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RESEARCH ARTICLE

Attitudes to Animal Dilemmas: An Exploratory Comparison Between Mexican and English Children

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Abstract

This research explores some of the factors that influence the relations about empathy and /or rejection that children establish towards some animal species. The role that school has within the social context in these dynamics was considered. Attitudes of young children (aged 7 to 9) from Mexico and England towards specific animal species, examining attitudinal differences not only between cultures, and educational systems, but between species have been compared. Ecological dilemmas involving animals are used as a method to analyse children's constructions of the environment in the field of moral development and conservation. Children expressed more negative attitudes towards spiders and snakes, than towards monkeys and birds. Although these attitudes in themselves are not surprising, the material in this study provides new information on how young children construct their moral ideas on conservation matters through the used of ecological dilemmas. Children's reactions vary according to culture, experience, affiliation for a particular animal and school ethos.

Key words: Attitudes, biophilia, children, animals, ecological dilemmas

Introduction

In the face of rapidly changing environmental conditions there is concern on several fronts about how to respond to them. However there is considerable debate about the extent to which the acquisition of knowledge and understanding of environmental issues necessarily leads to more positive attitudes towards or behaviour in, the natural environment (Posch, 1993; Barraza & Walford, 2002). There are substantial grounds to recognize not only the connection between attitudes and behaviour but also the connection between educational initiatives and attitude formation. Finding ways to reconnect people to nature is a critical challenge for conservation biologists in this new century (Brewer, 2002). Due to the connections mentioned above, this critical challenge must also be met in the classroom. In this, many conservation biologists are committed to recognizing their responsibility to collaborate with the school community as well as other groups of the society in order to promote broad public awareness to strengthen environmental attitudes, values and actions.

The role of education in the formation of values and social action can be fundamental for successful conservation and management programs (Barraza, 1996; Jacobson & Marynowski, 1997). Effective solutions to environmental problems require active participation of scientifically and technologically literate citizens (Brewer, 2002).

If we begin with the assumption that effective environmental education needs to be based on children's understandings of the environment, it becomes immediately clear that relatively little is known about that understanding (Loughland, Reid, & Pectocz, 2002; Barraza & Cuarón, 2004). Therefore more studies on how children think, learn and apply their knowledge on environmental matters are needed. It is important to identify where children are obtaining their information, and if what they are learning is

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accurate. This information and support provided by conservations biologists could help strengthen environmental education and science teaching programmes (Barraza & Cuarón, 2004).

Why the focus on dilemmas involving animals?

Children develop their sense of curiosity at a very early age. For most of them, animals are of special interest and usually attractive. However, the fact for example, that children like cats, because they think they are cute and they like to play with them, does not say anything at all about how they might understand their impact on an ecosystem; nor will it tell you much about how they might or might not relate to the environment more generally.

Ethical dilemmas can provide valuable information on children's values, knowledge and actions. When people are confronted with dilemmas, they find themselves having to come to terms with ambiguities in their own system of beliefs, and own moral values. Dilemmas involving animals are a particular type of moral predicament that individuals have to face specifically when confronted with environmental problems (Barraza, 1996). They are becoming more important, as the magnitude and detrimental effects of human actions on the environment increase. However, little research has been done using dilemmas as an effective method of children's environmental attitudes (Kohlberg, 1984). By using animal dilemmas we can establish some connections between children's preferences for some species of animals and their moral implications towards conservation issues.

Why the focus on biophilia?

We believe that identifying children's attitudes towards animals at an early age can help educators, parents and biologist identify key aspects for educational and conservation programs. By observing children's interactions with animals we can obtain much information on children's affective, social and cognitive development. A child's perception of animals-as-individuals appears to be less popular, as one move down the line from the bigger mammals to the smaller species of invertebrates (Van Arc ken, 1993). Children's preferences for a particular animal have a strong association with human features (Morris, 1960*)*. Children do not like animals which they think are dangerous and which make unpredictable movements. Snakes and spiders, for instance, were the two most disliked animals by the British children (Morris, 1960). This may be a general cross-cultural pattern. There is a human propensity to fear and elude threatening aspects of nature, particularly those associated with reptiles, such as snakes, and various biting and stinging invertebrates, like spiders (Kellert, 1993).

Attitudes towards wildlife or nature have been studied in different social or cultural contexts (e.g., Kellert, 1983, 1991, 1993; Adams, Newgard & Thomas, 1986; Kellert & Clark, 1991; Reading & Kellert, 1993; Caro, Pelkey & Grigione, 1994; Musser & Malkus, 1994; Uzzell 1994; Steel, 1996; Jacobson & Marynowki, 1997). They have not been assessed, however, with respect to one of the main settings where these behaviours tend to be moulded - schools. Children spend a lot of their time in schools, consolidating their behaviour, during classes and while playing on the grounds. They read school grounds as they read any external environment: as a set of symbols which tell them what they are supposed to 'be' and 'do' and 'think' and 'feel' in that place (Titman, 1994). The appearance of outdoor spaces within a school setting is important for children since they react to different elements related to stimulus, such as, the natural colour of flowers and trees, the texture of leaves, the smell of flowers, the form of fruits, and so forth (Titman, 1994). The appearance of outdoor spaces can stimulate

positive and/ or negative moral reactions. For example, Titman (1994) found that children are more aggressive amongst themselves as well as towards the environment when they do not have green areas in which to play, or when school grounds are very small.

From a very early age children start making contact with nature. Children explore their surroundings as part of discovering the world. They get to know their environment, touching, feeling, and trying everything to confirm their knowledge. It seems that there is a spontaneous attraction and a positive instinct between children and their world, a phenomenon described by Wilson (1984) as 'biophilia', or the innately emotional affiliation of human beings to other living organisms. If biophilia is the genetic affinity for other lives, why is it expressed in some children and cultures more than in others? and why do some living things seem to 'count' more than others? According to Nabhan and Antoine (1993) there are at least three answers to this question. First, perhaps biophilia is not genetically determined but is a set of learned responses. Second, some human genetic lineages may have been selected for biophilic responses more than others. Third, a child's learning environment greatly conditions the expression of any genetic basis for biophilia, that is, that biophilia is a function of an interaction between teaching and genetics. An alternative explanation is that biophilia is not about fixed traits as Wilson and others believe, that is not genetic at all. Egan (1991) proposes that much of the distressing disregard of nature that we see in many young children is caused by the fact that human potential for feeling a part of nature is too rarely evoked, stimulated and developed in children. This is supported by Ulrich who claims that "Learning is required for acquiring a positive response that is only partly predisposed by genetic factors, and the response is modified by conventional learning, experience and culture" (Ulrich, 1993). In this research an examination is made on how learning, experience and culture can intervene in the process of developing a moral responsibility towards children's attitudes to animals.

Affective and cognitive factors influencing the choice of age group

Young children from 2 to 7 years of age do not give moral reasons for or understand the rules behind their behaviour (Caduto, 1985). At this stage children react according to their feelings; their affective domain is stronger that their cognitive development. Because I wanted to analyze how children were able to establish connections between their affective domain and their cognitive development when confronted with dilemmas involving animals, slightly older children between 7 and 9 years of age were chosen to work with. These early years seem to be most appropriate for the development of environmental values. The age group was also selected because at this stage the child's mind undergoes a developmental change, both intellectually and socially (Piaget, 1969; Vygotzky, 1978). According to Kohlberg (1984), promoting environmental values at this stage of moral development will help the individual: 1) to internalize the rules and expectations of others, especially those of authorities (conventional moral stage); 2) to differentiate him/herself from the rules and expectations of others, understanding why his/her behaviour is affecting others; and 3) to define his/her values in terms of self-chosen principles (post-conventional moral stage).

According to Buergenthal and Torney (1976) children at this age have been found to be intensely curious about the wider world in all its variety; they are more favourably disposed towards other cultures than many older children; they appear open and flexible in their attitudes to social and political issues such as war, poverty. Perhaps most important for the focus of this study, is that Buergenthal and Torney (1976) found

that at this stage children are beginning to be aware of and interested in issues to do with what's 'fair', or 'right' at a general level (human rights, Barraza, 2001).

Whereas Buergenthal and Torney (1976) focus primarily on children's attitudes to other people, I was interested in exploring whether, within this developmental process, children form a moral concern towards animals. If so, I wanted to examine the extent to which cultural and education factors played an influential role in this process. In this context, I sought to elicit the immediate reactions of Mexican and English school children to particular situations that I felt would reveal their moral values and concerns towards different animals.

Cultural factors as a focus of analysis

Because children's moral and environmental attitudes may be influenced by their culture, comparable data were gathered in Mexico and England, two countries with significant cultural and structural differences in their economic development and educational systems [(Mexico: lineal and mostly traditional. England: Interactive programs based on community projects (Barraza & Walford, 2002)]. Mexico is an emerging country with a high biological diversity (McNeely, Miller, Reid, Mittermeier &. Werner 1990; Ramamoorthy, Bye, Lot & Fa, 1993). England, on the contrary, is a developed country with low biodiversity in comparison to Mexico.

Methodology

Study Sites

Five schools in Mexico and three in England were sampled. Schools were selected from the following categories: a) primary schools; b) mixed schools (girls and boys); c) day and boarding schools and finally d) schools with varying degrees explicit emphasis with regards to the environment (i.e., the emphases in their orientation and interest on environmental issues).

Boarding schools were included in this study to explore how in the absence of the daily presence of parents the school influences the formation of environmental attitudes in young children. Schools were grouped according to their ethos with respect to environmental policies and whether they were day or boarding schools (Table 1).

'Environmental schools' selected in this study have written environmental policies, demonstrated also by their active role in local, national and international environmental projects. Schools with 'some interest in the environment' were those that manifested a concern on environmental issues, although they were not active in environmental projects, nor had written environmental policies.

Socio-economic level of children in this study varied. Children growing up in different socio-economic levels acquire different cognitive abilities (Gray, 1991) and frequently undergo distinct cultural processes that might well influence general attitudes towards the world around them. Some of these socio-economic differences were considered in this study, although their evaluation was not the main purpose of the study.

Data Collection

Because perception and moral judgement are such subjective states, it was crucial to test the assessment tools in a pilot study. Two assessment instruments were tested with eight year-old children in a primary school not included in the final study in order to

evaluate their efficacy in eliciting children's perceptions of the environment and their attitudes towards environmental issues. These tools were: a sentence- completion technique and a narrative description (tell a story). After analysing the results of the pilot work an open-ended questionnaire was applied to 248 children (104 English and 144 Mexican). Open questions are optimal for testing hypotheses about ideas or awareness (Oppenheim, 1992). The questionnaire consisted of four open questions involving issues about moral values and concern for animals. Children in each school were asked to write what they thought would be their immediate reaction to different situations. Questions were related to different groups of animals: invertebrates (spiders), reptiles (snakes), birds, and mammals (monkeys), to test children's relationship with biophilia across a range of species. The questions were:

1. What would you do if you found a spider in the dining room of your house?

2. What would you do if you found a snake in your school's play ground?

3. What would you do if you were at the park, and you found a baby bird that had fallen from its nest?

4. What would you do if somebody offered you a monkey to keep as a pet?

Different settings were chosen to analyse children's degree of exposure with the situation.

Data Analysis

Based on a content analysis data was coded in order to classify the answers (Barraza 1999, 2001). All answers were registered and categorized according to the type of response. When analysing the children's responses to questions 1, 2 and 3 a five-category scale was used: 1) destructive, 2) fearing, 3) call for help, 4) unconcerned and 5) protectionist. For question 4, related to the monkey, a different category scale was used: 1) accept, 2) refuse, 3) report to police, 4) ask my parents, and 5) take it to the wild/zoo/vet/RSPCA (Royal Society for the Prevention of Cruelty to Animals). Each of these actions can indicate to what extent young children develop positive, negative and/or indifferent attitudes to situations that generate dilemmas involving animals.

For questions 1 and 2, the negative action was obvious (e.g., to kill), but in the others it was necessary to search for the negative impact and to see it with reference to a cultural context. For example, by recording the reasons that young children gave for accepting or refusing the monkey, it was possible to find out how much information young children in this study had on endangered species, and/or the illegal wildlife trade. Monkey trade is illegal worldwide. In Mexico all species of monkeys are endangered species. In this sense children's answers can provide basic information to the development of environmental education programs.

In the case of finding a baby bird that has fallen from its nest, the attitude of ignoring the animal and not doing anything to help it was considered a negative action (but see discussion).

Schools were evaluated to find out if environmental ones were more effective than the others in children's attitudes towards animal dilemmas.

Analysis of Deviance procedures using GLIM 3.77 (Royal Statistical Society, 1985) was used to perform statistical analysis. As indicated in Crawley (1993), a Poisson error and a logarithm link function were used for count dependent variables. In the cases where needed, re-scaling was made to avoid over dispersion problems (Crawley, 1993).

Comparisons were made contrasting Mexico versus England and between schools with different ethos. A probability of 5% (p=0.05) was considered as the cutting point for statistical significance.

Results

What would you do if you found a spider in the dining room of your house?

Some examples of children's responses are reported in Table 2. Overall, 44% of children in the study group said they would kill the spider, 10% manifested a fearing attitude, 7% would call for help, 6% would take no notice, and 32% would show a protectionist attitude towards the spider. All English children were significantly more likely than all Mexican children to have a positive reaction towards the spider or to pay no attention/notice to it; most of them would pick it up and put it outside (X^2= 60.97, df=4, p<0.0001; Fig.1a; Tble 2). Children from Mexican schools with environmental policies tended to be more protective (X^2= 48.88, df=8, p<0.001; Fig. 1b). However in the case of the English children the school ethos was not a significant factor (X^2= 5.129, df=2, ns). The interaction between country, school ethos and attitudes towards the spider is significantly different (X^2=30.76, df=8, p<0.001). It is not clear to suggest that school might be influencing children's attitudes towards spiders. It is more probable that cultural context through exposure have a greater effect on children's attitudes (see discussion).

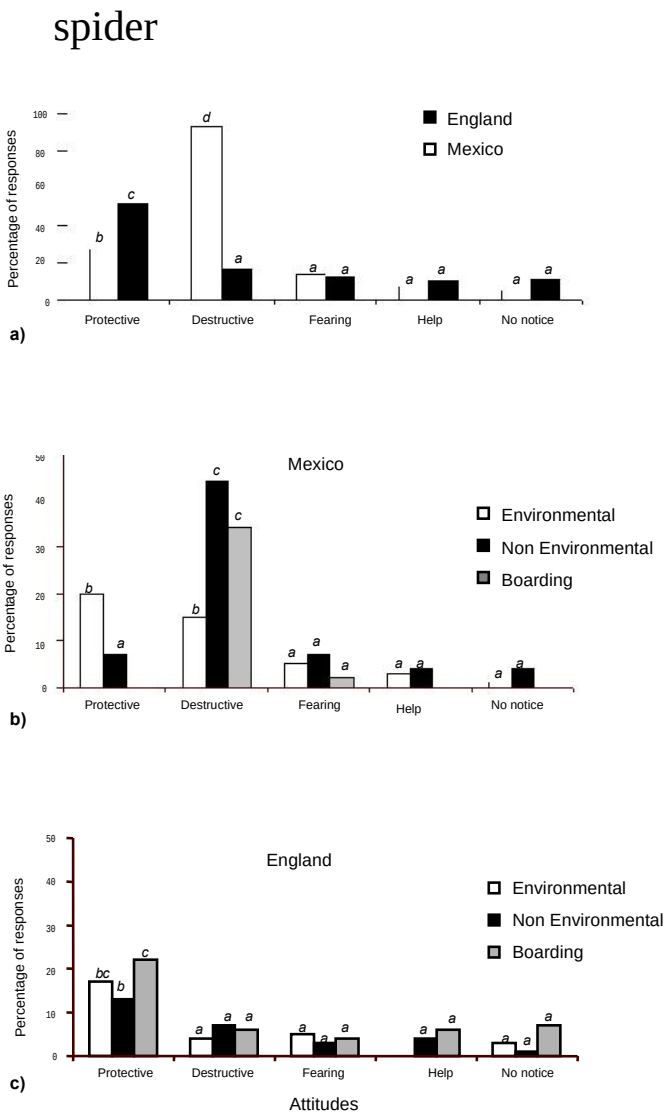

Figure 1.

Children's reaction to a spider they found in the dining room of their house. a) Countries; b) Mexican schools ethos; c) English schools ethos. Significant differences among countries and school ethos in each country are indicated by different letters (the same letter indicates no significant differences).

What would you do if you found a snake in your school's play ground?

