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Full Length Research Paper

The effect of playground characters placed in the playgrounds on the enhancement of primary school children's environmental consciousness

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In this study, the effect of playground characters placed in children's playgrounds as a pilot scheme within environmental consciousness-raising studies on children's environmental behaviour was analysed. Triple 15 expressions with 3-point Likert type "environmental behaviour" scale was applied as pretest and last test on primary school children (1st grade to 7th grade). In the statistical evaluation of the tests used in comparison t-test, Oneway ANOVA, Bonferroni test, Chi-Square, and Paired Samples Test were used. As a result of the evaluation, the effects of environmental consciousness-raising were studied separately according to class, question types, and gender and then a general evaluation has been made. The result of the study reveals that the application conducted on the playground has increased the environmental awareness in children while they are having fun without having to spare an extra time. As a result, the fact that the students could perceive the environmental messages on the playground characters and that in accordance with this consciousness their environmental behaviours were affected positively was proven.

Keywords: Environmental behaviours, Environmental knowledge, Playground characters, Playgrounds, Primary school children, 3-Point Likert scale

INTRODUCTION

Raising individuals sensitive to environmental problems is of critical importance in terms of the protection of the natural environment. Since 1992, The United Nations Conference on Environment and Development (UNCED), an international consensus has emerged that achieving sustainable development is essentially a process of learning and education must be a vital part of all efforts to foster greater respect for the needs of environment (Panigrahi, 2007). Education in environmental matters, for the younger generation as well as adults, giving due to the underprivileged, is essential in order to broaden the basis for an enlightened opinion and responsible conduct by individuals, enterprises, and communities in protecting and improving the environment in its full dimension (UNEP, 1972).

Principle 10 of the Rio Declaration on Environment and Development (1992) states that "environmental issues are best handled with the participation of all concerned citizens, at the relevant level" (Li, Liu, & Li, 2014) and children were recognized as important groups for the development of a sustainable environment (Kopnina, 2011). Beginning environmental consciousness- raising

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practices at an early age plays an active role in education as the behaviour repeated in ealy ages turn into habits (Ronis, Yates, & Kirscht, 1989). Carrying ecological self into consciousness can only be realized through experience and arranging a child's life accordingly. Studies on the environmental consciousness of children show that environmental education and consciousness raising practices enhance children's environmental consciousness dramatically and keep the continuance of the aforementioned consciousness. (Schumannhengsteler & Thomas, 1994; Weston, Tzaros, & Antos, 2006; Uzun, Sağlam, & Varnacı Uzun, 2008; Ozguner, Cukur, & Akten, 2011; Rioux, 2011).

Games, which are considered to be the most important tool of education and teaching for children, contribute to the development of physically and mentally healthy individuals (Bulut & Yılmaz, 2008). Since games constitute life in childhood, environmental consciousness should be taught through games (Çukur & Özgüner, 2008). That is why playgrounds have an important effect on children's behaviours and attitudes (Veitch, Bagley, Ball, & Salmon, 2006).

The purpose of this study is to save environmental education from the enclosure of school borders, and to carry it to the playgrounds (where children learn through games) and thus make them learn while having fun. In this context, playground characters with environmental messages prepared to raise environmental consciousness in children were used in playgrounds where children go to play.

In order to check if the study was efficient or not a 15 expressions scale was applied to the children that took part in the study before and after the consciousness raising practice. It is well known that evaluation can be made on thoughts, feelings, and behaviours via the "Environmental Behavioural Scales" (Yilmaz, Boone, & Anderson, 2004; Pooley & O'Connor, 2000; Tuncer, Ertepinar, Tekkaya, & Sungur, 2005; Berberoğlu & Tosunoğlu, 1995; Uzun & Sağlam, 2006; Bruni, Chance, & Schultz, 2012). Attitude consists of feelings, thoughts, and behaviours on a subject. However, these are not seperate dimensions. They affect each other, are affected by each other and usually there is consistency among them (Aydın, 2000; Özgüven, 2012). Since behaviour has a parallel tendency with both feelings and thoughts and sicne the study is directly focusing on behaviour, only behaviour is discussed in this study.

