belief-norm theory.

The value-belief-norm (VBN) theory of environmentalism (Stern, Dietz, Abel, Guagnano, & Kalof, 1999) describes causal ordering of five variables leading to pro-environmental behaviors. The first variable comprises personal values (altruistic, egoistic, and biospheric), which directly affect the three variables of personal beliefs: New Environmental Paradigm (NEP), adverse consequences for valued objects (AC), and perceived ability to reduce threat (AR). These beliefs can impact the fifth variable: pro-environmental personal norms, such as the sense of obligation to take pro-environmental behaviors (i.e., activism, non-activist behaviors in the public sphere, private-sphere environmentalism, and behavior in organizations).

Environmental education

One of the primary goals of EE is to increase motivation for pro-environmental behavior by fostering environmental literacy and environmental citizenship (Péer, Goldman, & Yavetz, 2007). However, many studies report that individuals with high prior motivation who participated in EE programs presented only small gains after the intervention was completed (Moody & Hartel, 2007; Rodriguez, Boyes, & Stanisstreet, 2010), pointing on the complexity of motivation-attitude-behavior relationship (Breunig, Murtell, Russell, & Howard, 2014). In

striving to resolve this complexity, the term “Education for Sustainability” (EfS) replaced the term “EE” more than two decades ago in an attempt to focus on the pedagogies of humans as agents of change (Cupitt & Smith, 2012). Thus, much of EE or EfS research focuses on investigating the conditions and learning processes that develop environmental citizenship (Wals, Brody, Dillon, & Stevenson, 2014).

EE in preschool

The United Nations (UN) declared 2004–2015 as the “Decade of Education for Sustainable Education” (UNESCO, 2005). An international workshop, “The Role of Early Childhood Education for a Sustainable Society,” was co-organized by UNESCO and Göteborg University in 2007 (Pramling, Samuelsson, & Kaga, 2008). However, little discussion was devoted to the ways EfS should be implemented (Hägglund & Samuelsson, 2009). Moreover, most studies have focused on elementary schoolers (Lester, Ma, Lee, & Lambert, 2006; Malandrakis & Chatzakis, 2014), while only occasional studies have been conducted in preschool (Johansson, 2009; Palmer & Suggate, 2004). This might be attributable to general attitudes regarding young children’s cognitive grasp (EE/EfS are perceived as comprising abstract concepts), innocence, and vulnerability (the “troubles” of planet earth might be too worrisome) (Elliott & Davis, 2009). Appropriate pedagogies might solve these concerns (Davis, 2008; Otieno, 2008). Furthermore, early childhood pre-service and in-service teachers often feel hesitant about implementing nature/science activities, as the curricular domain of nature and science is less comprehensible to them (Spektor-Levy, Kesner Baruch, & Mevarech, 2013; Torquati, Cutler, Gilkerson, & Sarver, 2013). One approach to address this lack of confidence is to design effective professional development programs focusing on nature, science, and EE (Torquati et al., 2013).

Teachers’ leadership and empowerment

What characterizes effective leadership? Fullan (2003) specifies five characteristics: (1) teamwork and developing others; (2) drive and confidence; (3) vision and accountability; (4) influencing tactics and politics; (5) thinking styles (i.e., understanding the big picture). Wetzler (2010) describes the educational leader as one who does the following: sets sizeable goals, gets students and their influencers invested in these goals, plans purposefully, executes effectively, continually increases effectiveness, and works relentlessly.

It is not clear what personal and organizational characteristics influence this empowerment (Sweetland & Hoy, 2000), but once attained, it affects professional growth, improves status, and increases knowledge, autonomy, and experience in decision making (Bogler & Somech, 2004; Gordon & Berry, 2006; Leithwood, & Sun, 2012).

What characterizes environmental leaders? Manolis et al. (2008) claim that effective leaders are those who integrate conservation science into policy, management, and society-at-large, while inspiring and nurturing future leaders.

Hargreaves and Fink (2003) added the “Seven Principles of Sustainable Leadership”: (1) create and preserve sustainable learning, (2) secure success over time, (3) sustain the leadership of others, (4) address issues of social justice, (5) develop rather than deplete human and material resources, (6) develop environmental diversity and capacity, and (7) undertake activist engagement with the environment.

How can we encourage preschool teachers to become environmental leaders? This concern is the focus of this paper.

The Environmental Leadership PD Program

To foster environmental citizenship successfully in preschoolers, Schachter (2015) suggests providing constant guidance and extensive training for teachers so as to enhance their environmental knowledge, awareness, and dispositions. However, little work in early childhood education has examined EE-related PD that targets in-service teacher learning, and recommendations for efficient PD design are scarce. To promote these issues, the National Teachers’ Center for the Advancement of Mathematic, Scientific, and Technological Education in Preschool developed a special Environmental Leadership Professional Development (ELPD) Program.