Typical responses are shown in Table 2. For both countries the most frequent answer was to call for help (i.e., to get a teacher or a staff member). Overall results showed that children's reactions towards snakes were more positive than negative, with 66.7% expressing a positive action (this total includes protectionist, call for help, and no notice attitudes). Mexican children expressed more negative or fearful attitudes towards snakes; almost 20% of them said they would kill it, while only 3% of English children mentioned they would do so (X^2=40.35, df=4, p<0.0001; Fig. 2a; Table 3). Children from environmental schools in England and in Mexico were less likely to give destructive responses than children from boarding schools in each country. Mexican children from schools with no environmental policies tend to call for help when finding the snake in a greater proportion than schools with environmental policies (X^2=26.78, df=8, p<0.001; Fig. 2b). Once again, cultural context through exposure seems to have a greater effect on children's attitudes than school policies.

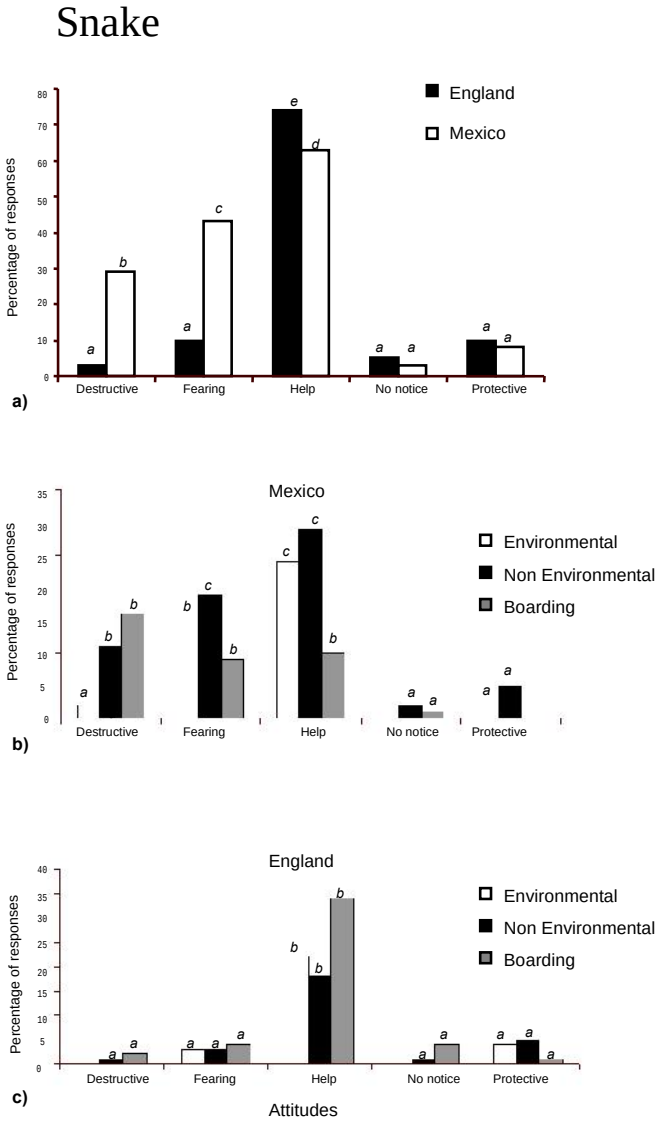

Figure 2.

Children's reaction to a snake they found in their school playground. a) Countries b) Mexican schools ethos; c) English schools ethos. Significant differences among countries and school ethos in each country are indicated by different letters.

Table 3.

Analysis of deviance to test the single and interactive effects of attitude and country of origin on the frequencies of environmental dilemmas related to the children's perception of four animals (asterisks indicate interaction).

Animals	Factor	Deviance (χ^2 approx.)	r^2	df	P
Spider	Attitude	142.6	67.4	4	≤0.0001
	Country	7.85	3.71	1	0.005
	Attitude*Country	60.97	28.84	4	≤0.0001
	Error	0	0	0	
	Total	211.39		9	
Snake	Attitude	191.7	79.91	4	≤0.0001
	Country	7.85	3.27	1	≤0.01
	Attitude*Country	40.35	16.82	4	≤0.0001
	Error	0	0	0	
	Total	239.88		9	
Bird	Attitude	354.1	87.7	3	≤0.0001
	Country	9.5	2.35	1	≤0.005
	Attitude*Country	40.15	9.94	3	≤0.0001
	Error	0	0	0	
	Total	403.75		7	
Monkey	Attitude	281.6	89.26	5	≤0.0001
	Country	7.8	2.47	1	≤0.01
	Attitude*Country	26.03	8.25	5	≤0.0001
	Error	0	0	0	
	Total	315.46		11	

What would you do if you were in the park, and you found a baby bird which had fallen from its nest?

Examples of responses are shown in Table 2. In most of their answers (94.3%) a positive action was involved. Overall, 77.3% of Mexican and English children manifested a protectionist attitude towards the bird, 17% would call for help (vet, RSPCA), and 4.5% would take no notice. Only 1.2% showed a destructive attitude. None of the children showed a fearing response to the bird. English children would call for help in a greater proportion than Mexican children (X^2= 40.15, df=3, p<0.0001; Fig. 3a; Table 3). There was a high tendency of Mexican and English children to try to save the baby bird and put it back in its nest, or take it home and look after it until it recovered. These two elements, protection and care, were constantly mentioned. However Mexican children would protect the bird more than English children. Something mentioned only by Mexican children was the possibility of finding the baby

bird dead. In such cases children said they would bury it. This action was considered a positive attitude.

There were not significant differences found between children attitudes and the school ethos. For this dilemma, children attitudes were not determined by the school ethos. Mexican children from schools with no environmental policies were more protectionist than children from schools with environmental policies (X^2= 4.008, df=6,ns; Fig.3b). English children from boarding schools manifested a more protectionist attitude than English from other schools ethos (X^2= 6.475, df=6,ns; Fig.3c).

Bird

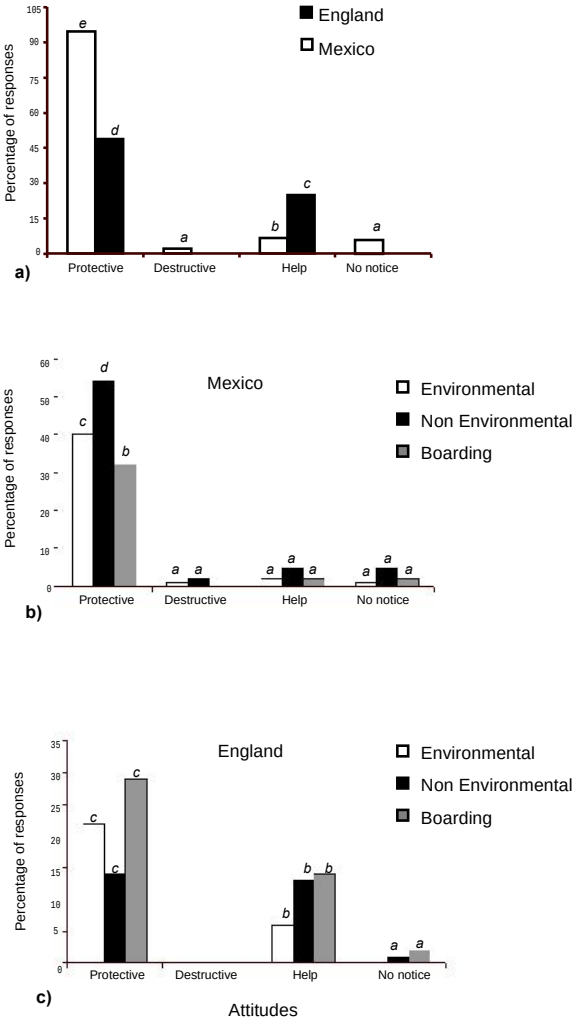

Figure 3.

Children's reaction to a baby bird that had fallen from its nest. a) Countries; b) Mexican schools ethos; c) English schools ethos. Significant differences among countries and school ethos in each country are indicated by different letters.

What would you do if somebody offered you a monkey to keep as a pet?

48% of Mexican and English children said they would refuse the offer (Fig. 4a). Whilst 32% said they would accept the animal. Next in importance were the children that would take it to either a zoo, a vet, to the RSPCA or into the wild, and those who would ask their parents. Some of the reasons why children of this age group would refuse to have a monkey were: "it's not nice for the monkey"; "it is cruel to keep pets"; "lack of space"; "it could be dangerous"; "they live in trees"; "a monkey is not a domestic animal"; "it's a wild animal"; "they are harmful"; "it's a struggle"; "too much a risk"; "they are too dirty"; "they are naughty"; "I don't like them".

A larger proportion of Mexican children said they would keep the monkey with them. English children were more likely than Mexican children to take the monkey either to a zoo, or a vet, or to the RSPCA or into the wild (X^2=26.03, df=5, p<0.0001; Fig. 4a).

Overall children from schools with environmental policies in England and in Mexico were less likely to accept the monkey as a pet. Also, a larger proportion of children from schools with environmental policies in England and in Mexico would take the monkey to a zoo, a vet, or into the wild. Even though the results from this dilemma show a slight tendency from children of environmental schools, to reject in a larger proportion the monkey as a pet, no interaction was found between school ethos and attitudes (X^2=15.36, df=10, ns). However, in the particular case of the Mexican schools the opposite was found. Mexican children from schools with no environmental policies refused the monkey in a greater proportion than children from environmental schools (Fig. 4b). In this particular case, the Mexican school with no environmental policies has a strong moral scheme program as part of its curricula. In the case of the English schools significant differences were found only between attitudes and not between school ethos ((X^2=25.29, df=3, p<0.0001; Fig. 4c). Only in the case of children's reactions to the monkey dilemma did we find a significant relationship between school ethos and students' attitudes. (X^2=15.61, df=8, p<0.05). The school policy seems not to determine children's attitudes – an issue to which I return in the discussion.

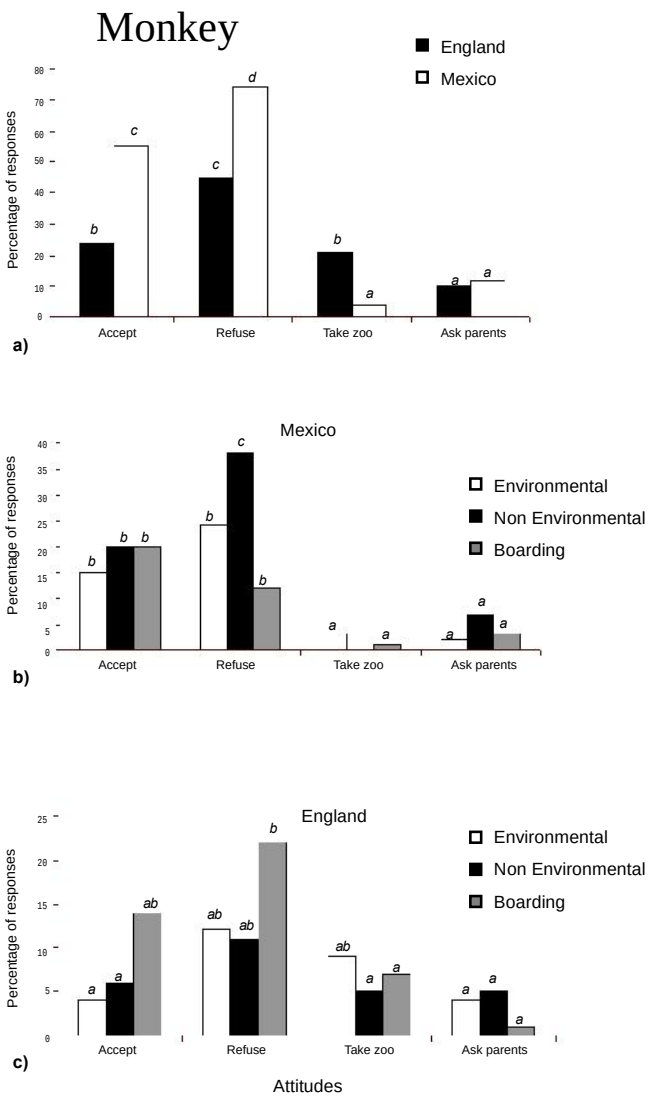

Figure 4.

Children's reaction when a monkey was offered to them as a pet. a) Countries; b) Mexican schools ethos; c) English schools ethos. Significant differences among countries and school ethos in each country are indicated by different letters.

Discussion

What the focus on dilemmas in particular has revealed?

Through the used of dilemmas Mexican and English children in this study manifested a sense of responsibility and ethical concern towards animals. There was a variation according to the dilemma, the species and the context. A direct relation between the dilemma and the species associated with biophilia was found. In the case of spiders and snakes children showed more negative attitudes.

Children in this study form a moral concern towards animals. Besides the ethical concern showed by children in their dilemmas, children expressed their knowledge about certain moral and ecological implications particularly about the bird and the monkey dilemma (e.g. many children gave important ecological reasons of why monkeys were not good pets). A certain level of morality in a society can be reflected through the used of dilemmas. Children answer to behavioural codes determined by society. In this study clearly the socio-cultural context was a determinant factor in children's attitudes towards animals. Overall English children expressed more respect and a sense of protection towards animal's species than Mexican children did.

The use of ecological dilemmas is a valuable tool to associate knowledge, attitudes and values that children manifested towards the environmental crisis.

Cultural differences in children's attitudes towards animals

Although as expected from the existing literature, it was not surprising to find that both English and Mexican children expressed more negative attitudes to snakes and spiders than to monkeys and birds, it is worth noting that Mexican children expressed a more destructive attitude towards the spider (63.6%) than did English children (16.6%). An important aspect to consider is the likelihood of a child finding a venomous spider in either country. For Mexican children the chance of finding a venomous spider in their homes is considerably higher than for English children. This may well be an indicator of why Mexican children have more negative reactions. These findings agree with previous research. Studies on human attitudes toward invertebrates (Kellert, 1993) reveal that the general public largely expresses feelings of aversion, dislike, or fear towards most invertebrates, particularly insects and spiders. Children and females tend to have higher levels of anxiety toward invertebrates (Hardy, 1988). In this study over half of the children had a negative attitude to spiders. It seems that for most children, spiders and insects are organisms deserving no moral consideration (Lockwood, 1987). This view can justify why for so many people it is acceptable to kill spiders and many other invertebrates.

Snakes were the second group of animals that, as expected, children rejected. This confirms adult's negative attitudes towards reptiles, particularly snakes (Morris, 1960; Gray, Larson & Braunhardt, 1979; More, 1979; Kellert, 1979, 1980; Wilson, 1993). Again, the negative attitude shown by Mexican children to the snake is considerably higher than the one shown by English children; 50% versus 13%, respectively. About 14% of the snake species of the world occur in Mexico (Flores-Villela, 1993a). There are about 320 species of snakes (Flores-Villela, 1993a), of which 60 (19%) are venomous (Flores-Villela, 1993b). In England, by contrast, there are only three species of snakes, which are rarely seen, only one of which is mildly venomous. Therefore, the probability and the risk of having an encounter with a snake plus a dangerous one in a school or in a house are much higher in Mexico than in England.

In the case of the baby bird that had fallen from its nest, children were more likely to express a positive attitude towards it. Nevertheless 3% of the English children and 5% of the Mexican children said they would just ignore it. It is possible that some children have been taught that the best thing to do when finding young wild animals is to leave them alone. The answer, "leave it alone" (without stating as a reason that it is best for the animal) or "would not do anything" was defined as a negative action. Children at this age start getting involved with the outside world, they enjoy looking after others (people and animals), and most of all, they like taking care of animals (Laucks, 1981). This sense of protection can tell us, in a way, how sensitive a child can be to an animal. Most of the children in this survey expressed a degree of compassion towards the bird, showing their concern to help it. According to Wilson (1993) children who throw stones at birds and children who feed birds are both responding to what may be an innate tendency to focus their attention on living things. The choice of behaviour used to engage the animal in the interaction is different and is a learned behaviour (Wilson 1993).

In this study the majority of children from 7 to 9 years old expressed their concern about keeping monkeys as pets. Keeping monkeys as pets is still common in Mexico (Cuarón, 1991, 1997). There are three species of monkeys in the country: spider monkey (*Ateles geoffroyi*), and two species of howler monkey (*Alouatta palliata* and *A. pigra*). All three species are considered to be threatened. Some of the main reasons why the species are endangered are hunting and the pet trade (Cuarón, 1991). Poachers usually kill the mother to capture the baby so that they can sell them as pets. Some of these problems have been addressed by the children, through this question, showing that even young children have some knowledge of the implications of having wild animals as pets. Mexican children however, were more likely to accept the monkey (37.6%) than English children (23.5%). One possible explanation for this could be that Mexican children are more familiar with seeing monkeys in houses; therefore it is much easier to acquire monkeys than it is in England.