MATERIAL AND METHOD

In this study, evaluating the effect of playground characters placed in pilot scheme areas in accordance with the environmental consciousness raising studies is aimed. Accordingly two different subject groups were formed through regrouping the same people before and after the study.

In this study, Bayındır town in İzmir city of Turkey which shows promise of socio-cultural and socio-economic growth was chosen. The first subject group consists of 420 students chosen randomly from students that attended 1, 2, 3, 4, 5, 6, 7 grades in 6 primary schools in this town in 2009-2010 school year.

The reason behind selecting different schools is to reach as many school children as possible in Bayındır. The reason behind applying the questionnaire to all grades is to present the difference in the effects of environmental consciousness raising studies in different age groups.

The study was carried out through in-place questionnaire method via standard forms and 15 expressions with 3-point Likert type "environmental behaviour" scale was organized closed-end (Mansuroğlu, Karagüzel, & Atik, 2008; Kanioglu & Drakou, 2004; Somerset & Markwell, 2009; Ajoke, Olaide, & Oluwakemi, 2011). Since the scale is one dimensional, all the articles evaluate the same attitude (Erol & Gezer, 2006). That is why such scales enable determining the subjects' ideas and contribution to the related statement (Demirkaya & Genç, 2006). The articles in the study include sorting rubbish in accordance with its type, economizing the natural resources, the rate of following environmental media, taking part in planting activities, sensitivity towards creatures in nature, love of nature, and reactions to individuals who harm nature.

The questionnaire form was developed in accordance with the opinions of experts experienced in questionnaire and environment protection. The questionnaire is addressed to primary school children. That is why expert opinions in this area are included as well in order to adapt the questions to children of this age group.

The pre-questionnaires were applied to 40 students of Şehit Teğmen Murat Aslantürk Primary School in Bornova which shows socio-economic and socio-cultural similarities with Bayındır as interviews. The questionnaire forms that were finalized according to the opinions acquired from these students became applicable.

The questionnaire was applied to the first subject group in May, the last month of education year when the first grade students learn to read and write, during lessons as pre-test in hopes that the subjects would be able to present their opinions and ideas unaffected by the environment.

Study results were evaluated using Microsoft Excel and SPSS programs. In view of the results begotten from the pre-tests 7 of the articles important in terms of environment and behaviours that should be developed were determined as messages to go on playground

Figure 1. Scenes from the playground in the study area and playground characters

characters. Since visual perception is more effective than any other perception skills, in transmitting message to children visual perception was used (Çukur & Güller Delice, 2011). It is a known fact that billboards in recreational facilities are used for educational purposes (Var & Karaşah, 2010). Billboards used outdoors aree of great importance in the reception of the message and its effect time (King & Tinkham, 1990). Based on this in September 2010 after the pre-test, thanks to its location in the town center and its propriety to the selected age group, 8 playground characters having the quality of a billboard were placed in the pilot playground. 1 out of these 8 introduced the playground character while the other 7 had the environmental messages determined by the pretest.

While these playground characters were being prepared, the fact that the effect group consisted of children in the ages between 6 and 12 was taken into consideration. The children need to be evaluated differently than adults in terms of their perceptive skills. In this respect the desired messages were adapted to the aforesaid age group in view of experts in this area (Erdem Ömüriş, 2010).

In order to make it easier for the children to perceive the playground characters, an interesting and effective character named “olive” who got its name from the town’s symbol in hopes that the children would embrace more easily was used in the design of the playground characters (Figure 1).

As the billboards need to be designed proper to the visitors’ physical and sociological features, special care was given in designing the playground characters in a way that would be friendly towards children and deliver the messages clearly (Özsoy & Mercin, 2003).

The messages ready to be written were placed on “olive” as speech bubbles. The introductory “olive” playground character on which “Hello, my name is Olive. I am a friend of nature. What about you?” message was written, was placed at the entrance to the playground which was expected to help children to get to know the character and by diverting their attention to the character make them follow the instructions.