The goal of the ELPD program was to develop environmental citizenship and leadership among preschool teachers. The 120-hour ELPD program comprised 15 face-to-face sessions lasting eight hours each. Between face to face meetings, the course coordinator supported participants and communicated via the web.

The unique features of the Environmental Leadership Professional Development Program

The ELPD program offered experiential and reflective learning, meetings with environmental researchers and educators, group discussions, a collaborative learning platform that included communication tools and reflection tools, and a course website to share teaching materials and ideas. The program included the following five features:

Prosocial and pro-environmental activism. Participants in the PD program were asked to plan an innovative venture related to environmental and sustainability issues. Besides the teacher and the preschoolers, the venture involved a range of societal actors (e.g., parents, local professionals, local businesses, a community organization, and local government). The venture encompassed prosocial values through which people tend to perform behaviors of sharing, helping, or looking after others (Tabernero & Hernandez, 2011). Such a venture simultaneously improves the quality and relevance of the learners’ education and transforms their relationship with the local community (Wals et al., 2014).

Project-based learning (PBL). The venture was designed to incorporate PBL characteristics (Krajcik & Blumenfeld, 2006). These include teamwork, formulated goals, project-planning, a long-term activity, learners’ hands-on engagement in the activities,

documentation, and evaluation. PBL relies on children's interests, motivation, and curiosity. It incorporates academic goals focused on knowledge and skills, as well as intellectual dispositions such as predicting, hypothesizing, persisting, and problem solving (Helm & Katz, 2010).

Empowerment and self-efficacy. Wu and Short (1996), who studied the relationship between teacher empowerment and the commitment and satisfaction they had with their jobs, found that among the six subscales composing the teacher empowerment scale (SPES), professional growth, self-efficacy, and status were the more significant predictors of job commitment. Empowerment and self-efficacy contribute to pro-environmental behaviors as well (Taberero & Hernandez, 2011). In order to enhance teachers' empowerment and self-efficacy, a significant portion of the program (approximately 30% of course hours) was devoted to workshops and discussions under the guidance and supervision of an organizational consultant and a personal development specialist. The aim of these workshops was to enhance teachers' self-efficacy, intrinsic motivation, and acquisition of leadership qualifications.

Greater knowledge - more courage to dare/act. At the pre-service or in-service level, professional development that enhances basic knowledge about natural sciences can help educators anticipate children's questions and their potential avenues of inquiry. Such knowledge may also enhance the educators' confidence and efficacy, thus increasing their enthusiasm for science, nature, and EE (Sobel, 2008). Ultimately, greater knowledge and efficacy could lead to spending more time performing such activities (Torquati et al., 2013). Accordingly, during the ELPD program, much effort was taken to enrich the participants' knowledge regarding, among other things, ecological systems, conservation strategies, and environmental dilemmas.

Place-based approach. Ross and Mannion (2012) suggest that the curriculum should focus on the relationships between teachers, learners, the neighboring community, materials, and places. Teachers should recognize the roles of materials and organisms in the places where they conduct their curriculum making (p. 312). To this end, emphasis was put on a place-based venture. Theoretical knowledge and environmental values were translated into daily practice for the preschoolers, the teacher, the community, and the immediate local population. Since preschool teacher training usually lacks formal scientific and environmental instruction, teachers might not feel confident teaching these topics. However, since teachers likely have some familiarity with their local ecosystems, accessing support from local natural resource agencies could provide additional necessary information and structure to help educators succeed (Torquati et al., 2013). Thus, we encouraged the participating preschool teachers to survey nearby natural and manmade resources and to identify environmental and social problems. They were asked to plan a venture that could solve or minimize the problem through collaboration of the preschool children and teacher with other stakeholders - parents, siblings, neighbors, and other community agents. We postulated that this place-responsive teaching (Mannion, Fenwick, & Lynch, 2013) and the embodied experience of an

environmental venture would strengthen the place-attachment of the children and all those who participated in the venture.

Key objective

In light of the VBN theory (Stern et al., 1999), the main objective of this study was to examine how the Environmental Leadership PD program and the environmental venture influenced the participating preschool teachers' values, beliefs (awareness), and personal norms (declared behaviors) and how these influenced their actual behaviors, namely, their circles of influence and the development of environmental leadership. To the best of our knowledge, and following the literature review, such studies concerning actual activism and circles of influence among preschool teachers are scarce.