Children's attitudes and biophilia

Some other cultural differences were found, particularly in those cases where children were involved with animals they dislike (e.g., snakes and spiders). Mexican children appeared to have more negative attitudes towards these animals. According to Wilson (1993) biophilia could have developed from biocultural evolution, in which culture grew under the effect of hereditary learning propensities, as the genes prescribing the propensities were spread by natural selection in a cultural context. Rapoport (1978) suggests that the relationship between environmental activities and the rules and meanings that accompany them is strongly conditioned by culture. In this study, Mexican children's could fear to spiders and snakes as a response shaped by a cultural and biological context. From a very early age they learn that spiders and snakes can be very dangerous. They develop a sense of cautiousness towards these animals because they are more at risk from them. Another explanation can be that simply spiders and snakes are animals not worthy of biophilic concern.

Effects of school environmental ethos

Results in this study reveal that children's attitudes towards situations involving animal's dilemmas were more strongly influenced by experience and culture, than by the school ethos itself. A revealing result was that I did not found a direct relation between the school ethos and children's attitudes. Although in some cases children

from environmental schools showed more positive attitudes towards animals, overall the attitude was determined by biophilia and the social context of the children. There was much greater variability among Mexican schools than among English schools. This was due in large part to Cave School. This Mexican boarding school has a strong emphasis in providing housing to orphan and underprivileged children, and their teaching capabilities are limited. Its performance contrasts with all the other schools in this study. Children from the Mexican boarding school manifested more negative attitudes towards animals, than children from all other schools.

As well as policy and resource matters, the issue of classroom practice needs to be considered. Differences in practice within the Mexican and English educational systems may also help to explain why children from two countries respond differently to environmental issues and have differing amounts of knowledge. This includes the dominant pedagogical approach, the style of teacher- training, methodological tools, the amount of resources available overall, but most important is the cultural context (Barraza & Walford, 2002). Many Mexican teachers are most comfortable in their classroom practice when providing the information about the environment in a one-way, top-down style and it is common to find them using this traditional and didactic method in primary schools, and not giving children an active role in the learning process (Barraza & Walford, 2002). In England, it is observed, more emphasis is given to practical activities when educating about the environment. Teachers usually act as 'managers' or 'consultants' for such learning, rather than providing a didactic lead. Their own teacher-training courses have equipped them with the skills and confidence to do this.

The proclamation of the decade of education for sustainable development by the United Nations has placed education in general and environmental education in particular, at the front of a future full of important and uncertain meanings (Caride, 2005). The legitimating of education for sustainable development in the educational mainstream is a first step which can be followed by reformation and transformation of the educational system itself at the micro-level – that of schools – and at the macro-level of policy development and implementation (Barraza, Duque-Aristizábal & Rebolledo, 2003).

Not finding a direct relation between the school ethos and children's attitudes will encourages us to work closely with the transformation of environmental policies in the school system, including a strategy for parents, teachers and children. The formation of ethical and environmental values starts at home. Parents have a significant role in the development of their children's environmental education (Barraza, 2001; Barraza & Cuarón, 2004). Their role, together with teachers is fundamental for the promotion of environmental values, attitudes, knowledge and active participation.

One of weaknesses of this study was probably not doing an analysis considering gender. It would have been interested to know if girls at this age (7-9 years of age) have a more strong sense of ethical concern towards animals than boys.

Conclusions

It is not possible to draw definite conclusions without further research, but this preliminary work leads us to believe that when children are exposed to situations involving dilemmas with animals their reactions vary according to four major factors: 1) culture; 2) experience; 3) affiliation for a particular animal; and 4) school ethos.

Cultural differences affect children's perception and attitudes towards animal-related issues. The symbolic meaning of animals depends on the biological as well as the

cultural context, in which biophilia may play an influential role. The symbolizing process can enhance positive or negative affiliation. Mexican children in particular seem to have learned to develop fear and to be cautious of more animals than English children. Experience and risk of exposure, we feel, influence children's attitudes towards these animals. In the case of Mexican children, 'snakes and spiders' represented a major perceived danger in their lives, simply, we suggest because of greater biological diversity they encounter in their daily lives. The affinity and preference that children manifested towards animals is connected with their human values.

While in this study school ethos was not statistically determining factor regardless children's attitudes, nonetheless children from schools with environmental policies in general were more likely to develop positive attitudes towards animals – as shown by their responses to spiders (fig.1ab); snakes (fig.2bc) and monkey (fig.4bc). However, the development of effective environmental policies in all schools needs to be considered in order to promote an environmental knowledge and awareness in the school population. Greater importance should be given to education programs in conservation biology. According to Sterling (2001) the ecological approach facilitates integrative thinking. Such thinking is systematic rather than linear, integrative rather than fragmentary. It is more concerned with process than things, with dynamics than linear cause-effect, and with pattern, rather than detail.

Identifying types of environmental attitudes is an important step towards promoting or reinforcing positive behaviours through environmental education in diverse contexts, particularly at home and school. Education at all levels must be developed to enable people to understand the interrelationships between humans and the environment.

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Biographical statement

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Hayvanlara Yönelik Tutumlar: Meksikalı ve İngiliz Çocuklar Arasında Keşfedici Bir Karşılaştırma

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Bu araştırmada çocukların bazı hayvan türleriyle kurdukları empati ve/veya reddetme ilişkilerini etkileyen faktörlerden bazıları incelenmektedir. Toplumsal bağlamda okulun oynadığı rol göz önünde bulundurulmuştur. 7 ila 9 yaşındaki Meksikalı ve İngiliz çocukların belirli hayvan türlerine karşı tutumları, sadece kültürler ve eğitim sistemleri değil aynı zamanda türler açısından söz konusu olan tutumsal farklılıkların incelenmesi yoluyla karşılaştırılmıştır. Hayvanları içeren ekolojik ikilemler, çocukların ahlaki gelişim ve koruma alanında çevreye ilişkin yorumlarını analiz etmeye yönelik bir yöntem olarak kullanılmıştır. Çocukların, örümcek ve yılanlara yönelik olarak, maymun ve kuşlara göre daha olumsuz tutumlara sahip oldukları görülmüştür. Bu tutumlar kendi içerisinde şaşırtıcı olmasa da bu çalışmada kullanılan materyal ekolojik ikilemlerin kullanımıyla küçük çocukların, koruma konularındaki ahlaki fikirlerini nasıl yapılandırdıklarıyla ilgili yeni bilgiler sağlamaktadır. Çocukların tepkileri kültür, tecrübe, belirli bir hayvana duyulan yakınlık ve okul karakterine göre farklılık göstermektedir.

Özet

Anahtar Kelimeler: Tutum, biyofili, çocuk, hayvan, ekolojik ikilem

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RESEARCH ARTICLE

Pre-Service Teacher Opinions About Eco-Friendly Person Activity Package Developed to Raise Environmental Awareness*

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Abstract

In this study, the effectiveness of Eco-Friendly Person Activity Package developed in order to raise environmental awareness in pre-service teachers and enable them to be an example of an eco-friendly teacher for their future students, and the responses about Eco-Friendly Person Activity Package were investigated. The study was conducted on 75 fourth year pre-service teachers from departments of Elemantary School Education who took Environmental Education Course in a state university during fall semester of the academic year 2014-2015 and 10 pre-service teachers who participated in the study were asked to provide their opinions. It was a qualitative study based on a phenomenological design. Data of this research were obtained using a semi-structured questionnaire and interviews and analyzed with an inductive approach using Nvivo 9 qualitative analysis program. The participants were asked about the environment, environmental problems, future environmental problems, characteristics of an eco-friendly person before and after the implementation and were asked to provide their opinions about Eco-Friendly Person Activity Package after the implementation. Before the implementation, it was identified that the participants had lack of knowledge about the environment, neglected the role of people in environmental problems, could not make realistic estimations about possible future problems and didn't know the requirements of being an eco-friendly person. Following the environmental education provided using Eco-Friendly Person Activity Package, the participants made statements indicating that they have a good knowledge of the environment, can describe environmental problems and their causes based on such knowledge, are aware of the fact that the future of the environment will change based on human acts, show positive attitudes, including loving the environment and having concerns about its future, describe an eco-friendly person and show such behaviors. Based on the findings, it was concluded that Eco-Friendly Person Activity Package, which aims to raise examples of eco-friendly teachers, was effective in reaching its target.

Keywords: Environmental education, eco-friendly person, pre-service teachers, eco-friendly person activity package

Introduction

Today, environmental problems increasingly continue, and in order to find solutions to these problems and prevent new problems from emerging, individuals who are aware of environmental problems, can take initiatives on solving them, and know that natural resources may run out have to be raised (Atasoy, 2015; Johnson and Mappin, 2005; Palmer and Neal, 2003; Özdemir, 2010; Sanera and Shaw, 1999). The deterioration of the environment at such rapid rate can only be prevented by individuals who internalize the environment and behaviorally protect it. Environmental education plays a key role

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in developing these protective behaviors towards the environment in individuals. These problems can be solved if personal behaviors are changed. Changing behaviors can only be achieved by changing knowledge and standards of judgment so environmental education is required to develop positive attitudes and values towards the environment (Erten, 2005, 2008; Çağlar, 2011).

Beyond being a particular section and subject of general education systems, environmental education is an area of practice in which the will and skills to live in harmony with the environment are developed. (Özdemir, 2010). Environmental education addresses students' cognitive, affective and psycho-motor learning areas (Erten, 2004). Moreover, environmental education aims to raise individuals with environmental awareness who know themselves, develop sensitivity towards the environment and thus are at peace with themselves (Wilson, 1996).

Environmental awareness can be defined as developing environmental knowledge, positive attitudes and environmentally responsible behavior (Erten, 2012). Environmental knowledge, positive attitudes and environmentally responsible behavior should be considered as three requirements or components of environmental awareness (Erten, 2012). Environmental knowledge, one of three components of environmental awareness, represent ecological knowledge. An environmentally conscious individual should be aware of the function in nature and importance of the thing s/he will protect. Positive Attitude towards the Environment, which is the second component, can be defined as feelings caused by environmental issues, attitudes towards environmental issues and the enthusiasm shown for the solution of these problems. The last component is Environmentally Responsible Behaviors. Environmentally responsible behavior of an individual is defined as individual's transforming environmental knowledge and positive attitudes towards the environment into behavior and engaging in actions that benefit the environment. Environmental awareness is a combination of all these and the lack of one of the components destroys an individual's environmental awareness (Erten, 2004, 2005, 2006; Erten and Aydoğdu, 2011).

The purpose of the training activities carried out to improve the environmental awareness is to inform individuals about environmental issues, and then try to ensure that such awareness turns into concrete behavior and becomes permanent through various activities, however, an attitude contrary to these requirements is shown in Turkey (Çağlar, 2011). It is known that an environmental education approach which points out to universal characteristics of the environment, provides facilities for individuals to observe and accurately perceive the nature, ensures that the sense of environmental protection is internalized and education services are provided to that effect (Cağlar, 2011; Foster and Magdoff, 2011). Considering that higher education institutions aim to raise individuals with qualifications that will advance the society's quality of life, it is a fact that these institutions are responsible for upbringing of the next generations with environmental awareness in order to fight with environmental problems, which threaten the quality of life on a global scale. Therefore, it is known that environmental education should target higher education students (Johnson and Mappin, 2005). Only a teacher showing eco-friendly behaviors can raise awareness about the environment in new generations so pre-service teachers are separated from the students from other higher education institutions (Güler, 2009; Lewin-Benham, 2006; Malone and Tranter, 2003; Phenice and Griffore, 2003). The common point between eight main headings specified by Environmental Protection Agency (EPA) for achievement in environmental education in formal education, environmental education stages of the North American Association of Environmental Education (NAAEE), the requirement for teacher training for environmental education (Glasgow, 1994), and the

environmental education model developed by Hungerford and Peyton (1994) and published in cooperation with UNESCO International Environmental Education Program (IEEP) is that increasing the quality of a teacher who will provide environmental education is essential.

Various investigations identified that environmental education facilitates turning knowledge into behavior, becomes more permanent, and allows development of positive attitudes towards the environment and acquisition of values, when it is performed using activities that involve one-to-one interaction with the environment (Erten, 2004; Farmer, Knapp and Benton, 2007; Ozaner, 2004). Organizing and environmental education with the same goals for pre-service teachers is thought to be effective in raising teachers who internalized environmental education. For this purpose, the Eco-Friendly Person Activity Package (EFPAP) was developed by the researcher in order to introduce environmental awareness to pre-service teachers.

The purpose of EFPAP is to make pre-service teachers be aware that the environment is not a thing which doesn't include them, that on the contrary, they are part of the environment and to make them acquire environmentally friendly behaviors. If the objective is to develop new environmentally friendly behaviors environmental behaviors in pre-service teachers, it is necessary to ensure that they experience such behaviors (Kollmus and Agyeman, 2010). This is the main reason for the preparation of the activity package. EFPAP activities are based on a variety of teaching methods and techniques. The implementation covers a 14-week process and consists of 15 activities. The implementation conducted using a variety of teaching methods is thought to serve the desired goal. EFPAP, which aims to bring environmental awareness to pre-service teachers and ensure that they become examples of an eco-friendly individual for their future students, was developed as an implementation proposal for Environmental Education Courses, which are taught uniformly in universities. With this aspect, it is expected to contribute to the literature. It is also thought to shed light on further practices and research on the necessity and effectiveness of alternative environmental education practices. Thus, the purpose of this study is to determine the effectiveness of EFPAP, which aims to provide pre-service teachers with environmental knowledge, positive environmental attitude, and beneficial environmental behavior, in improving ecological knowledge, environmental sensitivity, and responsible environmental behavior among pre-service teachers. It also intends to examine student views concerning the effectiveness of EFPAP. The study sought answers to the following questions:

1) What do pre-service teachers think about the environment, environmental issues and future environmental problems before and after the implementation?

2) What do pre-service teachers think about an eco-friendly person before and after the implementation?

3) What do pre-service teachers think about EFPAP?

Methodology

This study was conducted in the field of social sciences using qualitative research design. Qualitative research is carried out in a study process which involves the determination of perceptions and events in a clear and holistic way in their own environment (Coolican, 2009; Mayring, 2000). The structure of this study, conducted to determine individuals' thoughts and perspectives, and how they interpret an event, is consistent with phenomenological design, one of qualitative research designs. Phenomenology is a method depicting what is visible, based on individuals'

descriptions of their experiences (Larkin, Watts and Clifton, 2006). Studies conducted using this method are intended to determine the mental configurations of individuals and the facts disguised.

Study Group

This study was conducted on 75 fourth year pre-service teachers from departments of Elemantary School Education who took Environmental Education Course in a state university during fall semester of the academic year 2014-2015. Of such pre-service teachers, 10 were asked to provide their opinions before and after the implementation. The participants were selected in a manner that would reflect the study group, and the selection criteria were academic average, age and gender. The participants' characteristics were as follows: academic average: 2.02-3.62; equal number of females and males; age: in the range of 22 to 24 years. The participants were coded using the following letters: A, B, C, D, E, F, G, H, I and J.

Table 1.

The participants' characteristics

Department	ESE*	ESE	ESE	ESE	ESE	ESE	ESE	ESE	ESE	ESE
Academic Average	2.02	3.62	2.86	3.54	3.57	2.34	2.2	2.67	2.94	2.43
Age	22	22	24	23	23	24	23	24	23	22
Gender	F**	F	F	F	F	M***	M	M	M	M
Participant	A	B	C	D	E	F	G	H	I	J

* Elemantary School Education, ** Female, *** Male

Implementation Process

The study took 16 weeks and the first and last weeks of this period was allocated to implementation of data collection tools. Therefore, it took 14 weeks to apply EFPAP activities. During the first three weeks of the implementation process, the researcher provided ecological information and described the activities in the activity package to the pre-service teachers. In the case of the activities during the 10-week period between fourth and thirteenth weeks, the s pre-service teachers assumed the whole responsibility. The role of the researcher in this process was guidance. The participants were asked to be divided into 10 groups in which they would work with the participants they'd like to work with. Between fourth and thirteenth weeks' activities were assigned to these 10 groups by lot. A trip to an environment-oriented center was the final stage of the activity package. The implementation period was completed with final interviews made with the pre-service teachers during the last week. A scoring tool developed by the researcher was used to evaluate the pre-service teachers' products related to the activities. Table 2 shows the content of EFPAP and information about weekly schedule of the implementation.

Table 2.