Different types of “olive” on which the seven messages were written as follows: 1 “I use both sides of a paper while drawing”, 2 “When I throw away rubbish, I recycle glass bottles and newspapers”, 3 “I throw away

depleted batteries in depleted battery bins", 4 "I help with planting", 5 "I turn the TV of using the on/off button", 6 "I use both sides of a paper while drawing", 7 "When I throw away rubbish, I recycle glass bottles and newspapers" were placed in several spots where children could easily see and fastened.

In order to evaluate the effect of the playground characters on the children's environmental behaviour, second and last test studies were carried out one year after the pre-test.

The second subject group consisted of the same students that took part in the pre-test and who attended 2nd, 3rd, 4th, 5th, 6th, 7th, and 8th grade students of 2010-2011 education year of the same schools. Since there were unavailable students from the first subject group because of reasons like absence or transfer, 286 students that took part in the second subject group were taken into matching and this number was the determinant. The number of students in the subject group met the 10% exemplary number requirement that is needed to determine the sample size in descriptive analysis studies (Arlı & Nazik, 2010).

In accordance with the pre-test results the other 8 articles were added to the questionnaire in addition to the 7 that required to be thought over. The seven articles showed differences in application results for subject group while the other eight articles were placed in the questionnaire as control group. Thus the same questionnaire applied to the first subject group was applied to the second group in May 2011 during lesson as last test in their classes in hopes that the subjects' thoughts and opinions would be revealed without being affected by others.

RESULTS

The results were again analysed using Microsoft Excel and SPSS. The subject were asked to state their opinions on the articles using a 3-point Likert type scale determined as "1=no, 2= sometimes, 3= yes" on the "environmental behaviour" scale prepared to be used in determining the subjects' level of environmental sensitivity and the effect of environmental guidance practices on the subjects. When preparing the articles the evaluation was designed to be made by appointing points and 0 was the lowest and 100 was the highest point determined for the total of all statements stated in the environmental sensitivity. For each student, the total points they got for each article determined how sensitive they were. Environmental sensitivity point was determined through the average of the 286 students' points.

The effect of environmental consciousness-raising studies were determined through the matching of the pre-test and the final test. In the statistical evaluation of the study t-test was used to determine the effect of gender, one-way variance analysis (Oneway ANOVA) and Bonferroni were used for age (class), chi-square test was used to determine the basis of questions, paired sample test was used to determine the effect of environmental consciousness raising practices (Erol & Gezer, 2006; Aydın, 2010; Gençtürk & Memiş, 2010).

Findings

By evaluating the pre-test, determining the deficiencies in the attitudes towards environmental problems could be done. By doing this playground characters were prepared according to the determined matters that were placed in the application area. By the evaluation gotten from the pairing of the pre-test with the final test, the results of environmental consciousness raising practices were placed under four parts. The parts included results according to the questions, according to classes, according to gender and according to general evaluation.

3.1. Evaluation of the pre-test;

420 students took part in the pre-test. The students that gave the answer "no" were thought not to do the things stated. The answer "yes" was considered to be a positive attitude and the students that gave this answer were thought to always do so. The answer "sometimes" was considered to be neutral and the students that gave this answer were evaluated in positive attitude category since they were believed to do the thing sometimes because they have the required consciousness. That is why in studying the behaviours not active only the answer "no" was taken into consideration.

The questions used in this study and the rate of students that gave the answer "no" are shown in Table 1.

When the pre-test results are considered, the first seven articles were decided to be thought over because of their high negative answer rates. That is why the first seven articles were determined as the experimental group. The other 8 articles with their negative rate under 10 % were not written on playground characters and were determined to be used as control group in measuring the effect of the study.

Effects of environmental consciousness raising

In order to measure the effects of environmental consciousness raising practice pre-test and final test pairing was done. The results show the scores of 286

Table 1. The questions used and the rate of students that gave the answer "no".