METHODOLOGY

Participants

Forty-six preschool teachers took part in the ELPD program, and all were requested to participate in the study. However, only 23 gave their consent for the researchers to analyze their questionnaires and portfolio. Of these 23 teachers, 22 were female, and one male (the great majority of preschool teachers in the country are females). Mean age: 43; mean seniority: 19.6 (SD 6.34).

Data collection

The study applied a mixed (qualitative and quantitative) approach. Data sources included a questionnaire that had been administered at three different times and a documentation portfolio of the venture.

Pro-environmental Awareness and Behaviors Questionnaire (PAB) (based on Tal, Peled, & Abramovich, 2010). A PAB questionnaire was administered to the participants at the beginning of the course (pre-), another at the end (post-), and a third one year later. The questionnaire aimed to verify pro-environmental awareness (values, beliefs) and declared behaviors of participants. It included 4 open-ended questions and 44 Likert-scale items (Likert, 1932; on a scale of 1 = not at all - 4 = very much). Twenty-four of the items expressed attitudes and awareness statements (Cronbach's $\alpha = .87$), such as "Environmental issues should receive a higher national policy priority," and "I believe I can contribute to nature conservation through individual action." The other twenty items expressed behaviors (Cronbach's $\alpha = .87$), such as "When I see litter on the ground, I pick it up and throw it into a garbage can," and "I use rechargeable batteries." In addition, participants were asked to choose one or two of each "awareness" and "behavior" Likert-type statements they most agreed and did not agree with and to justify their choices.

The questionnaires that were given after the ELPD program (post- and one year later) had additional open-ended questions asking the participants to describe whether they had

changed and how they now perceived themselves. The participants were asked to elaborate and relate to the following issues: scientific and environmental knowledge, pro-environmental attitudes, pro-environmental private acts, personal growth, and pro-environmental behavior (within the family, the preschool, and the extended community).

Portfolio documenting the venture's stages and outcomes. Participants were asked to document their environmental venture from the initial stage of looking for an idea, through the various stages of implementation, and during the event itself. Documentation included a work plan, work drafts, final report, photos, children's reactions, associates' reactions, detailed conclusions, and self-reflection.

Data analysis

Quantitative analysis. Participants' responses to the Likert-scale items were entered into an SPSS 19 data file. Each preschool teacher participant was assigned an identification code name. Descriptive statistics included calculation of distribution, mean value for central tendency, and standard deviations for variability. Additional data analysis procedures included a t-test between the pre- and post-tests.

Qualitative analysis. All text of the open-ended questions in the PAB questionnaire, the portfolio, and self-reflections were compiled and analyzed through dedicated content analysis.

Qualitative data from the questionnaire were analyzed in conjunction with the VBN Theory for environmental responsible behavior (Stern, 2000; Stern et al., 1999). VBN theory represents a causal chain, progressing from relatively stable, central elements of personality and belief structure to an individual's responsibility for taking action. Therefore, we analyzed the participants' responses according to this causal chain, and found three levels:

- Level 1: Responses expressing values and beliefs. This basic level was labeled "Declarative Statement."
- Level 2: Responses expressing not only declarative values and beliefs, but also pro-environmental personal norms and/or private sphere behaviors. Level 2 was labeled "Limited Norms and Behaviors."
- Level 3: Responses expressing values, beliefs, personal norms, and activism. Level 3 was labeled "Values, Norms, and Prominent Activism."

Examples of each level can be found in [Table 1](#).

Table 1. Two Examples of Likert-type items chosen by participants, their reasoning, and the coded level of awareness and behavior (1 – Declarative Statement; 2 – Limited Norms and Behaviors; 3 – Values, Norms, and Prominent Activism).

Examples		Awareness	Behavior
1	Likert item	"Each and every person can make a difference in the environment."	"I shower quickly to conserve water."
	Participants' reasoning	Everyone should be responsible for his or her own actions. Every small deed has a significant impact on the environment. [Mira]	I attach a great deal of importance to the matter of water conservation, and I also try to pass this on to my children. We let the cold water in the shower run into a bucket (until it starts getting hot), and use it to water the plants in the garden. [Marsha]
	Coded level	1 Mira expressed a general statement, vaguely implying her understanding about individual responsibility and influence on the environment, yet with no indication how she "makes a difference."	2 Marsha is acting in favor of the environment in her own private sphere. However, her actions, though important, had not been spread further to her community.
2	Likert item	"I am willing to donate NIS 20 (approximately \$5 U.S) out of my own pocket to protect animals in the wild."	"I keep old stuff and old clothes, and give them away to the needy."
	Participants' reasoning	As far as I'm concerned, it's a trivial amount, and if these funds will actually go to protect animals in the wild, we will all gain from it, since the world seeks balance, and if certain animals become extinct, it will wipe out another line of living organisms that may be essential to people and the environment. [Frida]	Sometimes I take part in the swap-market where I live. I collect all the things I don't need at home (all sorts of things) and donate them. Or, I will pass on things I don't need to a friend, or to a needy home (a large family with many kids). I do this for two reasons: A. So they won't be thrown into the garbage, burned, or create a hazard if the clothing is not degradable. B. For humanitarian reasons. [Tania]
	Coded level	3 Frida's justification for donating money relies on comprehensive understanding of the environmental system, recognizing her responsibility towards the environment, and her willingness to take action.	3 Tania expresses values, beliefs, and activism.