Activities in eco-friendly person activity package and their coverage

Weeks	Implementation Process of EFPAP Activities	Activity Coverage	Teaching Methods and Techniques Used
1.	Ecological Information-I (Living and Nonliving Things)	The first stage of a 3-stage powerpoint presentation on ecological information, which is a component of environmental awareness, is introduced. Information about living and nonliving things, the subconcepts of the environment concept, is given.	Simple lecturing
2.	Ecological Information-II (The Concepts of Balance and Interaction)	In this section, which is the second stage of the presentation, ecological relations and matter cycles are described. Environmental problems arising from the changes in the environment are discussed.	Simple lecturing Large Group Discussion
3.	Ecological Information-III (Environmental Problems and Environmental Education)	At this stage, information about environmental problems, environmental education required to solve these problems and environmental awareness, which environmental education aims to raise in individuals. Newspaper reports about environmental problems from Turkey and abroad are shown and discussed. The pre-service teachers are asked to make recommendations for solution of the problems and the concept of environmental education is emphasized.	Simple lecturing Large Group Discussion Question-Answer Problem Solving
4.	Fixing Taps	The aim of the activity, fixing taps, which was developed as an activity to raise environmental awareness, was to develop knowledge and skill about water saving. Tap, types of tap, causes of waste of water from tap and how to fix such tap are demonstrated to this group of pre-service teachers.	Demonstration Project
5.	Paper Making	Recycling, paper recycling, environmental benefits of paper recycling and steps of paper recycling; the pre-service teachers produce a piece of new (recycled) paper using waste papers in paper recycling bins. The stages of making recycled paper are compared with the stages in paper recycling plants. They generate a product from the recycled paper.	Simple lecturing Demonstration Project
6.	Environment in the Past and Environmental Education	A description plan in which the following questions are answered and discussed with other groups is planned: “First Emergence of the Concept of Environment, Environmental Practices in All Societies from Past to Present, Value attached to the Environment and Causes of Emergence of the Concept of Environmental Education, Its Position Today and Its Objectives"	Simple lecturing Large Group Discussion Question-Answer
7.	Utilizing Waste	The students generate minimum 10 practical unique products from waste materials which are considered trash and group such	Demonstration Discussion Project

		materials as recyclable and nonrecyclable materials.	
7.	Making a Clock from Waste	In this activity, which is dedicated to utilizing waste materials, in addition to the activity of utilizing wastes, an operating system is made by adding a clock mechanism to waste materials.	Project
8.	Research at Bus Terminal	In this activity, a bus service of a bus company at intercity bus terminal is selected and the amount of waste generated during that bus service is calculated. Then, weekly, monthly and annual amounts of waste using total number of bus services of the terminal are calculated. Details about financial values of such amounts are also obtained. Executives of the company related to the selected bus service are met and details about how such waste is left in the environment are obtained. Each individual produces a solution to reducing and utilizing such waste.	Discussion Problem Solving Case Study Observation Interview
9.	Worldwide practices about the environment	All congresses and conferences held about the environment is described by grouped pre-service teachers. Objectives of the conferences; whether they are effective today or not and to what extent they achieve their objectives are discussed.	Simple lecturing Large Group Discussion Question-Answer
10.	Sustainability	In-depth information is provided about the concept of sustainability, which is also mentioned and defined in environmental agreements made worldwide. Information about sustainability is provided and practices under the name of sustainability in the city where the pre-service teachers live, Turkey and the world are interpreted.	Simple lecturing Large Group Discussion Question-Answer
11.	Carbon Footprint and Ecological Footprint	Information is provided about the emergence of carbon and ecological footprints, their implications and what such implications mean. All pre-service teachers individually perform Carbon and Ecological Footprint tests and share the results. What can be done to reduce footprints is interpreted and discussed.	Simple lecturing Large Group Discussion Question-Answer
12.	Solar Cells	The concept of renewable energy is introduced. Information about solar cells, operation principles of solar cells and areas of application of solar cells is provided. Minimum 5 products with effective practices in daily life are designed using solar cells.	Simple lecturing Demonstration Project

13.	Waste Burial Activity	For this activity, in the first week, the pre-service teachers dig a hole and bury the waste they've collected from the environment and this burial is opened in the last week. The pre-service teachers must group the waste they've buried, estimate the changes that would take place over time, and test the validity of such estimates by comparing them with the wastes they've buried. They prepare a presentation on the causes of transformation and the reasons for the fact that no transformation has taken place and share it with other groups.	Observation Problem Solving Project Discussion
14.	Trip	A trip to a water treatment plant, a solid waste treatment plant or a recycling plant is organized. The destination should either be a structure providing benefits to the environment or a business in which recycling is performed. Before the trip, a trip form is distributed to the pre-service teachers to investigate their observations and knowledge expected from them and the pre-service teachers are asked to complete and return the form at the end of the trip.	Trip Observation Discussion

Data Collection

Interviews of the study were conducted using a semi-structured interview form before the implementation and in the form of semi-structured interviews, carried out by adding a question to the existing interview form after the implementation. The interview questions were prepared under the supervision of an academic researcher specializing on qualitative studies. Before the study data were collected, preliminary interviews were made with 5 third year pre-service teachers from department of Science Education of a state university, other than the one in which the implementation was carried out. By taking account of the criteria that the pre-service teachers can give answers about their gains and experiences related to the activities, necessary revisions were made in interview questions and the questions were finalized at the end. The only difference between pre- and post-implementation interview questions is the extra question in the post-implementation questions, which asks the student to evaluate EFPAP. The interviews lasted 15-20 minutes. Inretview questions are given in Table 3.

Table 3.

Interview questions

Pre-implementation Interview questions
1. What do you think about the environment? 2. There are environmental problems caused by some deterioration in the environment. What do you think these are? *What kind of change do you think the existing environmental problems in Turkey will undergo 50 years from now? 3. In our lessons in this semester, we'll carry out Eco-Friendly Person Activities. How would you describe an eco-friendly person? * How would you describe the characteristics of an eco-friendly person? * What does s/he have to know? * How should s/he act? * How should s/he behave?
Post-implementation Interview questions
1. What do you think about the environment? What do you think these are? 2. There are environmental problems caused by some deterioration in the environment. What do you think these are? *What kind of change do you think the existing environmental problems in Turkey will undergo 50 years from now? 3. In our lessons in this semester, we carried out Eco-Friendly Person Activities. How would you describe an eco-friendly person? * How would you describe the characteristics of an eco-friendly person? * What does s/he have to know? * How should s/he act? * How should s/he behave? 4. How did your friends appear to you before, during and after the lesson? What kind of changes did you observe? *What did you gain from this lesson? I'll ask you to evalute.

Validity and Reliability Studies

In order to ensure validity and reliability of the study, the participants and the researcher's work were videotaped throughout the implementation. Two experts were asked to examine these records. Moreover, two weeks of the implementation process were observed by two experts. Pre-service teachers' consents to videotaping of the interviews were obtained using a volunteer form and such consent was also obtained verbally before the interview. The interview was carried out in the presence of the interviewee and the researcher only.

Data Analysis

Study data were analyzed using content analysis method. Content analysis involves summarizing and indicating basic contents of the available written documents and the messages they contain (Cohen, Manion and Morrison, 2007). Content analysis consisted of four stages, including processing qualitative study data obtained from the documents, coding data, finding themes, arranging codes and themes, describing and interpreting findings (Yıldırım and Şimşek, 2006). For the first stage, audio records and interview forms were transformed into written form in the computer environment without changing them. a total of 77 pages of written documents, including 23 pages before the implementation and 54 pages after the implementation, were obtained. Interview data, which was transferred to digital form without making any change, was reviewed by another researcher and deciphered records of the interview were cleared from daily colloquial language to make them suitable for analysis and arranged to

make them understandable (Coolican, 2009; Kvale, 1996). Then the interview was rearranged according to documentation rules (Mayring, 2000). Nvivo 9 program was used to analyze deciphered interview records. Data was analyzed using inductive analysis. Data was independently read by the author and qualitative study expert, and individual codes and categories were created. These individual codes and categories were compared and the records were examined until a consensus was reached. Inter-coder reliability coefficient proposed by Miles and Huberman (1994) was used to determine the reliability of the study. Compliance percentage was calculated using the following formula: reliability (r) = (Consensus) / (Consensus + Disseensus) X 100. Calculated compliance percentage was 91.03. Coding and categorization were performed before and after the implementation for each study problem and the findings were presented by including extracts.

Results and Discussion

Codes and categories obtained from the study are presented by giving pre- and post-implementation data in the same table. This tabulation method was thought to be effective so that the findings can be concretely understood. In this context, pre-service teachers' statements during the interviews are also included. The study results are listed under headings.

Results about the description of the environment

References and codes related to the opinions of the pre-service teachers from the study group about the environment are given in Table 4.

Table 4.

Coding and category densities of pre-service teachers' opinions about the environment before and after the implementation

Number of References and Coding Density of the Participants' Opinions About the Environment									
Before the Implementation					After the Implementation				
Category	Code	*NoR	**CD(%)	CD (%)	Category	Code	*NoR	**CD(%)	CD (%)
Living	Human beings	5	17.2	68.9	Living	Human beings	10	10.6	37.2
						Animals	9	9.5	
						Plants	10	10.6	
	Animals	8	27.5			Biotic	6	6.3	
					Nonliving	Earth	8	8.5	25.5
						Water	7	7.4	
						Sun	9	9.5	
	Trees	7	24.1		Balance	Water cycle	5	5.3	16
						Oxygen cycle	7	7.4	
						Phosphorus cycle	3	3.1	
Non-living	Environment	9	31	31.1	Intercation	Human-Human	8	8.5	21.3
						Animal-Human	7	7.4	
						Animal-Animal	5	5.3	

*Number of References **Coding Density

In view of the study data, there is a clear difference between the pre-service teachers' opinions about the environment before and after the implementation. Before the implementation, most of the participants represented the environment using living things such as human beings, animals or trees they see around them. As nonliving things, they showed the place where they live as the environment. It was seen that their description of the environment is incomplete. Before the implementation, the participants' statements were as follows:

> *"The environment is the space where my house is." (Pre-implementation Interview A)*

> *"It is the place [=space] where I[=human being], animals, trees live." (Pre-implementation Interview H)*

After the implementation, it was seen that the participants could refer to living things, nonliving things, the relationship between living things, that the system comprised of these things is in a balance and some factors providing this balance, while describing the environment. There were also differences between codings in *Living* and *Nonliving* categories before and after the implementation. Codes of nonliving category do not represent clarity, whereas

codes after the implementation are much clearer. The participants defined the environment using statements about the things comprising the environment, that these things are in balance by matter cycles and that this entire system is in an interaction. The implementation can be said to be useful in helping the pre-service teachers define the environment and the components of the environment. After the implementation, the participants' statements were as follows:

> *"It is a place where there are human beings, animals, plants, water and earth...interaction...where these creatures live in balance." (Post-implementation Interview C)*
> *"In the environment, human beings are affected by what human beings do [=human-human]." (Post-implementation Interview A)*
> *"There is a balance in the environment...the balance is provided by lion eating gazelle [=animal-animal]." (Post-implementation Interview E)*

Results About Existing and Future Environmental Problems

The participants' descriptions and opinions of the environmental problem are given in Table 5.

Table 5.

Coding and category densities of pre-service teachers' opinions about the environmental problems before and after the implementation

Number of References and Coding Density of the Participants' Opinions about the Environmental Problems									
Before the Implementation					After the Implementation				
Category	Code	*NoR	CD(%)**	CD (%)	Category	Code	*NoR	CD(%)**	CD (%)
Air pollution	Use of coal	11	20.3	59.2	Air pollution	Use of vehicles	14	7.9	28.1
						Use of coal	12	6.7	
	Factory wastes	8	14.8			Factory wastes	9	5.1	
						Use of oil	15	8.4	
	Felling trees	13	24		Water pollution	Contamination by pesticides	11	6.2	16.8
						Waste	4	2.2	
						Detergents	15	8.4	
					Radioactive pollution	Nuclear explosions	9	5.1	13.5
						Base station	15	8.4	
Ozone layer depletion	Deodorant	5	9.2	9.3	Global warming	Melting of icebergs	8	4.5	9.6
						Greenhouse gas	9	5.1	
Soil pollution	Domestic wastes	13	24	31.5	Soil pollution	Plastic	12	6.7	14
						Pesticide	6	3.4	
	Chemical	4	7.4			Waste oil	7	3.9	
					Behavior of a non eco-friendly person	Failure to separate plastics	6	3.4	17.9
						Failure to allocate papers to recycling	12	6.7	
						Waste of electricity	4	2.2	
						High consumption of water	10	5.6	

*Number of References ** Coding Density

In view of Table 5, it appears that the participants' opinions about the environmental problems before the implementation are concentrated in the categories *Air Pollution, Soil Pollution* and *Ozone Layer Depletion*. The environmental problems indicated by the participants are visible problems which directly affect human beings today. From the participants' statements, it can be concluded that they did not have adequate level of knowledge on environmental problems. In view of the participants' opinions after the implementation, it appears that the categories in which directly felt effects are referred to as environmental problems are detailed and diversified. Additionally, the participants also indicated the behaviors of non eco-friendly people as an environmental problem. Negative behaviors of people which affect the

environment were seen as an environmental problem and referred to with the category *Behavior of an Non Eco-Friendly Person*. The participants defined felling trees because of the failure to effectively ensure recycling of papers as an environmental problem and referred to individuals who act this way as non eco-friendly persons. Another significant point in the findings was that the participants only referred to environmental problems with visible effects which are effective today before the implementation, whereas they also referred to behaviors which have the potential to become an environmental problem when their effects increase, after the implementation. Examples of such references include the problem of water shortage caused by lack of awareness on water consumption, types of pollution caused by failure to separate plastics for recycling or long-term damages to the country caused by waste of electricity. In other words, the participants began to think about the future of the environmental problems.

Codes and categories about the participants' opinions of the change in environmental problems in the future are given in Table 6.

Table 6.

Coding and category densities of pre-service teachers' opinions about future environmental problems before and after the implementation

Number of References and Coding Density of the Participants' Opinions about Future Environmental Problems									
Before the Implementation					After the Implementation				
Category	Code	NoR*	CD(%)**	CD (%)	Category	Code	NoR*	CD(%)**	CD (%)
Negative Change	Cancer	18	56.3	90.6	Conditional Positive Change	Recycling	8	10.1	41.8
	Living things which underwent mutation	1	3.1			Environmental awareness	5	6.3	
	Death	7	21.8			Environmental education	4	5.1	
	Breathlessness	3	9.4			State placing emphasis on its citizens	7	8.9	
No Change	Being the same	3	9.4	9.4		Protection of animals	6	7.6	
						Afforestation	3	3.8	
					Negative Change	Water shortage	5	6.3	58.2
						Melting of icebergs	3	3.8	
						Extinction of living things	5	6.3	
						Pollution	12	15.2	
						Disease	9	11.4	
						War	8	10.1	
						Scarcity of food	5	6.3	
						Climate change	4	5.1	

* Number of References ** Coding Density

The majority of the participants stated that the environmental problems would be negative in the future before the implementation. It is seen that they think the environmental problems 50 years from now would only affect the living things. Their statements on such affects included breathlessness because of air pollution and increase in cancer. One of the participants said that the effects of environmental problems would manifest themselves as creating living things which have undergone mutation in the future. This statement was interpreted as the fact that the participant was far from the reality caused by lack of knowledge about the environment. Some of the participants stated that there'd be no change in environmental problems and no increase in the intensity or the number of the problems. Such statements were thought to be a result of the lack of knowledge on the factors affecting the environmental problems and ecological knowledge about the environment. The participants' statements before the implementation were as follows:

"There'll be too much cancer in the future; there'll be deaths caused by the environment "(Pre-implementation Interview B)

"Animals will undergo mutations because of the changes in the environment."(Pre-implementation Interview D)

It is seen that post-implementation participant opinions were concentrated by approximately the same rates in Conditional Positive Change and Negative Change categories and the opinion that environmental problems wouldn't change didn't continue. In view of the codes and categories after the implementation, it appears that participants had the opinion that the environment would undergo a change incorporating its entire components. In view of the codes of the category *Conditional Positive Change*, pre-service teachers indicated that the environmental problems could be solved, when eco-friendly behaviors such as environmental education, development of environmental awareness, effective functioning of recycling are shown in the future. Other participants expressed their opinions using pessimistic statements for 50 years from now as a result of their knowledge. The participants' statements after the implementation were as follows:

"50 years from now, water shortage will increase. Big states, which fight for oil today, will declare war against weak states." (Post-implementation Interview G)

"Because of air pollution [=pollution], everyone will have asthma [=disease], cancer [=disease]" (Post-implementation Interview D)

"If raising awareness increases, the number of activities made increases [=environmental awareness], environmental problems may be reduced. But there may be less environmental problems compared to today. But if there is no awareness raising, if the people who rule do not pay attention to the public [=State placing emphasis on its citizens], there'll be more to come. There may be a water shortage; may be this[=water shortage] will happen." (Post-implementation Interview F)

Results About Environmental Awareness

Table 7 shows the pre-service teachers' opinions about an eco-friendly person before and after the implementation.