Questions	Answer "no"	
	N	%
1. Do you use both sides of a paper when drawing for fun?	166	39.5
2. When you throw out the rubbish do you keep glass bottles and newspapers?	163	38.8
3. Do you throw away the batteris in the depleted battery bins?	110	26.2
4. Do you help with planting?	98	23.3
5. Do you turn off the TV using its on/off button, not the remote?	90	21.4
6. Do you prefer playing in the playground rather than at home?	72	17.1
7. Do you watch TV shows on environmental problems?	65	15.4
8. Do you warn smokers to quit?	37	8.8
9. Do you warn those who pick up flowers in gardens and parks?	31	7.4
10. Do you pick up rubbish on the floor and throw it in the rubbish bin?	30	7.1
11. Do you value you toys and use them long?	28	6.7
12. Do you warn those who throw rubbish on the ground?	25	6.0
13. Do you believe all animals in nature should be protected?	23	5.4
14. Do you switch off lights if they are not necessary?	14	3.3
15. Do you turn off the tap while brushing your teeth?	8	1.9

students that were included in the pairing out of the 420 that took part in the pre-test.

According to the questions: According to the final test results of the 286 students (Table 2) a positive change of 62.1 % in the first, 54.7 % in the second, 77.4% in the third, 68.6 % in the fourth, 74.0 % in the fifth, 70.9 % in the sixth, and 59.9% in the seventh articles were recorded in the articles to which the students gave the answer "no". In the control group a positive change of 32.6 % in the 8^{th}, 0.0 % in the 9^{th}, 41.6 % in the 10^{th}, 64.3 % in the 11^{th}, 43.7 in the 12^{th}, 47.5 in the 13^{th}, 76.2 % in the 14^{th}, and 14.3 % in the 15^{th} articles were recorded.

According to classes: One education year passed between the pre-test and the final test. That is why the first grade students in the pre-test are second grade students in the final. Therefore to avoid confusion, the classes of the students when they took the pre-test were taken as the basis (Table 3).

Of the 286 students that took part in the study, 42 were first, 42 were second, 48 were third, 41 were fourth, 37 were fifth, 39 were sixth, 37 were seventh grade students. According to final test results, the students who gave the answer "no" showed a positive change of 74.0 % for the first, 56.2 % for the second, 70.8 % for the third, 61.2 % for the fourth, 59.3 % for the fifth, 64.7 % for the sixth, and 62.3 % for the seventh grade students.

According to gender: Of the 286 students 139 were girls and 147 were boys. According to the final test results (Table 4), the girls showed a positive change of 67.4 % while the boys showed a positive change of 62.2 % in the experiment group. In the control group girls showed a positive change of 51.0 % while boys showed a positive change of 32.5 %.

According to general evaluation: Environmental sensitivity point which is gotten from the average result of the 286 students was 48.7 in the pre-test and this point became 71.9 with a 23.2 raise in the final test for the experiment group. When we look at the control group, the change was 3.9 points (Table 5).

DISCUSSION

The environmental opinions of a community might be shaped by their early childhood experiences (Wells & Lekies, 2006). Researchers and policy makers have become increasingly aware that individual behaviours

Table 2. The number and rate of students that gave the answer "no" to the questionnaire articles

		Pre Test Answer "no"		Final Test Answer "no"	
	Articles	**N**	**%**	**N**	**%**
Experiment Group	1.	145	50.7	55	19.2
	2.	161	56.3	73	25.5
	3.	106	37.1	24	8.4
	4.	92	32.2	29	10.1
	5.	89	31.1	3	8.1
	6.	65	22.7	19	6.6
	7.	62	21.7	25	8.7
Control Group	8.	37	12.9	25	8.7
	9.	31	10.8	31	10.8
	10.	29	10.1	17	5.9
	11.	28	9.8	10	3.5
	12.	25	8.7	14	4.9
	13.	23	8.0	12	4.2
	14.	12	4.2	3	1.0
	15.	8	2.8	7	2.4

Table 3. Number of students and the rate of students that gave the answer "no" according to their classes

		1st grade		2nd grade		3rd grade		4th grade		5th grade		6th grade		7th grade	
		%	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**	**N**
Experiment group	**Pre test**	44.2	42	38.1	42	31.5	48	28.9	41	33.2	37	37.4	39	39.0	37
	Final test	11.5	42	16.7	42	9.2	48	11.1	41	13.5	37	13.2	39	14.7	37
Control group	**Pre test**	10.1	42	5.1	42	3.7	48	6.1	41	7.4	37	12.8	39	15.5	37
	Final test	3.3	42	2.7	42	3.2	48	2.7	41	6.4	37	8.4	39	11.1	37