The inductive content analysis of the portfolios revealed several attributes. However, in this paper, we will focus on just two: empowerment and circles of influence. The participants' descriptions revealed evidence regarding their sense of personal and professional

empowerment. These descriptions were further analyzed, highlighting three levels of empowerment: minor, limited, extended.

We called the impact or influence that each venture and each preschool teacher had on the immediate local area "Circles of Influence." Content analysis of the environmental venture report exposed the intensity and extent of influence on three levels: Level 1 - the preschoolers and their parents; Level 2 - the preschoolers and two additional circles; Level 3 - the preschoolers and multiple other circles.

Two EE researchers validated the classification and coding of the statements. After two phases of validation and corrections, the inter-judgmental validation process reached 95% agreement.

RESULTS

Pro-environmental awareness and behaviors

Quantitative analysis of the Likert-scale section in the PAB questionnaire revealed the following: pro-environmental awareness and pro-environmental behaviors as assessed by the Likert-type items were pronounced before the course: $M=3.64$ (SD 0.66) and 3.48 (0.72) respectively, and remained unchanged by the ELPD program, 3.59 (0.68) and 3.57 (0.66). These findings indicate that participants were already pro-environmentally motivated prior to the intervention. On a declarative level, they held positive attitudes toward sustainability, expressed reasonable awareness regarding the need to be active and support pro-environmental actions, and agreed with the need to start EE at an early age. However, the qualitative data and the inductive content analysis revealed a different, more complicated reality, with greater diversity among the participants. This methodological peculiarity will be addressed in the discussion section of this paper.

As previously mentioned, participants were asked to choose the statement they most agreed with and a statement they did not agree with from the Likert-type items, and to justify their choices. Their justifications were analyzed in conjunction with the VBN Theory (Stern, 2000; Stern et al., 1999), and levels of awareness and behavior were identified and validated (see two examples in [Table 1](#)).

[Figure 1](#) shows the distribution of the participants' coded responses according the three levels of awareness and behavior, at the beginning of the course (pre-), at the end (post-), and a year later.