Table 7.

Coding and category densities of pre-service teachers' opinions about an eco-friendly person before and after the implementation

Number of References and Coding Density of the Participants' Opinions about An Eco-Friendly Person									
Before the Implementation					After the Implementation				
Category	Code	*NoR	CD(%)**	CD (%)	Category	Code	NoR*	CD(%)**	CD (%)
Behavior	Going for a walk	4	11.1	52.7	Environmental knowledge	Photosynthesis	8	6.2	14
						Environment	4	3.1	
						Importance of a living thing	6	4.7	
	Not littering	12	33.3		Positive attitude toward the environment	Love for trees	7	5.4	39.5
						Love for living things	9	7	
						Love for Animals	4	3.1	
	Planting a tree	3	8.3			Love for the earth	14	10.8	
						Thinking about the earth	17	13.2	
					Environmentally responsible behavior	Not littering	11	8.5	46.5
Positive Attitude towards the Environment	Love for plants	8	22.3	47.3		Using recycle bins	10	7.7	
						Preferring domestic products	8	6.2	
						Planting trees	9	7	
	Love for Animals	9	25			Becoming a member of environmental protection organizations	5	3.9	
						Water saving	9	7	
						Calling 181 hotline	8	6.2	

* Number of References ** Coding Density

Pre-service teachers' opinions of an eco-friendly person before the implementation were grouped in the categories of attitude towards the environment and behavior. Codes in the behavior category reveal that the behaviors are not shown to provide a benefit to the environment. The participants thought that going for a walk in the environment or showing love for plants and animals are enough to become an eco-friendly person. It was seen that there were deficiencies in the participants' descriptions of a person with environmental awareness, i.e. an eco-friendly person.

In view of the participants' statements about an eco-friendly person after the implementation, it is clear that they referred to environmental knowledge, positive attitude and environmentally responsible behavior. They defined an eco-friendly person as a person with environmental knowledge showing positive attitudes towards the environment with acts such as showing love for the environmental components and thinking about them, and displaying environmentally responsible behavior s to the environment. EFPAP can be said to teach the participants what an eco-friendly person means.

> *"An eco-friendly person is a person who goes for a walk, travels and does sports." (Pre-implementation Interview D)*
>
> *"Loves cats [=love for animals], loves dogs [=love for animals]...loves the flowers in his/her home[=love for plants]." (Pre-implementation Interview J)*
>
> *"I'd call a person who does everything s/he does carefully an eco-friendly person. Actually most people know what they have to do but they cannot turn this into a behavior or a habit. I'd call a person who thinks about the earth and loves the living things on the earth an eco-friendly person." (Post-implementation Interview G)*
>
> *"S/he calls 181 hotline for people to take action when s/he sees an environmental problem...becomes a member of organizations protecting the environment, doing things for the environment [=becoming a member of environmental protection organizations]." (Post-implementation Interview D)*

Results About The Pre-Service Teachers ' Opinions of EFPAP Activities

After the implementation, the pre-service teachers were asked to provide their opinions about the activities. Codes and categories of these opinions are given in Table 8.

Table 8.

Coding and category densities of pre-service teachers' opinions about the implementation

Category	Code	NoR*	CD** (%)	CD (%)
Behavioral Changes	Power saving	4	2.9	55.8
	Calling the municipality	6	4.4	
	Reducing garbage	13	9.6	
	Using recycle bins	8	5.9	
	Using energy saving bulbs	7	5.1	
	Using waste battery bins	6	4.4	
	Recyclable material	14	10.3	
	Reuse:	18	13.2	
Attitude Changes	Awareness	8	5.9	25.8
	Interest in news about the environment	10	7.4	
	Happiness	2	1.5	
	Concern for the future of the environment	15	11	
Environmental knowledge Changes	Knowing the effects on the environment	10	7.4	18.4
	Knowing precautions	13	9.5	
	Knowing the importance of people	2	1.5	

* Number of References ** Coding Density

Pre-service teachers' opinions of the activities and the course were categorized according to the changes in behaviors, attitudes and environmental knowledge they referred to. It is clear that the participants gained knowledge about negative effects on the environment and possible precautions that can be taken against such effects. They developed an awareness of the environment, happiness because of developing love for the environment and concern about the future of the environment, and showed signs of positive attitudes towards the environment. It is seen that the participants acquired knowledge about environmental problems and they developed changes in behavior about prevention of environmental pollution. The pre-service teachers stated that they showed behaviors of saving, reuse and recycling, which can be an indicator of to what extent the objectives of the implementation have been met. The implementation can be said to be effective in raising eco-friendly pre-service teachers.

> *"I was greatly interested in energy saving bulbs. Energy saving bulbs are more expensive but you can use them for longer and cause less damage. For example, I looked at the bulb in my room and changed it."(Post-implementation Interview D)*
>
> *"Our house has no insulation. We were using too much gas for heating. We, me and my housemate, talked that we should use less gas [=energy saving]."(Post-implementation Interview C)*
>
> *"I'm happy when I see a forest; when I see it, I know that I should do my best to protect it."(Post-implementation Interview H)*
>
> *"In the past, I had no interest in news about the environment; now I most definitely read any news about the environment on a newspaper or a magazine" (Post-implementation Interview J)*

"Everybody should be aware that they live in the environment and not only them but also many people, living and nonliving things live in it and act accordingly [=awareness]. They should know that any damage caused by them will not only affect them but everyone around them."(Post-implementation Interview K)

After I learned from where a product has come from and the amount of damage caused to the environment in the process, I check the country of origin of every product [=awareness].(Post-implementation Interview A)

"Many conferences and congresses were held, decisions were passed but environmental pollution cannot be prevented, global warming cannot be prevented. I'm sometimes terrified about the future of environment [=concern for the future of the environment]."(Post-implementation Interview B)

Discussion, Conclusion and Suggestions

In the light of the findings obtained in the study, the effects of the Eco-Friendly Person Activity Package, developed to raise environmental awareness in the pre-service teachers, on developing environmental knowledge, attitudes and environmentally responsible behavior s towards the environment in the participants were investigated. In this context, the participants' pre- and post-implementation opinions about the environment, environmental problem and characteristics of an eco-friendly person were examined to identify the effectiveness of EFPAP. Their opinions of the implementation were also studied after the implementation.

According to the study findings, there were deficiencies in the participants' descriptions of the environment and their thoughts about environmental problems before the implementation. Most of the pre-service teachers considered the environment as one only consisting of the living things they can see around them and had no knowledge about the components of the environment and that such components are in a balance by interactions, and limited environmental problems with events causing damage to human beings. The participants, who stated that environmental problems only cause damage to human beings, showed characteristics of an anthropocentric individual (Erten,2007; Erten and Aydoğdu, 2011). Pre-service teachers had negative thoughts about the future of environmental problems in general. What is interesting here is that they didn't think that what individuals could do can have positive effects on environmental problems. In other words, before the implementation, the participants saw the environment independently from themselves and could not think that behaviors useful for the environment can have positive effects on the environment. These findings are consistent with those reported by previous studies in the literature stating that university students and teachers do not have adequate knowledge about the environment and the components of the environment (Desjean-Perrota, Moseley, Cantu, 2008; Erol and Gezer, 2006;Yılmaz, Morgil, Aktuğ and Göbekli, 2002;Sama, 2003; Zak and Munson, 2008). The fact that individuals have negative thoughts about the future of the environment is in contradiction with the objective of raising individuals who are optimistic about the future and know that the problems can be resolved by showing effort, one of the basic goals of education (Erten, 2003). This finding was interpreted as evidence of lack of environmental education.

After the implementation, the participants' thoughts about the environment, environmental problem and future environmental problems changed. The pre-service teachers referred to nonliving things, the relationship between the things and the balance in the environment while describing the environment. This indicates that their level of ecological knowledge about the environment improved. The implementation

was also found to deepen the participants' descriptions of environmental problems. Before the implementation, the pre-service teachers defined an environmental problem as visible situations which directly affect them, and after the implementation, they described environmental problems in detail. The participants became aware of the effect of human beings on the environment and defined behaviors of individuals causing damage to the environment as environmental problems. When the effect of the implementation on the opinions of future environmental problems is studied, it appears that basic level of reasoning about potential environmental problems 50 years from now was replaced by a variety of realistic ideas. It is noticeable in terms of the results of the study that the participants mentioned possibility of positive developments provided that individuals do what is required to resolve possible environmental problems in the future. This suggests that the participants showed signs of becoming an ecocentric individual. Ecocentric thought, which is based on protection of the environment in an unselfish way, ensures that environmentally responsible behavior s are more permanent (Erten, 2007; Erten and Aydoğdu, 2007). Therefore, it is very important that individuals have an ecocentric environmental understanding. This education provided improvements in the individuals' descriptions of the environment. This study is in good agreement with previous studies which showed that when educational activities about the environment provided to individuals were increased, their environmental knowledge also increased (Keleş, Uzun and Varnacı-Uzun, 2010; Poudel, Vincent, Anzalona, Huner, Wollard, Clement, DeRamus, and Blakewood, 2005; Şahin, Cerrah, Saka and Şahin, 2004).

Pre-service teachers were questioned about their knowledge on the characteristics of an eco-friendly person in order to identify their descriptions of environmental awareness before the implementation. They were asked to define environmental knowledge, positive attitude and environmentally responsible behavior, which are the three dimensions of an eco-friendly person (Erten, 2005). Before the activity package, the participants envisaged an eco-friendly person as a person who spends time inside the environment and shows love for street animals and houseplants. When the participants' opinions of an eco-friendly person were studied after the implementation, it was seen that they referred to ecological information about the environment, actions to protect the environment and attitudes towards the environment. The participants, who made a very limited description of an eco-friendly person before the implementation, made clear and detailed descriptions of an eco-friendly person after the implementation, which indicates that EFPAP was effective in introducing the concept of an eco-friendly person and requirements of becoming one. Moreover, their references to recycling of wastes and water saving indicate that they had the concept of an ecocentric eco-friendly person. Based on these findings related to the description of an eco-friendly person, environmental education provided as a whole can be said to be effective in raising awareness about attitudes and behaviors towards the environment in pre-service teachers. (Chatzifotiou, 2006; Meichtry and Smith, 2007; Volk and Cheak, 2003). Moreover, the participants' increased knowledge about the environment was found to be effective in increasing their attitudes and behaviors towards the environment (Tikka, Kuitunen and Tynys, 2000). It is very important to know the definition of an eco-friendly person and act as one. Only a teacher showing eco-friendly behaviors can raise awareness about the environment in new generations (Güler, 2009, Haktanır, 2007; Lewin-Benham, 2006; Malone and Tranter, 2003; Phenice and Griffore, 2003).

In view of the participants' opinions about EFPAP, they were found to use positive statements about the process. The pre-service teachers stated that they enjoyed carrying out the activities and being involved in noncurricular activities. Changes in the

participants themselves and their environment after the implementation included increased environmental knowledge, changes in attitudes such as happiness about the environment and concern about the future of the environment and, behaviors aiming to protect the environment and prevent problems. EFPAP can be said to change the individuals' knowledge and attitudes, which in turn are transformed into behaviors about the environment. The valuable result, which the study aimed throughout the implementation process, was that the environmental education manifested itself in the individual as a behavior useful for the environment. A teacher who is unaware of environmental problems, does not have adequate knowledge and experience, has no experience of the environment and does not show environmentally-conscious behaviors cannot reach the level of environmental education s/he aims in his/her students (Atasoy and Ertürk, 2008; Atasoy, 2015). An eco-friendly teacher can be effective in providing his/her students with information about the environment and raising awareness in them (Güler, 2009, Haktanır, 2007; Lewin-Benham, 2006; Malone and Tranter, 2003; Phenice and Griffore, 2003). It is thought that maintaining an educational understanding which makes individuals face the real environment in a certain arrangement and shows them that they are the lead actors (Erten, 2007) in environmental problems, which is a worldwide problem beyond what they see, was effective. These findings are in good agreement with previous studies which reported that when the individuals are provided with environments where they acquire knowledge by interacting with the environment, reflect on environmental problems outside the classroom and do something for the environment, more effective results can be achieved (Karataş and Arslan, 2012; Meydan, Bozyiğit and Karakurt, 2012; Ozaner, 2004; Payne, 2006; Phenice and Griffore, 2003).

In general, the study results suggest that the Eco-Friendly Person Activity Package, which was developed to raise examples of eco-friendly teachers and integrated into Environmental Education Course, can be said to be effective in reaching its targets. Providing environmental education in a planned manner is seen to enable observation of eco-friendly behaviors in students in a quicker way (Uluçınar-Sağır,Aslan & Cansaran, 2008). It is a fact that it is not possible to provide environmental education which may resolve environmental problems by only using a book full of environmental knowledge and observing the environment seen through the window of a classroom. The future of the environment requires raising individuals who were educated using the environment, live the environment and are equipped with knowledge, attitudes and behaviors to keep the environment alive. Repeating this study, which was conducted with students from a department during a semester, with pre-service pre-service teachers from various departments in a greater scale may contribute to understanding the effectiveness of EFPAP. Deficiencies in knowledge, attitudes and behaviors about the environment of the students before the implementation were ascribed to the fact that they didn't receive any environmental education during previous six terms of their undergraduate study. This result is evidence of the lack of environmental education, which is a problem with international scale, and causes concern. Based on this, it is thought that there should be curricular activities in which environmental education is provided using alternative implementations and which doesn't limit environmental education with a single course.

▪ ▪ ▪

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RESEARCH ARTICLE

Çevre Bilinci Kazandırmaya Yönelik Geliştirilen Çevre Dostu Birey Etkinlik Paketine İlişkin Öğretmen Adayı Görüşleri*

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Özet

Bu araştırmada, öğretmen adaylarına çevre bilinci kazandırmayı, gelecekteki öğrencileri için çevre dostu örnek bir öğretmen olmalarını sağlamayı amaçlayarak geliştirilmiş Çevre Dostu Birey Etkinlik Paketi'nin, etkililiği ve bu pakete ilişkin katılımcı görüşleri araştırılmıştır. Araştırma 2014-2015 eğitim-öğretim yılı güz döneminde bir devlet üniversitesinde Çevre Eğitimi Dersi'ni alan, Sınıf Öğretmenliği 4. Sınıf öğrencilerinden 75 kişi ile gerçekleştirilmiş, çalışmaya katılan 10 öğrencinin görüşlerine başvurulmuştur. Nitel araştırma deseninde fenomenolojik (olgu bilim) bir çalışmadır. Araştırmada veriler yarı yapılandırılmış görüşme formu ve görüşmeler ile elde edilmiş, Nvivo 9 nitel analiz programı ile tümevarımcı bir yaklaşımla çözümlenmiştir. Katılımcıların uygulama öncesi ve sonrası; çevre, çevre sorunu, gelecekteki çevre sorunları, çevre dostu bireye ilişkin bilgileri sorgulanmış ve uygulama sonrası Çevre Dostu Birey Etkinlik Paketi'ne ilişkin görüşleri alınmıştır. Uygulama öncesi katılımcıların çevreye ilişkin bilgi eksiklikleri, çevre sorunlarında insanın rolünün göz ardı edildiği, gelecekteki olası çevre sorunları ile ilgili gerçekçi tahminlerde bulunamadıkları ve çevre dostu birey olma gerekliliklerini bilmedikleri tespit edilmiştir. Çevre Dostu Birey Etkinlik Paketi ile verilen çevre eğitimi sonrası katılımcılar, çevre ile ilgili ekolojik bilgilere hakim, bu bilgilerden hareketle çevre sorunlarını ve nedenlerini tanımlayabilen, gelecekte çevrenin durumunun insan davranışlarına bağlı olarak değişeceğini fark eden, çevreyi sevme ve geleceğinden endişe etme gibi olumlu tutum gösteren, çevre dostu bireyi tanımlayan ve böyle davranışlar gösterdiklerini belirten ifadelerde bulunmuşlardır. Bulgulardan hareketle; çevre dostu örnek öğretmenler yetiştirmeyi hedefleyen Çevre Dostu Birey Etkinlik Paketi'nin hedefini gerçekleştirmede etkili olduğu sonucuna ulaşılmıştır.

Anahtar Kelimeler: Çevre eğitimi, çevre dostu birey, öğretmen adayları, çevre dostu birey etkinlik paketi.