Table 4. Rate of students that gave the answer "no" to questions according to their gender

	Pre test				Final test			
	Girl		**Boy**		**Girl**		**Boy**	
	%	**N**	**%**	**N**	**%**	**N**	**%**	**N**
Experiment group	33.4	139	38.4	147	10.9	139	14.5	147
Control group	5.3	139	11.4	147	2.6	139	7.7	147

Table 5. ESP and the total number of students

	Pre test		Final test	
	ESP	**N**	**ESP**	**N**
Experiment group	48.7	286	71.9	286
Control group	82.3	286	86.2	286

can ameliorate or exacerbate environmental problems and it is often assumed that individuals who are knowledgeable and concerned about the environment will engage in environmentally responsible behaviour (ERB) (Mobley, Vagias, & DeWard, 2010). There is an international consensus believes that environmentally educated population starts with children understanding (EPA, 1998). Since the study addressed 6-12 year old children, the study is of vital importance to the betterment of the community's future environmental consciousness.

For children, play serves a multitude of developmental functions – physically, socially, cognitively and emotionally (Wilson, 2012). Also, play is an important opportunity for children to express themselves and use their creative potential (Deniz, Kılıçaslan, Kara, Bulut, & Göktuğ, 2013). Through play children learn about themselves and the world around them (Kos, 2010). That is why playing outdoors has several advantages especially in early childhood. According to the literature, one of the main advantages of using the outdoor environment is that it provides children with the space to move freely: movement, along with play, has been described as one of the most natural and powerful modes of learning for young children (Maynard & Waters, 2007). Therefore playgrounds where children go to play were chosen instead of schools.

Admittedly, in the preschool and elementary school years, small-scale actions at the level of the classroom, the school yard and the local environment are most appropriate. Young children should not be burdened with distant environmental problems and the operations of distant institutions beyond their levels of direct experience and comprehension (Chawla & Cushing, 2007).

The effects of the environmental consciousness raising practices applied in our study were analysed through pairing pre-test and final test results.

In early childhood, the parents' environmental attitude plays an important role in the children's environmental attitude (Evans et al., 2007). That is why, in order to consider the effects of parents and other environmental factors (TV programs, course schedules, education, seminars and activities provided by the governmental and non-governmental organizations), some of the articles were not included in the practice and a control and an experiment group were created.

The results were analysed in terms of effectiveness of the environmental consciousness raising practices used according to questions, classes, gender and lastly general evaluation.

Comments on questions: The positive increase rate of the written (experiment group) and non-written (control group) articles were tried to be determined. When considered according to the questions, while a positive change was recorded in the experiment group, irregularity was recorded in the control group. While the positive change in the experiment group was 54.7-77.4 % gap, the gap is 0.0- 76.2 % for the control group. When the results were considered, 11^{th} and 14^{th} questions of the control group showed the highest change and reached a close rate to the experiment group (Figure 2). The reason behind these rates can be explained through concentration of the effects of parental attitude and environmental factors on these questions.

Comments according to classes: In this section, the effect of higher age on environmental consciousness raising was tried to be determined. When the results are considered class-wise, the change in experiment group can be seen to be higher and more regular than the control group as seen in Figure-3. When considered according to the study's effects, the change in the first and second classes were close to each other and the most important change is seen in the third, fourth, fifth, sixth and seventh classes. The sudden rise of the 4^{th} grade students in the control group can be explained through the concentration of the parental and environmental factors on the 4^{th} grade students. In our country the students are introduced with Science courses in which the basis for environmental development is laid in the fourth grade (Ünsal & Güneş, 2002). It can be stated that the students that attend the third grade and higher got more benefits from the study.

Comment according to gender: The effect of gender factor was tried to be determined in the studies in this kind of commentary. According to literature, female students tend to show more responsibility toward the environment than male students (Tikka, Kuitunen, & Tynys, 2000).