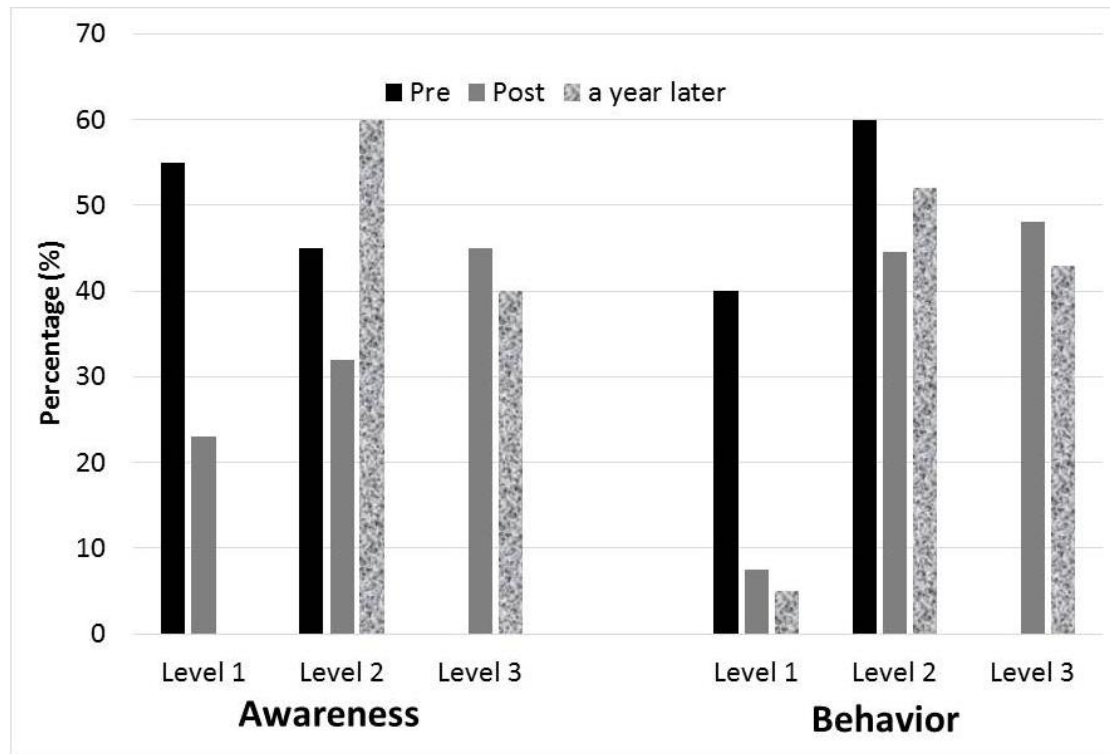


Figure 1. Distribution (in percentage) of participants' responses indicating the level of awareness and behavior at the beginning of the Environmental Leadership Professional Development program, at the end, and a year later (Level 1 – Declarative Statement; Level 2 – Limited Norms and Behaviors; Level 3 – Values, Norms, and Prominent Activism) (N=23).

Figure 1 illustrates the shift in thinking of the participants as a result of the program. Before the program, none of the participants displayed any Level 3 awareness or behavior (i.e., no profound values, prominent willingness to act, or prominent activism), with most having level-1 awareness (55%) and level-2 behavior (60%). In other words, they expressed some concern about the environment and only limited willingness to act before the course. At the end of the program (post-test), almost 50% of the responses corresponded to level-3 awareness, meaning that the participants now exhibited profound understanding, high values, and a deep willingness to act. A year after the program ended, awareness was even more pronounced (level 1 was reduced to zero) and behavior remained almost as high as it had been directly after the program.

Personal empowerment and self-efficacy

On the two post-tests, participants were asked to note whether they had experienced change following the ELPD program. Qualitative analysis revealed three levels of evidence (minor, limited, and extended) of change or personal growth.

Minor evidence. When there was almost no evidence of growth or personal empowerment, the participants' descriptions of personal growth were characterized as superficial or "minor." Such texts were very short, and rare; we found only two examples. The first was Rona's who wrote: *"My own enthusiasm – and the kids' – captured my imagination, and I got creative."* Although Rona stated that she became creative, she left this statement vague without specifying exactly what she did and how these acts empowered her. The other example is Gerry who said: *"Take 100% responsibility for yourself, because it doesn't depend on anyone else's actions or non-actions."* Gerry wrote a slogan that would be appropriate for an advertisement for raising environmental awareness. However, he didn't actually reveal any concrete actions, nor any evidence of being empowered.

Limited evidence. When texts revealed limited description of personal empowerment or a specific change, the participants' personal growth was characterized as "limited." An example of such a statement is the following:

Previously, the attitudes and opinions I had about trends and changes that are happening all over the world were a threat to me. Learning gave me insights, and sometimes neutralized [my] fears. Learning led to thinking about making a behavioral change toward an eco-friendly lifestyle (Frida).

Such accounts constituted 28% of the texts.

Extended evidence. Personal growth was designated as "extended" when participants (63%) wrote rich accounts with prominent evidence of personal growth, along with some attributes of empowerment. Sofia was one of them:

I went through the process of learning about myself and my own abilities. I learned not to underestimate my own value ... to love the environment much more than before ... not to take the environment for granted. For a topic that had been relatively neglected, as far as I was concerned, I rediscovered a gainful, rewarding, and creative enthusiasm. I think that this year has given me the opportunity to express myself, and to revive myself ... I think that the two most important things I managed to reestablish during the course were my curiosity and my sense of wonder.

Empowerment as educator and environmental leader

Qualitative analysis revealed three levels of change:

Minor evidence. Participants' descriptions of change as educators and leaders were characterized as superficial or minor when there was almost no evidence for such a change (13%). For example: *"I learned that if I actually believe that I'm going in the right direction, I can change things and make a difference. I also learned that you get results when you're enthusiastic"* (Adina).

Limited evidence. When texts revealed limited description or revealed a specific change, the participants' personal growth was characterized as limited. Such accounts constituted 13% of the texts, for example:

My role as an educator is to provide the children with the tools and means to engage in learning, and to personally experience collecting and sorting waste materials. I am confident that the child will also take home these values about protecting the environment, and that these are the children who will bring about the change. (Vivian)

Extended evidence. Most participants (74%) wrote rich accounts, with prominent evidence of their acts as leaders, along with some attributes of empowerment. Patty was one of them:

As a project leader, I felt that by being highly motivated, I accomplished what I had set out to do: to make a difference and to get others to take action. As a project leader, I learned that we need to create and encourage environmental leadership and activism in order to trigger the change processes that will give nature back its rightful place and contribute to improving our present and future lives. I formulated an approach to environmental responsibility, leading me to construct a curriculum whose main goals include education for environmental citizenship in preschool.