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RESEARCH ARTICLE

The Effect of Ecopedagogy-Based Environmental Education on Environmental Attitude of In-service Teachers *

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Abstract

Environmental attitude covers a person's behavioural aims, impacts, and believings which is acquired from environmental subjects or activites. It is also mentioned that environmental attitude can be used in order to predict environmental behaviour. The aim of this study is to analyse the efficiency of an ecopedagogy-based TUBITAK environmental education project, which comprised of community of practice and was titled 'Ecology in Canakkale and Around, 2010', on environmental attitude of in-service teachers and to determine whether there is any difference between genders in terms of environmental attitude. The methodology of the study was mixed methodology within a case study. The qualitative and the quantitative data were collected simultaneously and evaluated together. An environmental attitude scale was used in order to collect the quantitative data. The participants' diaries, semi-structured interview and non-participant observation notes were used in order to collect the qualitative data. It was found that the ecopedagogy-based environmental eduction caused to change environmental attitude of in-service teachers favourably and this change was observed mostly on male in-service teachers.

Key words: Eco-pedagogy, community of practice, in-service teachers, environmental attitude, TUBITAK.

Introduction

'Ecology' has gained a status of common use in the 21st century. This is attributable to the UN Rio Summit Declaration adopted in 1992 which puts strong emphasis upon need for paying greater attention to ecological elements in the developing programs and efforts, adding that ecology has social and economic impacts. Even though economy and ecology are not considered complimentary (Lummis, 2002), this has changed over the time; currently, even commercial titles seek to underline that their products are so-called 'environment friendly'. Does this refer to an actual environmental awareness or a fashion of becoming ecological? What really matters should be the awareness that ecology is extremely important.

A number of suggestions have been made in an attempt to address global ecological problems (Çepel, 2008). McCallum (2008), on the other hand, underlines that it is us-human- and not the globe that needs to be saved and addressed. It appears that perspective is important to consider because ecology-related issues including erosion, environmental degradation, climate and flora are discussed with almost no reference to human (Postel, 1999). However, scholars note that environmental approach needs to be holistic (Öztunalı- Kayır, 2003; Vester, 1997). From holistic approach, the human is considered as a part of nature—not master of it, implying that any harm done to nature will eventually affect people as well (Öztunalı- Kayır, 2003; Vester, 1997). As an

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observation, it could be argued that the focus on nature has been mostly human-oriented. This sort of approach considers nature as the servant for human (Lummis, 2002; Ünder, 1996). Achievement of holistic approach therefore matters for a sustainable nature; at this point, 'education' appears to be the most important subject to discuss (Gadotti, 2008; UNEP, 1972).

Eco-pedagogy

The 1972 UN Stockholm Conference on Environment final declaration states in its 19th principle that ecological problems are to be solved via education for a sustainable life, stressing the importance of adult education (UNEP, 1972). A diverse set of education and education is employed (ecological education, integrated education, and eco-justice etc.) for sustainable development (Kahn, 2010; Kahn, 2008). Kahn (2010) notes that these educations have positive impacts upon ecological literacy while falling short to achieve bold goals. According to Kahn, sustainability is achievable by development of a critical approach towards political, ideological and economic events. This critical approach towards education is called 'eco-pedagogy or earth pedagogy' (Kahn, 2010; Kahn, 2008). The fundamentals of the eco-pedagogy include protection of nature (natural ecology), the impact of the human societies upon nature (social ecology) as well as the influence over civilization and economic, social and cultural composition (integrated ecology) therefore, essentially it promotes respect for nature, human, culture and diversity. In fact, all these notions constitute core of the 'World Convention'. Considered necessary for a sustainable development, the global convention is made possible by interaction between all elements in the world. However, it is also stressed that subscription to this convention should begin at schools and social groups (Antunes & Gadotti, 2009).

Community of practice

Etienne Wenger has also put special emphasis upon education within a society. Etienne Wenger's (2004) conceptualization of 'community of practice' is defined as a learning of cooperation with a constructive approach (Johnson, 2001) and is considered for use in the restructure of knowledge by an application in a social environment (Baran, 2006). In fact, community of practice is not a new perspective or approach. Even though it is first introduced in industry, this perspective is said to be traceable back to many centuries ago (Wenger, McDermott & Snyder, 2002). Community of practice is first determined as a field of subject that will gather the group or community. Around the field of subject, a group of people sharing the same goals and ambitions are gathered together. The knowledge and talents to be transmitted are learned by cooperation based on implementation and practice (Wenger, 2004).

The features of the community of practice and the goals and content of the ecopedagogy-based education on nature overlap in many respects. In the ecopedagogy-based environment education, a group of select participants are gathered together to make sure that they learn the language of the nature and subsequently develop holistic approach (Ozaner, 2004). Three major titles stand out here: (a) Ecopedagogy-based environment education, (b) a group of selected participants, (c) learning by practice. The ecopedagogy-based environment education as defined in this study refers to the field under review, the group of participants consists of in-service teachers who work at Ministry of Education of Turkey and students as well as academics. Some of the aims of ecopedagogy- based environmental education help to improve favourable environmental attitude and

awareness, increase environmental knowledge level, have holistic approach towards nature (Turner, 2011).

Particular attention is paid in Turkey and in the world to ecology education; there are a number of international (Chenoweth, Wehrmeyer, Lipchin,Smith & Gazit, 2007; Davis, 2013; de Wet, 2007; Dori & Tall, 1998; McNaughton , 2010; Miller, 2008; Misiaszek, 2011; Turner, 2011) and domestic (Akşit, Akşit & Kayacılar, 2012; Eryaman, Yalçın-Özdilek, Okur, Çetinkaya & Uygun, 2010; Güler, 2009; İstanbullu, 2008; Keleş, Uzun & Varnacı- Uzun, 2010; Oğurlu, Alkan, Ünal, Ersın & Bayrak, 2013; Okur-Berberoğlu, Yalçın-Özdilek, Eryaman, Uygun & Çetinkaya-Edizer, 2013; Yalçın & Okur, 2014; Yardımcı, 2009) studies on this subject.

Literature Review

Misiaszek (2011) studied on how an ecopedagogy education should be with 31 ecopedagogy specialist from South America (Buenos Aires, Cordoba, Santa Monica, Argentina and Sao Paulo, Brazilya) and North America (Appalachia). One of the specialist asked why environmental educations were intended for students, not in-service teachers. Whereas adults such as in-service teachers earn money so they especially need environmental education. Ecopedagogy supports social and environmental justices beside traditional environmental education (Gadotti, 2008; Kahn, 2008; Lummis, 2002) therefore there is critical perspective to politic and educational systems (Kahn, 2008; Lummis, 2002). Social transformation might happen by this perspective. Hence in-service teachers need more ecopedagogy education than the other human community. On the other hand this critical perpective should not be taught just within formal education, outdoor activities should also be used for ecopedagogy education. (Misiaszek, 2011)

TUBITAK (The Scientific and Technological Research Council of Turkey) has been financed environmental education projects intended for professional development of in-service teachers since 1999 (Erentay & Erdoğan, 2009). The expectations of the TUBITAK from these projects are to have favourable environmental attitude and awareness, increase environmental knowledge level, have positive behaviour change, teach nature's language in natural environment by activities. The expectations from in-service teachers are to share these knowledge, experiences, and acquisitions at private and social lives, by this way TUBITAK aims to have common impact of educations on public. (TUBITAK Call Paper, 2010)

TUBITAK projects intended for in-service teachers help to fill the gap which Misiaszek (2011) mentioned in her research because there are many theoretical publications related to ecopedagogy (Hung, 2014; Lucksinger, 2014; Monani, 2009) however I could not reach to praxis research. The budgets of TUBITAK projects are mostly high however there is a problem at sharing of the outputs of the projects (Okur-Berberoglu & Uygun, 2013a). The most remarkable result when we have considered literature review above is that the most of the publications' data are derived from the TUBITAK 4004 coded projects intended for students (Akşit et al., 2012; İstanbullu, 2008; Yardımcı, 2009). On the other hand one of the target group of 4004 coded projects is in-service teachers (TUBITAK, Call Paper, 2010, 3).

It has been observed that there is lack of publications derived from the 4004 coded projects intended for in-service teachers (Eryaman et al., 2010; Güler, 2009; Keleş et al., 2010; Oğurlu et al., 2013; Yalçın & Okur 2014) therefore this research focused on the publications derived from the 4004 coded projects intended for in-service teachers because the target group of this research was in-service teachers as well. There is limited research about ecopedagogy praxis so I mentioned Turner (2011)'s research

even she worked with students. 'Ecology-based Environmental Education IV' was carried out at Gala Lake National Park, and Igneada Longoz Forest National Park in Edirne collaboration with Hacettepe University and TUBITAK in 2008 (Güler, 2009). 24 in-service teachers attend to the project and it was for 12 days. The aims of the research were to determine expectations of in-service teachers from project, to indicate self-efficacy level of environmental education teaching, and to identify changing of personal opinion about environmental education. The data was collected by semi-structured interview and analysed by discourse analyses. At the end of the analyses, the participants said that their expectation form project was to gain environmental knowledge and they had it. They also said they were happy because their perspective to the world changed as favourable, they felt more responsible to the nature, and they would share and teach what they had learnt. On the other hand, the participants did not have enough self-efficacy about using outdoor education as a learning environment so they tended to invite an expert or academician about outdoor environmental education. (Güler, 2009)

Keles et al., (2010) carried out a TUBITAK project which was titled 'Nature Education at Ihlara Valley and Around' collaboration with Aksaray University in 2009. 25 pre-service teachers attend to the project which was applied for 10 days. The aims of the research were to determine the effect of the environmental education on environmental ideas, awareness, attitudes, and behaviours of participants via scales. The scales were applied as pretest- posttest- postpost test (after 3 months). At the end of the research, it was indicated that environmental awareness level of participants was increased, and environmental attitude and behaviour were changed as favourable while there was not any difference environmental ideas.

Eryaman et al., (2010) researched the effectiveness of an ecopedagogy- based and community of practice- based environmental education on participants. The data was derived from the project which was titled 'Ecology in Canakkale and Around, 2009' and collaboration with TUBITAK and Canakkale Onsekiz Mart University. The project was 10 days, two terms, and there were totally 40 in-service teachers who was working at different disciplines. The participatory action research was used as methodology. The data was collected via semi-structured interview, participant observation, camera records, and open-ended questions. The aim of the project was to determine tendency of the participants to take active role in solving any environmental problem. As a result, the researchers found that the participants were very enthusiastic in order to take active role to solve any environmental problem. They suggested that non-governmental organisations and schools should have more collaboration, be developed more effective environmental education programmes and followed up the participants after projects.

Turner (2011) designed an ecopedagogy-based environmental education programme for college students. The aim of the study was to determine environmental consciousness of the students. The research was carried out to two different group as two semesters at a state university in Maryland. The community of practice was applied in the research. Totally 35 (18+17) students joined the research as volunteer. The researcher carried out and lectured the subjects herself. Each education was for 14 weeks. The subjects were mostly related to the social sciences. The titles of the subjects were 'Nature and the Self; Masters, Stewards, Family; Language, Media, and the Environment; Place and Space, or Where We Live; Production, Consumption, and Waste; Rights, Ethics, and Environmental Justice; Envisioning the Future'. The researcher used the NEP (New Ecological Paradigm) survey, open ended questions, self reflections (poem, story, photograph etc) and writing assignments for the evaluation. The NEP survey was used as pretest-postest and percenteage of the

results were calculated. The other qualitative data were analysed by discourse analysis. The researcher determined her methodolgy as qualitative approach though she used NEP survey. The percentage of the posttest of the NEP survey increased at the the end of the research. The incresing were calculated respectively as 5.3 % and 6.5 % but these incresings were very low. 8 theme were determined at the end of the research. These were 'empathy, mutuality, ethical consciousness, context, critical language awareness, perspective, imagination, and agency'. The researcher found that her ecopedagogy-based education program was effective on having environmental consciousness of the students. The following up was not carried out at this research.

Oğurlu et al. (2013) explained some geography subjects (location, climate, flora, fauna, ecosystem etc.) to in-service teachers via activities within a TUBITAK project which was titled Isparta Nature Conservation Areas Nature Education (IDE) in 2012. The aims of the project were to examine competency of formal education system in terms of environmental education and to determine exist and potential contribution of 4004 coded projects on geography education. The data was collected by surveys and interviews which were held at the beginning and the end of the project. It was found that the competency of formal education system in terms of environmental education was insufficient; 4004 coded projects helped to eliminate this incompetency, the environmental knowledge levels of in-service teachers were increased, and their perspective to natural environment was changed as favourable.

Okur-Berberoğlu and Uygun (2013b), carried out an ecopedagogy-based environmental education program within a TUBITAK project which was titled as 'Ecology in Canakkale and Around'. The aim of the research is to determine the effect of the education program on in-service teachers' gaining environmental knowledge, having favourably awareness and attitude. The quantitative approach and pretest-posttest-control groups design were used. This research design was used just within this study. There were two control groups and one experimental group. The in-service teachers who had ecopedagogy-based environmental education were in experimental group. There were 66 in-service teachers totally. The in-service teachers were followed up after six months. The educators taught subjects via outdoor experimental activities for experimental group. The indoor experimental activities were used for control group 1; traditional methods (lecturing, question-answer, discussion) were used for control group 2. An environmental knowledge test, awareness and attitude scales were developed within quantitative approach. Indoor group was more effective in terms of gaining knowledge while experimental group had more favourable awareness, and attitude.

Yalçın and Okur (2014) examined the effectiveness of an ecopedagogy-based environmental education program on electromagnetic area awareness of in-service teachers. The project was held in Canakkale and financed by TUBITAK in 2010. The project was ecopedagogy-based and for 10 days. There were 24 in-service teachers as participants at the project. The triangulation mixed methodology was used within a case study. The participants were followed up after six months. The data was collected by the electromagnetic field awareness scale, diaries of the participants, semi-structured interview documents and 6th month following up data. It was identified that the participants' awareness was developed throughout the education and they tended to be careful about using of electrical devices such as mobile phone, computer, hair dryer in their daily lives.

The other important point at the literature above was that they rarely researched on environmental attitude (Keleş et al., 2010; Okur-Berberoğlu & Uygun, 2013b). However attitude is used an indicator of behavioural change (Barker & Roger, 2004) because

the main aim of environmental educations is to change environmental behaviour favourably (Barr & Gilg, 2007).

Environmental Attitude

Özgüven (1994) determines attitude as acceptance or rejection tendency to an idea. Attitude has three dimensions: cognitive, affective and behavioural (Morgan, 1989). Environmental attitude covers all personal behavioural aim, impact and believes which are acquired by environmental knowledge and activities. (Bogner & Wiseman, 2006). Kaiser, Wölfing and Fujrer (1999) say that environmental attitude might be used in order to predict environmental behaviour. Behavioural change can be observed directly however it takes a long time to observe this change (Kaiser et. al., 1999) so attitude is used in order to estimate behavioural change. It is needed a scale in order to determine attitude and there are environmental attitude scales which are developed for the different researches (Barr & Gilg, 2007; Çınar, Doğu & Meydan, 2008; Fernandez Lo Faso, Gemio, Garcia, Ceballas- Zuniga, Bueno & Gallardo, 2006; Gökçe, Erdoğan, Aktay& Özden, 2007; Kellstedt, Zahran& Vedlitz, 2008; Mostafa, 2007; Okur & Yalçın-Özdilek, 2008; Raykov & Marcoulides, 2006; Tikka, Kuitunen & Tynys, 2000). The researcher decided to use a scale which was developed by Okur ve Yalçın-Özdilek (2012) beacuse it was very suitable for the aim of this research.

The other important point environmental attitude research is gender difference. Fox-Keller (1983) said that female students were keener on to ecology in natural science; this might be related to higher empathy abilities of females (in Bowen& Roth, 2007). Kellstedt et al., (2008) carried out a modelling study intended for adults about the subjects of global warming such as knowledge, attitude and personal competency. They designed two kinds of modelling for men and women because they thought that women were more aware than men in terms of environmental subjects therefore the modelling could be affected this tendency of women. Mostafa (2007) said that men had more favourable attitude in terms of using eco-friendly products than women while Tikka et al., (2000) found women have more favourable attitude. Similarly Gökçe et al., (2007), Okur and Yalçın-Özdilek (2008), Çınar et al., (2008) found that female students had more favourable attitude than male students. Yalçın-Özdilek, Kaska, Olgun and Sönmez (2006) did not find any difference between genders in terms of environmental attitude.

Some research as seen above did not find any gender difference in terms of environmental attitude while some of them found that females have more favourable attitude. On the other hand there were no explanation why females had more favourable attitude except Fox-Keller's (1983 in Bowen & Roth, 2007) explanation by empathy ability of females. On the other hand Okur, Yalçın-Özdilek and Sezer (2013) checked out the correlation between multiple intelligence areas and environmental attitude by regression analysis. They found that there were no difference between genders in terms of environmental attitude while the female students had more scores than males at nature intelligence category. They offered that natural intelligence might be used in order to predict environmental attitude. As seen above there have been different results in terms of gender therefore gender difference was checked out at this study as well.