When the results were considered gender-wise, the girls showed a higher score with a difference of 5.2 % than the boys (Figure 4). Furthermore it can be stated that this study does not show a huge difference between the genders. Since the control group was kept out of the study, the changes in this group were considered as changes caused by environmental factors. Thus, it is clear that girls are affected more than boys by the environmental factors.

comments on the general evaluation: In this section the overall effect of the study was analysed. The ESP was calculated by the average of the 286 students. ESP showed an increase of 47.6 % in the experiment group while it showed an increase of 4.7 % in the control group.

Since the control group was not included in the study, the insignificant change in this group was determined to be because of the environmental factors.

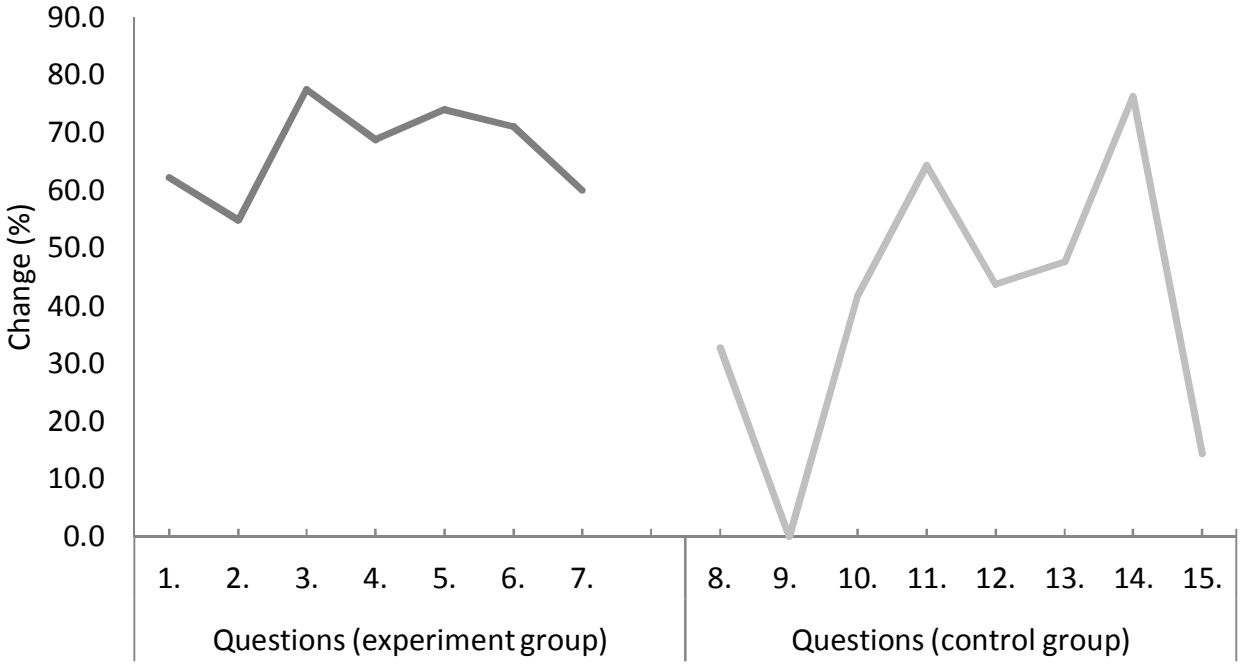

Figure 2. The positive change according to test results for the students who gave the answer "no" to the questions in the pre-test.