On a practical level, analysis of the teachers' environmental ventures and portfolios revealed that participants' initiatives included not only their preschoolers and the children's parents, but also extended circles of influence, as will be described below.

Circles of influence as environmental leader

Participants chose to collaborate with colleagues in their neighborhood, district, and professional organizations to introduce new ideas, and lead a change in the environment or in people's attitudes. The participants inspired their preschoolers, the children's families, and the community. Their portfolios showed varying degrees of change from "Hesitant" to "Environmental Leaders." We analyzed each portfolio to assess and code what we called "Circles of Influence," and the qualitative content analysis and the validation process revealed three levels: one on level 1, eight on level 2, and fourteen on level 3 (see appendix 1 for a sample of ventures on each level).

The project on the lowest level influenced only the preschoolers and their parents. Projects on level 2 also influenced an additional circle (i.e. the parents plus other residents of the neighborhood). Projects on the third level reached even beyond the neighborhood and included involvement of the local authority, politicians, or organizations. Level 3 environmental ventures exemplified active environmental leadership and citizenship that can influence many circles of residents and associates. These ventures connected people from diverse groups, ages, abilities, duties, and authorities on the basis of environmental interests like planting, cleaning, recycling, etc. They were ventures that changed reality.

DISCUSSION

As mentioned in the literature review, early childhood teachers often feel hesitant and less knowledgeable about science and natural environments (Spektor-Levy, Kesner Baruch, & Mevarech, 2013; Torquati, Cutler, Gilkerson, & Sarver, 2013). One approach to address this lack of confidence is to design effective professional development programs focusing on nature, science, and EE (Torquati et al., 2013). Thus, the main objective of this study was to examine how the ELPD program and the environmental venture influenced the values (awareness), norms, and behaviors (circles of influence, environmental citizenship, and leadership) of preschool teachers.

Quantitative analysis of participants' responses to the Likert-scale PAB questionnaire indicated that they were already aware of environmental issues. They understood the importance of EE and the need to raise public awareness. That quantitative evidence did not change by the end of the ELPD program, nor a year later. Accordingly, we queried whether the ELPD special program had indeed made a difference. Affirmative evidence was found in the qualitative methodology.

At the pre-stage, none of the teachers' written responses to the open-ended questions of the PAB questionnaire were coded as high-level pro-environmental awareness or behavior. However, by the end of the program, and then a year after the program ended, a high percentage of participants expressed Level 3 awareness and behavior. It is important to choose appropriate methodology and research tools to allow people to explain and express their genuine attitudes and thoughts. This was underscored by the qualitative data, which revealed the teachers' insightfulness regarding sustainability and EE.

Moreover, data collection was not limited to the respondents' declarative level. It continued on a practical level during the participants' actual implementation of the environmental venture. This component of the ELPD program and the ensuing research were instrumental in gaining a better understanding of the personal and professional changes undergone by the preschool teachers. The aforementioned is contrary to many studies that show changes in attitude - and even willingness to act - but no actual activism (Boyes & Stanisstreet, 2012; Skamp, Boyes, & Stanisstreet, 2013). Dono, Webb, and Richardson (2010) elaborate that environmental activism is not well understood, and in particular, its relationship with pro-environmental behavior. They found a significant relationship between social identity and environmental behavior, and that only the citizenship component of environmental behavior significantly predicted environmental activism. These findings support the model of the ELPD program presented in our study which includes citizenship as a component of environmental behavior and which encourage the teachers to conduct environmental venture-what might be considered as "new tool" by Dietz and Stern (2002). Dietz and Stern (2002) classifies "education," "provision of information," and "voluntary measures" as "new tools" to achieve pro-environmental behavior and activism.

The implementation of the environmental venture was accompanied by intensive support from an organizational consultant, a personal development specialist, and the ELPD program staff, allowing the teachers to experience environmental activism in a “supportive environment.” Perhaps this experience encouraged the teachers to become a classroom role model for their preschoolers. Modelling activism and engaging the preschoolers in pro-environmental ventures from such a young age may prepare them to be activist citizens in their future lives and careers (Tsevreni, 2011).

Furthermore, as part of the venture’s portfolio, all participants reported experiences of empowerment – both on a personal level, and as educators and leaders. Thus, the ELPD course described in this study address one of the challenging aspects of EE: how to draw people from passive to active environmental citizenship. Specifically, the ELPD program may serve as a model to encourage the development of preschool teachers from “hesitant” to environmental leaders.