The aims of this study are to determine effectiveness of an ecopedagogy-based and community of practice- based environmental education project which was titled 'Ecology in Canakkale and Around, 2010' on environmental attitude of in-service

teachers and to examine whether there is any significant difference between genders in terms of environmental attitude.

Methodology

The methodology of the study was mixed method within a case study. The qualitative and the quantitative data were collected simultaneously and evaluated together. Environmental attitude scale was developed in order to collect the quantitative data. The diaries of participants, semi-structured interview and non-participant observation documents were used in order to collect the qualitative data.

Quantitative Data Collection Intervention: Development of Environmental Attitude Scale

The scale which was developed by Okur and Yalçın-Özdilek (2012) was used (Annex 3). The scale was carried out both explanatory and confirmatory factor analyses. The explanatory factor analysis gave entry factor loads as 0.30 and above, the KMO value as 0.763 and the Bartlett dimensionality test as less than 0.001, the Cronbach Alpha coefficient as 0.740 whereas in the confirmatory factor analysis, the adaptation figures were obtained as X^2 /sd: 1.88, RMSEA: 0.066, SRMR: 0.062, CFI:0.90, IFI:0.90, GFI:0.92, AGFI:0.87. It was concluded that the figures out of the explanatory factor analysis are consistent for the measurement of the environmental attitude of individuals (Büyüköztürk, 2007; Şencan, 2005) and that its theoretical foundation is strong and solid (Şimşek, 2007). Environmental attitude scale had two-dimensional, and named as having favourable attitude and having unfavourable attitude.

Quantitative Data Analysis

Whether the data retrieved out of the participants feature a normal distribution is tested by Kolmogorov-Smirnov test. This test is preferred to confirm that data do not show a normal distribution even if number of samples in a research is less than 30. If 'p' significant value is bigger than .05 at the end of the Kolmogorov-Smirnov test it means that data do not show normal distribution (Büyüköztürk, 2007). The p value was less than 0.05 end of the Kolmogorov-Smirnov test in this research, it was concluded that the results did not reveal a normal distribution therefore non-parametric tests were used in other analysis.

The analysis of the tests that were run before and after the education was evaluated by the Wilcoxon signed-rank test. This test is suitable if repeated measures are done to same group and results do not show normal distribution (Büyüköztürk, 2007; Huck, 2004; Peers, 1996). Mann Whitney U test confirms that pretests and posttests do not display any significant difference between genders in terms of results. The Mann Whitney U test was picked because the participant points did not display normal distribution and the observation were independent from each other (Büyüköztürk, 2007; Huck, 2004; Peers, 1996).

Qualitative Data Collection Interventions

It is noted that case study is a useful method to collect data about events and individuals (Yıldırım & Şimşek, 2006) and to draw definitive and explanatory conclusions (Morgan, Hamilton, Bentley, & Myrie, 2009). Likewise, it is also underlined that case study is a reliable method in the literature to have deeper understanding of events (Mitchell, 2008; Robinson, 2008; Schmitt, 2005; Yıldırım& Şimşek, 2006). Yıldırım and Şimşek (2006) emphasize that qualitative research is an effective tool in order to understand better human behaviour.

Case study was used in this study as a qualitative research method. The participants were asked to keep a diary in order to collect the qualitative data. A diary was given to each participant for that purpose. The participants were asked to write down on a daily basis what they had learnt during the day, how they were planning to use these skills in their lives and how they felt about that day. This particularly sought to ensure that the participants make an independent and impartial comment on the program (Morgan et al., 2009). Morgan et al., (2009) note that individuals may express themselves more accurately when they do this independently and freely, suggesting that this is actually allowing researchers to gather proper collection of data and information. In addition, a project meeting was held with the participants at the end of the program. At the meeting, they were asked to share their experiences on the most influential and amazing part of the project and how they thought to share this in their social and daily lives in the future. The meeting was camera-recorded; after the meeting, the transcript of the record was made available for effective use.

It is noted that additional techniques should be employed in order to have greater reliability of qualitative data, (Yıldırım & Şimşek, 2006). Different methods are offered to achieve reliability (Morgan et al., 2009; Yıldırım & Şimşek, 2006). One of these methods is non-participant observation (Zanovello, 1999). Baş and Akturan (2008) recall that researcher may not be able to spend his or her whole time with the participants or participants may act differently when they are with researchers. For this reason, the project supervisor and 4 assistants working in the project observed the participants during the education and took notes. At the end of the project, the diaries, the transcripts of the meeting as well as the observation notes have been analysed by reliance on content analysis.

Education Programme

The education program was designed as an academic programme for 10 days in line with eco-pedagogic approach as well as the objective of the science-society projects (TUBITAK Call for Paper, 2010, 1-2). The goal of an academic programme is to ensure participant becomes part of knowledge, perceive nature as a whole and think like a scientist (McNeil, 1996). Within the academic program, knowledge and information are disseminated from simple to complicated version and in connection with other disciplines (McNeil, 1996). Bruner also expresses support for an academic outlook in the programs (in Demirel, 2005). The biggest criticism to the academic program underlines that every teacher cannot be as knowledgeable as a scientist in any given subject (McNeil, 1996). However, the educators were picked in terms of community of practice. In line with the same goal, different scholars from 21 different disciplines were brought together to create a learning environment of social and cognitive salience.

The subject matters of the project included production of compost out of domestic organic waste, vertebral animals in Canakkale and its nearby towns, the geological history and outlook of the same vicinity, the endemic flora in the region, the river ecology, its importance and features, the Troy National Park since the Prehistoric era, ethno-botanic, seaweed and their crucial importance, the historical importance of Canakkale, underwater and sea ecology, underwater scuba-diving, ecotourism, the climate and aerial aspects of the region, electromagnetic field created by man and environmental safety and health, astrophysics, Can coal basin and water resources, ecological footprints, the role of insects in protection of the nature and biological combat, and deep ecology. As seen above the researcher used the subjects related to either natural sciences or social sciences for the ecopedagogy-based education programme.

Gadotti (2008) emphasizes that the subjects related to either natural sciences or social sciences might be used within an ecopedagogy-based education programme. On the other hand ecopedagogy has four key principals (Lummis, 2002): equity, morality, respect and inclusion. Equity explains relationships between human and non-human communities. Moral explains to consider human and the other life forms. Respect explains to consider cultural and biological diversity. Inclusivity explains to codify all human as men, women, minorities, and the other life forms in an ethical framework. (Lummis, 2002) In this perspective biodiversity was often emphasized in this research. For example the educator who lectured 'vertebral animals in Canakkale and its nearby towns' lesson directed an activity at Kalkim Village. The educator demonstrated how to catch a vertebral animal at the area and wanted to participants to catch some vertebral animals. The participants found mostly tortoises and lizards but could not find any snake so the educator used the snake samples which were fixed in formaldehyde in order to show to the participants. (Annex 2)

Participant Selection

TUBITAK asks greater involvement and participation of students, teachers, and public civil servants working rural areas as well as graduate students in the target group for an effective and reliable outcome in the research. The call for application in 2010 asked participation of the in-service teachers working in the Darüşşafaka Education Institution, Childcare Institution regional boarding schools (YİBO) (TUBITAK Call for Paper, 2010, 3). Priority was given to the teachers from YIBO schools.

A survey was designed in order to select participants. A paper which explained the aim of the project and the survey e-mailed to all primary and secondary schools' e-mail accounts. It was asked to the in-service teachers to write down an essay related to why they wanted to join to the project. All essays were collected by e-mail. Project director selected the participants according to their essays. The total number of participants in the project was 24; 13 of them were male, 11 of them were female. The demographic characteristics of the participants were presented at Annex 1.

Results

It is evident that there is statistically significant difference between the pretest and posttest results out of the environmental attitude scale ($z = -2.620$, $p<.05$, Table 1). A review of the difference results average as well as the totals confirms that this is in favour of the positives. According to these findings, it could be argued that the ecopedagogy-based environmental education has been effective on changing the environmental attitudes favourably.

Table 1.

Comparison of the pretest and posttest results of the participants out of the environmental attitude scale by use of Wilcoxon Signed-Rank Test

Posttest-Pretest	*N*	*Average*	*Total*	*z*	*p*
Negatives	6	9.75	58.50	-2.620*	.009
Positives	18	13.42	241.50		
Equal	0				

* Based on negatives

Participant no 2, female science teacher, made the following statement after diving activity on the diary and she affirmed the impact of the event on change attitude:

> *"I could not sleep at night; I was scared because I could not swim and it would be my first time on the sea. I was undecided on diving….It was nice to see the underwater world. I was fun touching the plants down there and seeing fishes swimming around me. I will pay utmost attention not to do harm on the underwater living things."*

The participants had 3 m. scuba diving experience helping with diving experts at Bozcaada, Aquarium Cove. She emphasized that she were nervous at the first stage but later her attitude has changed as favourably when she saw under sea and biodiversity.

Participant no 23, female biology teacher, stated his favourable attitude towards nature on the diary after the 'vertebral animal of Canakkale and around' lesson on 25.07.2010:

> *"I realized that I had some prejudices I have to get rid of. Everything in the nature plays a role whether you like it or not.*
>
> *All living things in the world are equal."*
>
> *I had an opportunity to talk with 23 coded participant while diving activity. She mentioned how she liked natural environment and tried to inspire her children to like the natural environment. She emphasized that she might like the natural environment because of motherhood or hormones. Participant no 1, female mathematics teacher, made the following statement on the diary after the same lesson on 25.07.2010:*
>
> *"The lecture was a little big rough given that it was after the lunch. I had prior prejudices because I was not good with the animals; this has significantly changed owing to the professor. I never put myself in place of the animals. I learned some new terms on vertebral animals. I went beyond my limitations in the practice session. I even touched a snake. I was pretty nervous before the class; but now I am perfectly fine. I also acquired extensive information on how to discern these animals."*

23rd participant expressed her favourable attitude within holistic perspective and 'equality' concept, the 1st participant stated that her attitude changed favourably. One of the most interesting points for the participants at vertebral animal lesson were to

touch a snake for the first time in their lives even it was dead. The other was to learn that the farmers was thinking blind lizard as a snake and killed it. The participants might refer to 'equality' because of this kind of killing.

Participant no 11, male primary school mathematics teacher, expressed his attitude after 'the endemic flora in Canakkale and around' lesson on 26.07.2010 as follows:

> *"I talked to my friends before; I am actually fond of nature; I truly love animals, the flowers, the trees and the plants; I really care about the nature. I remember myself sobbing because I witnessed mass killing of street animals. Because I am extremely concerned about the environment, I am really careful about dumping and littering. But I did not know I had actually a lot more to learn; this course made me realize there are a lot more to think about on nature and environment. This project made me see that the circle was actually bigger and larger than I used to think."*

The participants firstly had theorical lesson mentioned above and the day after practical lesson in land. The lecturer explained why Canakkale has had rich endemic flora and wanted the participants to pick up some flora samples. 11th participant mentioned this richness. During the lecture sessions, the project team has also observed the participants. It was noted that the participants were heavily interested in the course content as evidenced by frequent questions directed at the instructor and the participants' eagerness to buy books recommended by the teacher. 8th participant, male science and technology teacher, asked how they could create a herbarium in their school. Creation of a herbarium is a fairly expensive endeavour. Such a question means that he developed strong interest in the subject during the course.

The participants were also mentioned how their attitude changed favourably at the meeting which was held at the end of the project. Participant no 9, male science teacher, made the following statement on his environmental attitude:

> *"People develop attitudes towards the nature based on their profession or experiences; for instance, I majored in physics; after that, I took some advanced education. I realized that everybody here was devoted to education on a voluntary basis. Of course, I already knew that I had a lot to catch up during this process. I was particularly aware that my knowledge on biology was pretty poor; so during the course, I had a chance to fill this gap. I think I did amazing in this endeavour. Like I said, I tended to think by formula; but it is amazing to see that there are a lot in the nature affecting everything going on around you. So this course has been particularly helpful to me in understanding the nature and the universe. "*

Social science teacher 10th male participant expressed his feelings on attitude as follows:

> *"The people actually cut the branch they are holding on. Worse, I think, is that they do not even know they are actually doing this…To address this situation, teacher, clerics and the non-governmental organizations need to do their part and warn the people. "*

Science teacher 14th male participant expressed his feelings on attitude as follows:

> *"After the education I received, a lot has changed in my life about nature. I now know that we are part of the nature, not owner of it. I promise that I will use the information I got here and teach them all to my students. "*

The following was the statement of science teacher 15th male participant on environmental attitude:

> *"Above all, I should note that the biggest benefit of this program is its ability to address my prejudices. I have often stood against the people's reaction against, say, gold mining, or exploitation of natural resources for energy. I assumed that somebody was actually manipulating these people. I still think this is actually a possibility in at least some occasions. But I noticed during the project that such activities actually do harm on nature and the natural habitat of animals down there. I always say this: Turkey is more important to me; but it turns out the future of these animals was also important; and I realized this at this program. "*

Primary school teacher 16th female participant was a scout leader; his statement read as follows:

"I was impressed by the visible interaction between different fields of science and the thought that each is an integrated part of a whole."

22nd participant, female science teacher, expressed his environmental attitude towards nature as follows:

"Each creature in the nature complement another one."

15th male participant mentioned 'the geological history and outlook of the same vicinity' lesson which was held on 26.07.2010 and field trip to 'Can Thermal Reactor and coal basin' on 01.08.2010. It was lectured earthquakes, rock structure of Canakkale and Turkey, and how to form mines at the first lesson. The participants had opportunity to visit to coal basin and to observe how human could affect the natural environment in order to mine. The other participants mentioned 'Deep Ecology' lesson which was held on 02.08.2010. In fact deep ecology is a kind of philosophical approach to nature; in other words it aims to be understood nature within ecopedagogical approach. All the environmental subjects in the programme were mentioned one more time and connected one another. It was wanted participants to understand each environmental subject does not an independent subjects, all of them related to each other.

As evidenced by the statements above, the participants developed an attitude by which they tend to see the nature as a whole. They made comments on the entire session of education regardless of a particular section in it. It was also observed that the participants use the knowledge and education they received during this session for developing synthesis and holistic views. They particularly tend to see themselves as part of the nature.

There is no significant difference between genders in terms of total points out of the final test and the entire environmental attitude scale ($p > .05$). This refers to a finding in favour of females in terms of preliminary tests ($U = 30.50$, $p < .05$, Table 2).

Table 2.

Mann Whitney U analysis results of the preliminary test point out of the environmental attitude scale

Group	*N*	*Average*	*Total*	*U*	*p*
Male	13	9.35	121.50	30.50	.017
Female	11	16.23	178.50		

It is concluded that the implemented education has been far more influential upon male participants in changing their environmental attitudes considering that there is no significant difference in favour female participants in the posttest and the above statements.

Discussion, Conclusion and Suggestions

A review of the quantitative and qualitative data reveals that the education has been influential in changing the attitudes of the participants towards the natural environment in a positive manner (Table 1). It was concluded that the education has been more influential upon the male participants in changing their environmental attitudes considering that there is significant difference for the female participants in the environmental attitude scale while there is no significant difference at the posttest and the content analysis includes stronger attitudinal statements made by male participants. (Table 2). There are empirical findings suggesting that the participants' views on nature have been changed as favourable subsequent to the ecopedagogy-based education intended for in-service teachers (Keleş et al., 2010; Okur-Berberoğlu & Uygun, 2013b, Yalçın & Okur, 2014). The difference between this study and these three researches was that they followed up the participants so they could examine the long term impacts of the education programmes. The other important point was research design. The participants of this study were organised according to one group; control group was not used however Okur-Berberoğlu and Uygun (2013) used pretest-posttest-control group (PPC) design. PPC is a very powerful design in order to determine the impact of independent variable on dependent variable (Büyüköztürk, 2007). The other research found favourable attitude change however if they used control groups their results would be more reliable. This study has remarkable findings in terms of professional development of in-service teachers about environmental subjects although it has some limitations such us not to have control group and following up process. This study also helps to fill the gap which Misiaszek (2011) mentioned ecopedagogy education of the in-service teachers. The education programme which was given at Annex 2 might be repeated in another study, be used PPC, and carried out following up process.