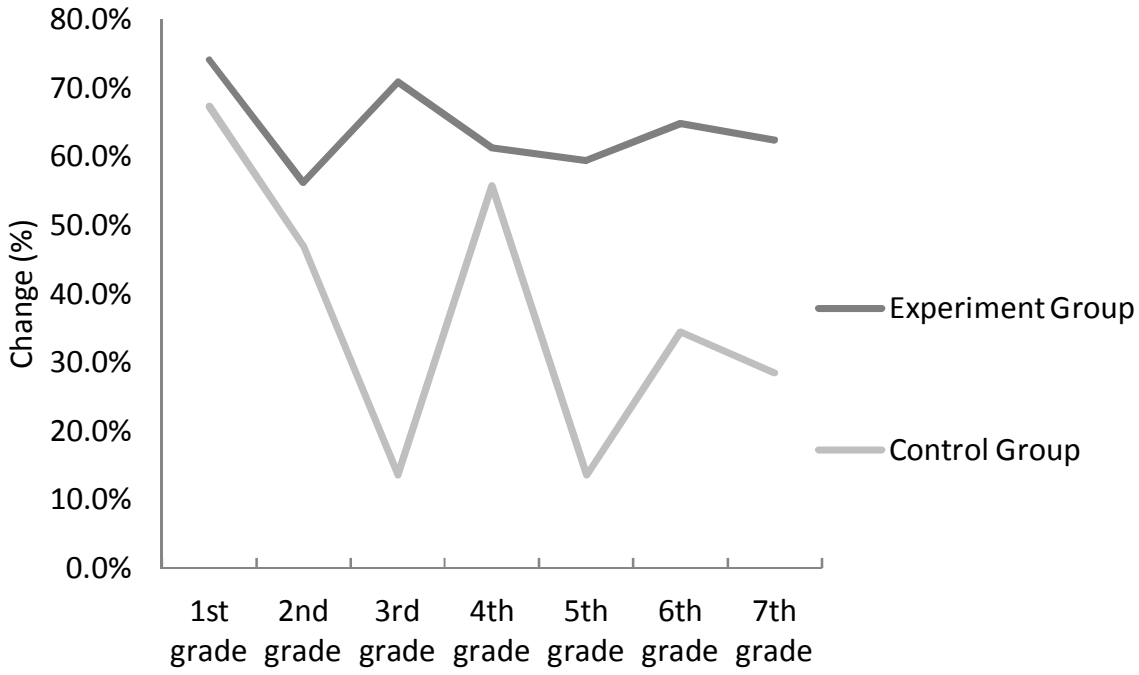

Figure 3. The positive change in the final test results for the students who gave the answer "no" according to classes.

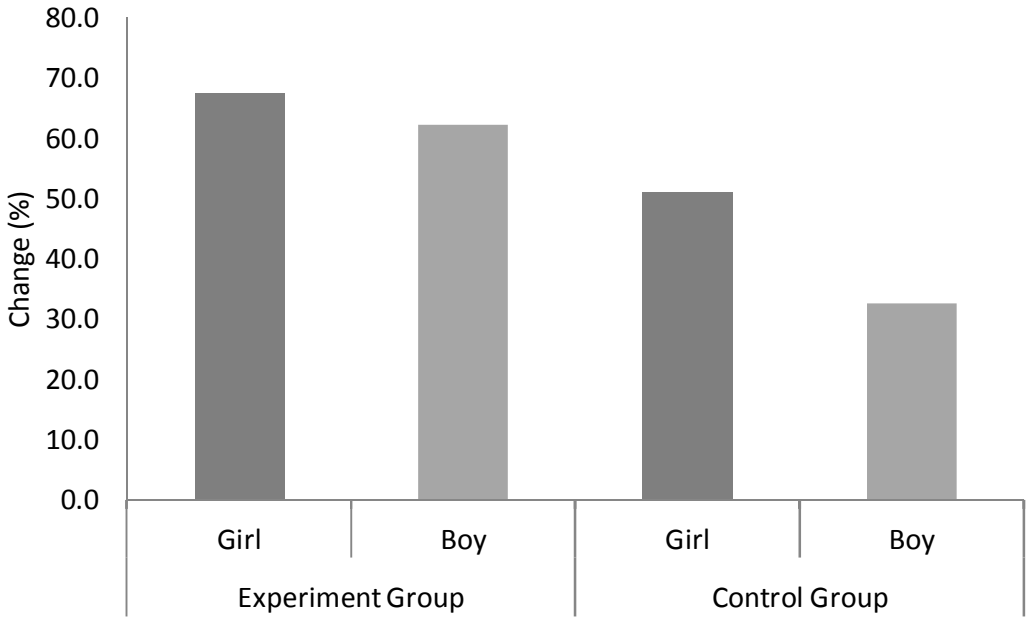

Figure 4. The positive change according to gender.