In accordance with the VBN theory of environmentalism (Stern et al., 1999), the findings in this study show that most participants expressed positive environmental values and beliefs, and showed positive intentions to accept pro-environmental norms. During the ELPD program, and even a year later, these perspectives led to a causal chain of behavior: pro-environmental activism, environmental leadership, and citizenship.

Furthermore, the ELPD program was designed in accordance with the five key drivers for teacher learning and performance specified by Wetzler (2010): experiential learning with reflection, feedback, support (i.e., ongoing support during the environmental venture), and accountability; practical knowledge-building (e.g., EE teaching practices); performance-support tools (e.g., self-reflection tools); role models to observe (e.g. meetings with environmental researchers and educators); community of shared purpose and values (e.g. group discussions; sharing teaching materials and ideas on the course website). Another feature of the program was emphasis on behavior and activism through the execution of an environmental venture and a place-based approach. These features may serve as a way of operationalizing values and beliefs into behavioral norms. Hovardas and Korfiatis (2012) contended that by operationalizing values and beliefs into norms within assessment frameworks, scholars in the field of EE could translate educational objectives into concrete, assessable predictions.

Teachers’ empowerment as individuals and leaders

Responses relating to empowerment were considered “extended evidence” of empowerment when participants wrote rich text, with prominent evidence and examples of their growth. Sweetland and Hoy (2000, 710–711) detail four conditions for teacher empowerment. First, teacher empowerment is most effective when it is oriented to increase teachers’ professionalism. Second, empowerment has at least two dimensions: organizational and classroom. Third, empowering teachers has greatest impact on student achievement when the emphasis is on the core technology of teaching and learning in schools. Fourth, to be

effective, teacher empowerment needs to be authentic. The design of the ELPD program addresses most of these conditions. It is oriented to increase preschool teachers' professionalism in EE. It urges teachers to make a change not only in their own classrooms, but also beyond and in other organizations. It aims to inspire the preschoolers, through educating the teachers to adopt daily sustainable ways of living in the preschool classroom, and model pro-environmental awareness and authentic activism for the young children.

However, the extent to which teachers felt empowerment still differed among the participants. Jagers, Martinsson, and Matti (2014) argue that individuals who think along the lines of ecological citizenship are more likely to behave in an environmentally friendly way in their daily lives. Moreover, there may be a link between one's level of concern regarding environmental issues and one's willingness to undertake pro-environmental actions. Boyes and Stanisstreet (2012) call for education strategists and practitioners to be aware of this heterogeneity within the teacher and student population. People are not uniform in their behavioral responsiveness to EE, or even about specific actions. There is a wide variety of factors involved. All the preschool teachers who participated in the ELPD program – and in this study – noted that they had experienced personal growth and empowerment as educators and leaders (even a year after the program ended). This indicates that the PD program (design and requirements) succeeded in having a positive impact on the participants.

From “hesitant” to environmental leader

The results showing that most of the participant teachers demonstrated extended evidence of empowerment and leadership, and conducted environmental ventures that reaching wide “circles of influence” (Level 3) were not a foregone conclusion. It is not easy to move out of one's comfort zone and lead a venture that involves many supporters and collaborators. Hargreaves and Fink (2003) detail seven principles of sustainable leadership: (1) creates and preserves sustainable learning, (2) secures success over time, (3) sustains the leadership of others, (4) addresses issues of social justice, (5) develops rather than depletes human and material resources, (6) develops environmental diversity and capacity, (7) undertakes activist engagement with the environment. These principles illustrate how complicated it is to be a sustainable leader. One of the significant findings in our study is the fact that most of the participants retained their progress: A year after the ELPD program ended, we collected data from all the participants. Most of them not only expressed a willingness to act, but also described the actual pro-environmental activism they had undertaken in their role as educators as well as in their private life. The unique characteristics of the ELPD program contributed to sustain this progress.

In a review of PD courses, Schachter (2015) found that only half the studies she examined simultaneously targeted teachers' skills, knowledge, and dispositions. This pattern is worrisome, since the field has stressed that targeting these three areas is an important component of teachers' PD (Schachter, 2015). Although, in some cases, it may be easier to only target teachers' skills or ability to enact specific practices, neglecting to address teachers'

knowledge and dispositions could be problematic. The long-term impact of PD on teachers' practice may be hindered if the program is limited to address only specific skills – or specific strategies for teaching those skills – without considering how sustainable the skills are or how they relate to general classroom practice. Perhaps the ELPD program had such an impact due to its design, which aimed to enhance the teachers' knowledge, skills, dispositions, self-efficacy, and leadership simultaneously.