The other important point is how to done following up process. Keleş et al., (2010) followed up the participants after 3 months while Yalçın and Okur (2014), Okur-Berberoğlu and Uygun (2013b) followed up the participants after 6 months. This process included all group. The in-service teachers who joined TUBITAK projects came from all over Turkey so it was difficult to follow up all group members one by one but it is believed that project teams should start to individual following up process. Brymer and Davis (2012) point out that there are no 'one size fits all' programme design. Individuals might reflect same output at different time scale or different outputs at the same time. Human is social existence. It has not been known what the impacts of community of practice, social interactions at professional and social lives or environmental problems that in-service teachers witnessed on their acquisitions. It is needed less project participants and longer following up time (1 year or 3 years). It might be determined as more reliable common impacts of the projects on public or the impact of the educations on in-service teachers' professional lives. It has not been seen yet these kind of researches.

Turner (2011) used community of practice with students at her research though she did not follow up the students. Turner's results and this research's results are consistent. Some theme in Turner's research were also mentioned by the participants of this research. For example 11 coded participant mentioned 'empathy', 23 coded participant mentioned 'mutuality and equality', 10 coded participant mentioned 'agency', 1 and 11

coded participants mentioned 'perspective'. On the other hand Turner's programme were mostly based on the social sciences while the programme of this research was based on the natural sciences. Gadotti (2008) suggests to use both sciences while designing ecopedagogy-based programmes. However he emphasizes that the programme should be mostly based on the social sciences because valuable outputs might be had by ignoring positivist-reductionist approach of natural sciences. This is controversial. As seen this research, there were favourable outputs though the programme was mostly based on the natural sciences' subjects. The other important point is the application process of the programme. Turner lectured all the subjects herself in her programme while each specialist lectured own subject in this research. The researcher was also a facilitator in this research. Turner focused on the indoor activities, I focused on the outdoor activities. The other important point is the programme time. The TUBITAK projects were about for 10 days while Turner's programme was for 14 weeks. Turner might not need to follow up the students because of this long period. An ecopedagogy-based education programme intended for in-service teachers for 14 weeks might be carried out in further researches.

There has been a problem at professional development of in-service teachers about environmental education as said Oğurlu et al. (2013). The content analysis on the environmental attitude reveals that holistic perspective was made possible by the education. The views by participants no 9, 11, 15 and 23 particularly confirmed that some progress was made with respect to development of environmental attitude. 9 coded male participant majored in physics and currently has been working as a teacher of science and technology. He noted that they have been trying to explain everything by formula and equations in physics education, adding that he realized at the education that there were a lot of variables that required something greater than equations and formulae. This is further testified by a statement that participant no 11, male a math teacher, made. McCallum (2008) recalls that reliance on a positivist approach to explain the universe via equations in the history of science has negatively affected the integrity of the nature. In other words, one single event may lead to several conclusions or vice versa. To this end, participant no 15 noted that he realized complex relationship between industry and ecology in the education. Currently, ecology and industry are seen as opposing phenomena. However, they should actually be considered as complementing each other (Goleman, 2010; Kahn, 2010). Kahn (2010) stresses the salience of education and education for achievement of sustainable development. In short, eco-pedagogical perspective gains prominence for better preservation of natural resources for future generations.

While human beings tend to be more interested in issues directly concerning their lives because of their selfish nature (Hadlock & Beckwith, 2002), the indirect impacts also require greater attention considering that holistic approach needs to be developed. This applies to case of biological diversity (Lummis, 2002) as it is essential to have a basic comprehension of the species in the world and what they mean to the human life (McCallum, 2008). The principle of preservation of biological diversity is adopted at the 1992 Rio Summit; however, its full implementation became possible only in 2010. It is not certain how many species have become extinct during this period and how this process of extinction has affected human life (CBD, 2010b). The time runs out as said 9th, 11th, 15th, and 16th participants, it is obvious that favourable environmental attitude and holistic perspective should be created and considered together to address not just for biodiversity but also to address different subjects such as water resource, geographical structure, culture, tourism because all these subjects are within the principles of the ecopedagogy (Lummis, 2002)

The United Nations declared 2010 as the year of biological diversity (CBD, 2010a). The growing industrial and human pressure amounted to a level to threaten the lives of other creates (Çepel, 2008, Öztunalı- Kayır, 2003). For this reason, biological diversity was stressed by a motto reading "biological diversity is life itself and the life is biological diversity" (CBD, 2010a). At a meeting held in Nagoya of Japan, the delegates from 193 countries agreed on a road map to protect the biological diversity in the land and sea ecosystems (CBD, 2010b). Turkey holds a special place in terms of efforts over the matter given its rich biological diversity (Çepel, 2008). Under the current conditions, Turkey has a lot to lose unless proper measures are taken. For this reason, different education programs should be drafted to pay attention and preserve local biological diversities.

There were 21 different environmental subjects in this study. It was impossible to explain everything about environmental subjects within just for 10 days education programme. Different education programmes might be designed for each environmental subject as seen biodiversity. Yalçın and Okur (2014) carried out a study related to electromagnetic area (EMA) awareness within a TUBITAK project. However EMA subject was only one of the environmental subjects in the programme. They did not design a specific education programme about EMA. It has not been seen yet a specific education programme related to any environmental subject. Different specific education programmes might be designed related to EMA, biodiversity, ecotourism etc and TUBITAK might start to finance these kinds of programmes.

It cannot be reached enough projects outputs although TUBITAK has been financing environmental education programmes since 1999 (Erentay & Erdoğan, 2009). TUBITAK did not open own archive even it was applied personally. The lack of academic outputs of the projects has been causing educational and economic deficits. It is possible to design more effective education programmes, to have different outputs or to use different learning/teaching models if project teams share their findings. It was not known which programmes or models were using, what their contents were, which outputs they succeed. It was known that hundreds of projects were financed since 1999. It is so difficult to say something within considering just 7 researches. The other significant point is that there are more academic outputs of environmental education programmes intended for children. Is it ignored professional development of in-service teachers? The other important problem is the economic side of the projects. Average budget of each project is 30,000 TL (Okur- Berberoğlu & Uygun, 2013a). It is known that how project team uses this money but also it is important to know publicly what happened at the end of the project in order to use Turkey's budget effectively.

Projects teams should consider some important points while designing a programme. For example some research (Csobod, 2002; Fien& Maclean, 2000; Fien& Rawling, 1996) said that teachers would like to be in the developing process of the programme. It has not been seen yet a programme which is developed with in-service teachers. It is a big deficient for Turkey and it should be researched.

It is also possible to compare working years or disciplines of the teachers. Oğurlu et al., (2013) just considered geography teachers in their study. It was not also consider disciplines of the in-service teachers in this study. It was enough to have in-service teachers as participants for the project director. It might be compared working years or disciplines of the in-service teachers in further researches.

Some studies on ecology found significant differences between genders (Kellstedt et al., 2008; Mostafa, 2007; Stern, 2000; Tikka et al., 2000) whereas some did not (Yalçın-Özdilek et al., 2006; Fernandez Lo Faso et al., 2006). Ecopedagogy-based educations in Turkey appeared to have ignored the gender variable in the sessions. This study did not find any significant difference between genders. However there was

a significant difference in favour of females at pretest but there was not any difference at the posttest. It was evaluated that the males rank orders increased at posttest so the programme might be more effective on males than females. The gender variable should be analysed in order to develop effective education programmes. Fox-Keller (1983) notes that women were more interested in ecology, suggesting that their environmental attitudes were more constructive and attentive (in Bowen and Roth, 2007). The primary reason for this difference was reported as their ability to become more emphatic, meaning that they thought as if they were a living organism (in Bowen and Roth, 2007). Participant no 23 recalled that her affection with the nature my stem from the inherent feeling of motherhood. On the other hand Okur et al., (2013) said that nature intelligence might be use to predict environmental attitude. The nature intelligence level of in-service teachers might be considered at participants' selection in any further research. It might be examined correlation between environmental attitude and multiple intelligence. Whether there could be differences between genders in regards to love for nature should be taken into consideration. Kellstedt et al. (2008), in their model on global warming, introduced two separate settings, one on males and the other on females. They did so because of the possibility that their model could be affected given that the females were more sensitive towards the nature. Particular attention could be paid to create gender-based ecology educations.

Actually ecopedagogy consider environmental education with holistic perspective as all humans. (Kahn, 2008). The important point here is sustainable development and social transformation. On the other hand human should limit consumption behaviour for sustainable development. Due to increasing consumerism, people tend to spend and consume more regardless of whether they actually need to do so (Aracıoğlu & Tatlıdil, 2009). However, they barely think over what raw materials have been used during the making of these goods and commodities and how nature has been affected by production process (Goleman, 2010). Goleman (2010) recalled that what needed to be done in order to minimize the damage is to purchase ecological products. It was also stressed that ecological items were more expensive than others (Aracıoğlu & Tatlıdil, 2009). Goleman (2010) underlined that even though ecological products were more expensive, the producers would market more ecological products if the consumers tended to buy these products, leading to harmonization with nature. As a result, industrial production would not do any harm to nature. In this way social transformation will happen. Social transformation is not easy and short process. The impression that one can never achieve something significant if he or she acts alone may raise despair and hopelessness. Participant no 23, a biology teacher, identifies himself as a small fish, implying that maybe small fishes come together to do something. This is a very constructive thought as an outcome of the education given that like any other educations (Kıncal, 2006), the ecopedagogy-based education seeks to create a change on behaviours (Barr & Gilg, 2007; Kaiser vd., 1999). Concrete results in this respect will become possible in case of changes in individual attitudes regardless of offering academic education sessions. Ecologically speaking, for concrete changes, the national policies should also be subjected to a through process of change. In this way, more effective results are attained. The most suitable example of this was the decision by the Italian government. Considering that use of plastic bag was so frequent in the country, the central government introduced a ban on its use effective by start of 2011; the supermarkets now sell cloth bags for shoppers (Euractiv, 2011).

In fact, ecology can be considered as a quadratic or cubic equation. The value to be attributed to the variables in the equation can change the values on the other side of the equation. This means that n$^{\infty}$ combination is possible. It is believed that the optimal

level of the equations is achieved by compliance with the world convention and respect for the human beings as well as the nature.

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Annex 1.

Demographic characteristics of the participants

Participant No	Gender	Age	Profession
1	Female	25	Math teacher (elementary graders)
2	Female	26	Science and tech teacher
3	Male	20	Science and tech teacher
4	Female	31	Landscape teacher (Academic)
5	Female	26	Science and tech teacher
6	Female	28	Primary school teacher
7	Male	49	Social science teacher
8	Male	35	Science and tech teacher
9	Male	32	Science and tech teacher
10	Male	37	Social science teacher
11	Male	26	Math teacher (elementary school)
12	Male	32	Science and tech teacher
13	Male	33	Primary school teacher
14	Male	24	Science and tech teacher
15	Male	35	Science and tech teacher
16	Female	29	Primary school teacher
17	Male	34	Science and tech teacher
18	Female	20	Biology teacher
19	Male		Primary school teacher
20	Male		Science and tech teacher
21	Female	26	Science and tech teacher
22	Female	22	Science and tech teacher
23	Female	44	Biology teacher
24	Female	26	Primary school teacher

Annex 2.

Education programme

Date	Time	Name of the event	Place
25.07.2010	12:00-13:00	Opening speech and filling out preliminary surveys	ÇATOML (Çanakkale Vocational High School for Tourism and Hotel Management)
25.07.2010	13:00-14:00	E 25. Introduction and meeting	ÇATOML
25.07.2010	14:00-16:00	E. 1. First aid in emergency cases	ÇATOML
25.07.2010	16:30-18:30	E.2. Producing compost out of domestic waste	ÇATOML
25.07.2010	19:00-22:00	E3.Vertebral animals in Çanakkale and nearby towns-Theory	ÇATOML
26.07.2010	9:00 -12:00 (Theory) 13:00-17:00 (Practice)	E.4. Geological and historical structure of the region Theory and practice	Kalkım Municipality
26.07.2010	18:00-20:00	E.5. Endemic plants in the region Theory	Adatepe
27.07.2010	9:00-12:00	E3.Vertebral animals in the region Practice	Kalkım Municipality
27.07.2010	13:00-19:00	E 7. Rive ecology and its significance (Theory and practice)	Kalkım Municipality
28.07.2010	09:00-12:00	E 9.Troy national park since the prehistoric era	Troy National Park
28.07.2010	13:00-16:00	E 6. Ethnobotanic	Tevfikiye Village- nearby Troy National Park
28.07.2010	16:00-18:00	E 10. Improving national parks by focusing on preservation	Tevfikiye Village- nearby Troy National Park
28.07.2010	18:30-20:00	E 16.Seaweeds and their vital importance Theory and practice	Harmanyeri- Kepez Coast
29.07.2010	08:00-19:00	E 11. Historical importance of the city	Gallipoli Peninsula
29.07.2010	20:30-22:00	E 15. Underwater and sea ecology Theory	ÇATOML
30.07.2010	10:00-15:00	E 17. Scuba-diving event	Bozcaada
30.07.2010	16:00-17:00	E 15. Underwater and sea ecology Practice	Bozcaada
30.07.2010	18:30-19:30	E 13. Ecotourism	Bozcaada
31.07.2010	9:00-12:00	E 22. Climatic features of the region	ÇATOML (Theoretical) Çanakalan Wildfire check point
31.07.2010	13:00-17:00	E 12. Natural and human-made magnetic field and environmental health	Çanakalan Wind Stations
31.07.2010	20:30-23:00	E 20. Astrophysics: are we alone in the universe	Ulupınar Observation House (ÇOMÜ) Çanakkale
01.08.2010	9:00-15:00	E 18. Çan Coal reserves and water resources	Çan
01.08.2010	15:00-19:00	E 19. Drinking water filling facilities Atikhisar Dam-trip	Çanakkale-Çan Highway
01.08.2010	20:00-21:30	E. 24. Ecological footprints; life 100 years ago; life now	ÇATOML

02.08.2010	09:00-11:00	E 21. Role of insects in preserving the nature Theory and practice	ÇATOML (Theory) Dardanos Facilities (Practice)
02.08.2010	11:00-12:00	E 2. Producing compost out of domestic waste	ÇATOML
02.08.2010	13:00-16:00	Deep ecology	ÇATOML
02.08.2010	20:00-22:00	Interactive presentation	ÇATOML
03.08.2010	09:00-11:00	Final surveys Evaluation of the project by the participants	ÇATOML

Annex 3.

The attitude scale which is developed by Okur and Yalcin-Ozdilek (2012)

	Very suitable	Suitable	Not sure	Not suitable	Never Suitable	
1. If I see it has been switched on I switch off the electric lamp. 2. I like to read the books related to natural environment. 3. It annoys me to see the lamp which has been switched on. 4. It is interesting to reconcile what I have learnt at school with nature. 5. I do not disturb plants or animals because I think that they are also living things. 6. I turn off the tap while brushing my teeth or shaving. 7. I think I am doing everything in order to protect nature. 8. If I see it turned on I turn off the tap. 9. I collect papers in a recycle bin at the school. 10. I prefer to buy reusable battery. 11. It annoys me to see people who throw away their rubbish to street.						The first theme (having favourable attitude)
12. It is very silly to think that destruction of the rain forests has impact on global warming. 13. It is very silly to think that extinction of any species might impact on me and my children lives. 14. The water in nature never runs out.						The second theme

Ekopedagoji Temelli Çevre Eğitiminin Öğretmenlerin Çevresel Tutumlarına Etkisi

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Özet

Çevresel tutum, bir kişinin çevreyle ilgili konu ya da faaliyetlere ilişkin inançlarını ve davranışsal amaçlarını içerir. Çevresel tutumun, çevresel davranışın kestiriminde kullanılabileceği belirtilmektedir. Bu çalışmanın amacı, eko-pedagoji temelli bir TUBITAK çevre eğitimi projesi olan ve topluluk pratiğinden oluşan 'Çanakkale ve Çevresinde Ekoloji, 2010" projesinin, öğretmenler üzerindeki etkisini analiz etmek ve cinsiyetler arasında çevresel tutum açısından herhangi bir farklılığın olup olmadığını belirlemektir. Projede vaka çalışması kapsamında karma metodoloji kullanılmıştır. Nitel ve nicel veriler eşzamanlı olarak toplanmış ve birlikte değerlendirilmiştir. Nicel verilerin toplanmasında çevresel tutum ölçeği kullanılmıştır. Nitel verilerin kullanılmasında katılımcı günlükleri, yarı-yapılandırılmış görüşme ve katılımsız gözlem notları kullanılmıştır. Eko-pedagoji temelli çevre eğitiminin öğretmenlerin çevresel tutumunu olumlu etkilediği ve bu değişimin en çok erkek öğretmenlerde gözlendiği görülmüştür.

Anahtar Kelimeler: Eko-pedagoji, topluluk pratiği, öğretmen, çevresel tutum, TUBITAK