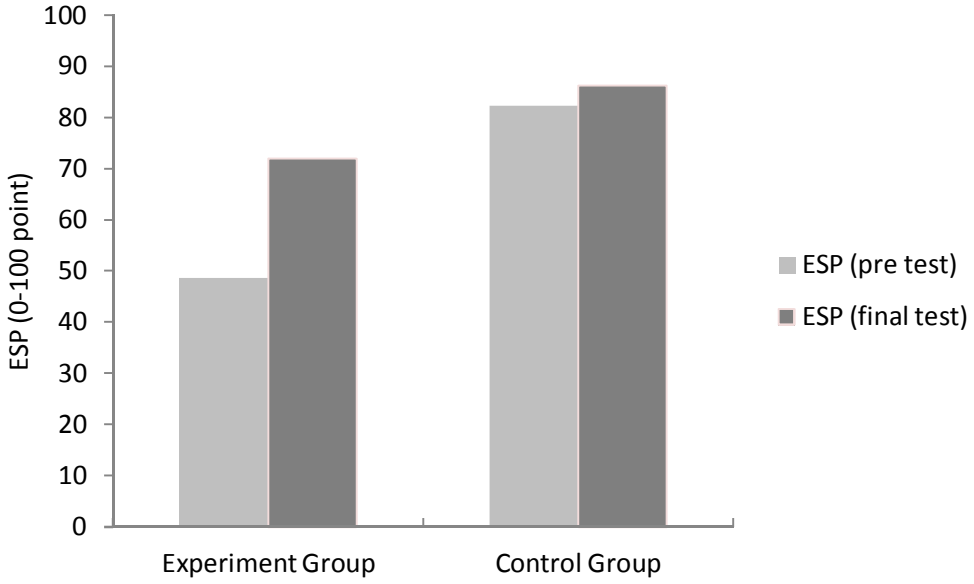

Figure 5. ESP of the pre-test and final test results of the experiment and control groups.

The 90 % change in the ESP of the experiment group and the control group showed the success of the study. When the results were taken into consideration, the rise in the ESP of the experiment group is an important result of the study (Figure 5). The positive change in the direction of the playground characters used in the pilot areas provided the expected results for the project.

CONCLUSION AND SUGGESTIONS

In this study, the effect of playground characters placed in pilot children's playgrounds on the environmental consciousness of children was measured. By pairing the results of the questionnaire applied as pre-test and final test, the effects of our environmental consciousness raising practices were presented. The control group formed in order to measure the effect of parents and other environmental factors was helpful with the presentation of the experiment group. Although we can see the effects of environmental factors on the control group, the positive change in the experiment group is significant. When the study is analysed question-wise, consciousness in the messages on the playground characters was procured.

In terms of perceiving the environmental messages the 8-12 year age group was seen to be better, that the gender factor was not effective, and that girls are affected by the environmental factors more than boys. When the overall results were considered, the rise in ESP shows that the children perceived the messages on the playground characters and used them effectively. The closeness children felt towards "olive" helped them to adapt the messages more easily. Thus the study showed that children could be educated through aesthetic and educational materials while playing. Moreover, the possibility of using such playground characters in the designing of the playgrounds as well as placing them in the already operational playgrounds is seen as an advantage in its widespread use.

Presenting environmental information to the public with the intention of enhancing the understanding of the environment and promoting environmental awareness requires the creation of a new type of environmental information system for the general public (PEIS) (Düpmeier & Geiger, 2006). In this respect, for the children that makes up the target parks that have the theme of environment should be made and children should be provided with education while playing. In this study, playground characters, one of the items that could be used in the parks with the theme of environment, were scrutinized and requirements were identified for their designation. As a result of this study, playground characters are suggested as effective methods in the design of parks with the theme of environment. This study and the likes of it are a necessity rather than a need, and they present the analysts with important tasks.

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