To conclude, as Bogler and Somech (2004) contend, teachers should be encouraged to participate in seminars and programs that stress their professional growth and self-efficacy. This claim was translated into the ELPD program that included five features: Prosocial and pro-environmental activism; Project-based learning (PBL); Empowerment and self-efficacy; Knowledge – more knowledge more courage to dare/act; Place-based approach.

As revealed in our study, once teachers experience greater opportunities for professional growth and acquire greater trust in their ability to achieve high-order goals, they may feel empowered and committed toward their profession and extra-role behavior. According to Howe and Stubbs (2003), ongoing programs and opportunities for professional interaction are essential for leadership development, a long-term process that depends on opportunities for continued stimulation and support at every stage of the way. The opportunity to become teacher-leaders should be made available to all teachers (Thoonen, Slegers, Oort, Peetsma, & Geijssel, 2011). Thus, the ELPD program we presented in this study may serve as a PD model for empowering teachers toward development as environmental leaders and role models as environmental citizens.

Limitations of this study

Our study employed a pre- and post-test design for internal validity. However, we realize that future studies should include a comparison group of preschool teachers who participate in a PD program designed without the central elements of the ELPD. For example, there would be no organizational consultant or personal development specialist to provide guidance and supervision during workshops and discussions. Such a study may shed more light on the specific impact that the ELPD program had on the participants, highlighting the most beneficial component of the program.

Another limitation of this study is the small sample size (23) of participants. This might hinder the attempt to generalize the research conclusions. Another suggestion for a future study might be to revisit the participants in a longitudinal study, to document their awareness, behaviors, intentions, and leadership several years later.

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Appendix

Appendix 1. Examples of an environmental venture for each level of the “Circles of Influence”

Level	Description of environmental venture
Level 1: Preschoolers and their parents only	“The Walking-Bus.” This was a suggestion for parents and children to walk, cycle, or come to school by scooter. The teacher explained the advantages to the children: reducing air and noise pollution, and getting healthy exercise. The incentive used was a medal awarded for arriving at the kindergarten six times without using motorized vehicles (i.e., on foot, on a bicycle, or on a scooter). In addition, the children were asked to look for natural phenomena along their way and to document what they saw through painting and verbal description to their classmates. Eventually, a “walking bus” was devised whereby children who lived close to each other would meet along the way (escorted by their parents), and come to kindergarten as a group. While the (successful) venture was comprehensive, it only involved the children in the kindergarten and their parents.
Level 2: Preschoolers and two additional circles of influence	The children in this class liked to use field guides, photo albums, and an encyclopedia when exploring natural phenomena. The teacher planned a venture that included observing birds; going to nearby natural sites to learn about the flora and fauna; planting vegetation (herbs, flowers, and vegetables) in the preschool yard; building an artificial “winter pond,” into which tadpoles were introduced for the children to watch them grow. Each child prepared an album with his or her best drawings and photos of the different organisms they observed. Those albums served as field guides when they went out to explore the nearby environment. The children's families were involved in the venture. Parents and grandparents were invited to a special “cooking-day,” in which they used vegetables and herbs from the garden to prepare traditional dishes. The teacher and her preschoolers also invited the neighboring preschool classroom to learn about the garden plants and the pond.
Level 3: Preschoolers and multiple other circles, reaching beyond the neighborhood	One teacher proposed a venture to take action to help a neighborhood day-care center for special-needs adults. The teacher had read in the local newspaper that the center was going to close because of financial difficulties. She encouraged her children to take action in a number of ways: 1. The children brought recyclable bottles to class. Every few days, the bottles were taken to the recycling machine at the nearby supermarket. The refunded bottle-deposits were set aside.

2. The children decided to use the money they accumulated to purchase plants from the greenhouse that operated at the day-care center. This helped the residents retain the greenhouse as a profitable facility.

3. Sometimes, the children worked in the greenhouse alongside the day-care residents, preparing the plants to be planted in the preschool garden. The residents taught the children how to use gardening tools and how to start a garden. Later, everybody gathered in the preschool yard to prepare the ground for the new garden. Aside from the environmental goal, this activity helped enrich the lives of the adults in the day-care center.

4. In order to expand the mutual activities, the children, their parents, and their new collaborators from the day-care center for special needs adults prepared masks and costumes from recycled and reused materials. The preparation was for a special holiday called "Purim", in which there is a custom to masquerade. Another custom is to send each other fancy food gifts. At the end of the activity, the parents arranged for each resident from the day-care center a big basket full of fancy food gifts.

5. The children and their parents organized a petition against closing the day-care center for special needs adults, and sent it to the local authority council. The result of the petition was that the council decided to retain the day-care center.