

## Importance of Environmental Education in the Creation of Environmental Attitude and Behavior on Solid Waste Management

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### اهمیت آموزش محیط زیست در ایجاد نگرش و رفتار محیط زیستی در خصوص مدیریت پسماندهای جامد

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#### Abstract:

When we can make emphasis on recycling and processing materials, that enough energy and materials are not available. Rapid population growth and excess urban development are a significant cause of the destruction of the environment and natural resources. To achieve sustainable development, the human need to manage the waste. One way to manage waste can be done through environmental education; of course, this possibility depends on a positive attitude in this regard. This is applied research. The semi-experimental research method was employed in this study, which was carried out using a pretest-posttest design involving control and experimental groups. The statistical population consisted of girls and boys in the sixth grade of two elementary schools, and a prepared questionnaire was employed as the tool for measuring the students' environmental attitude and behavior concerning the methods for less waste production, reuse, and recycling before and after the education program. The related experts and its reliability confirmed the validity of the questionnaire by Cronbach's alpha coefficient of 0.8. The students were taught topics on resources available in the world, the scarcity of these resources, and the methods for less waste production, reuse, and recycling. The obtained data was analyzed for the independent groups using Levene's test and T-test. Results indicated that there is a significant difference between the girls and boys' mean environmental attitude and behavior concerning less using and less waste production, reuse and recycling waste before and after the education program. Overall attitude and behavior levels of the girls and boys concerning the taught subjects increased after the education program. However, the environmental attitude and behavior level of the boys in this regard increased more compared to the girls.

**Keywords:** Environmental education, Environmental attitude, Environmental behavior, Reduce, Reuse, Recycle.

#### چکیده:

صحبت از بازیافت و پردازش مواد زمانی به میان می آید که انرژی و مواد اولیه به اندازه کافی در دسترس نباشد. هم اکنون رشد سریع جمعیت و توسعه بی رویه صنایع در شهرهای بزرگ علاوه بر اینکه موجب انهدام محیط زیست می گردد، زمینه تخریب منابع طبیعی را نیز فراهم می سازد. به منظور دستیابی به توسعه پایدار، انسان ها نیازمند یافتن راهی برای همزیستی با محیط زیست و کاهش فشاری هستند که هم اکنون به منابع طبیعی وارد می کنند. یکی از راه های مدیریت زباله ها از طریق آموزش محیط زیست می باشد؛ البته این خود وابسته به نگرش مثبت در این زمینه است. این یک تحقیق کاربردی است و به روش نیمه آزمایشی به وسیله پیش آزمون و پس آزمون و با استفاده از گروه های کنترل و آزمایش انجام گرفته است. جامعه آماری، دانش آموزان دختر و پسر دو مدرسه ابتدایی مقطع ششم دبستان می باشد. پرسشنامه محقق ساخته ابزار اندازه گیری اطلاعات و آگاهی های دانش آموزان دختر و پسر در خصوص نحوه تولید کمتر، استفاده دوباره و بازیافت زباله است. روایی پرسشنامه توسط متخصصان ذی ربط و پایایی آن از طریق فرمول آلفای کرونباخ به میزان ۰/۸ تعیین شده است. به دانش آموزان موضوعاتی در خصوص منابع موجود در روی زمین، محدودیت آن ها، نحوه تولید زباله های کمتر، استفاده مجدد و بازیافت آموزش داده شد. داده های حاصل، توسط آزمون لون و آزمون t برای گروه های مستقل تحلیل گردید. نتایج حاکی از آن است که تفاوت معناداری در نگرش و رفتار دختران و پسران نسبت به استفاده کمتر و تولید کمتر زباله، استفاده مجدد و دفع زباله قبل و بعد از برنامه آموزشی وجود دارد. میزان آگاهی دانش آموزان دختر و پسر نسبت به سه موضوع مورد آزمایش یعنی تولید کمتر، استفاده دوباره و بازیافت پس از آموزش افزایش یافته است ولی آگاهی پسران در این خصوص بیشتر از دختران ارتقا یافته است.

**واژه های کلیدی:** آموزش محیط زیست، نگرش محیط زیستی، رفتار محیط زیستی، تولید کمتر، استفاده دوباره، بازیافت.

## 1. INTRODUCTION

Waste management is one of the most problematic and challenging environmental issues we face today. The problem has increased over time as humans and societies have become more prosperous and sophisticated. As populations have grown and lifestyles have changed, the issue has become increasingly complex. Growth in global consumption has led to increased levels of waste (Roch, 2006).

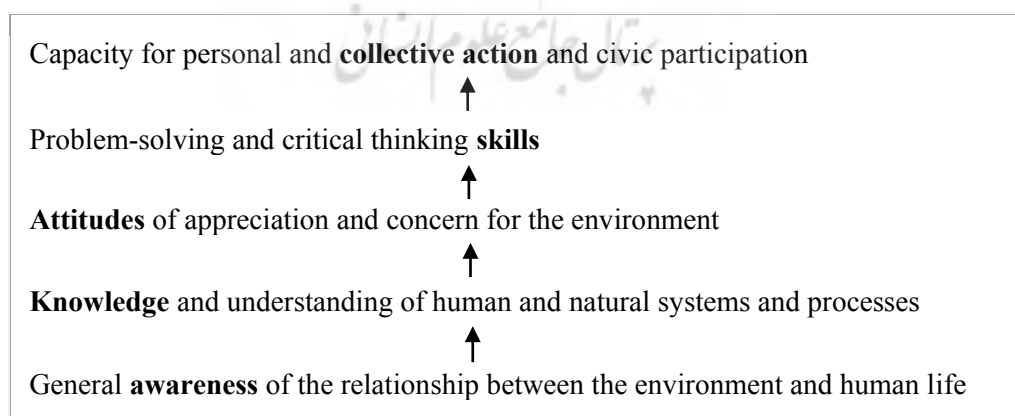
Studies show that unmanaged waste disposal is considered the leading cause of environmental problems. Due to the rapid growth in population and consequently raise the consumption of packed goods, the amount of non-biodegradable waste is increasing over time (Ferrer, 2015). In most urban cities, solid wastes are thrown away indiscriminately in any available space without care of the negative impacts it has on the environment. This poses a threat to human health and the environment. Improper management of solid wastes the environment spreads diseases and contaminates groundwater, air, and land quality. This is in support of Glenn (2009) who observed that improper solid waste disposal of household solid wastes is a source of air, land and water pollution and creates hazards to humans and environment. It is a primary environmental concern to many nations especially the developing countries (Mbolisi, F.O., 2009).

Within the areas of the household and school,

an individual or a student, in particular, is one of the waste generators. The physical condition of home and school are reflections of how the students think about the environment. By being committed to and conscious of their impact on the environment, students may set as examples for other people to follow and make a positive contribution in caring for the environment (Ferrer, 2015).

In an era where humans affect virtually all of the earth's processes, the question arises about whether we have sufficient knowledge of human-environment interactions. How can we sustain the earth's ecosystems to prevent collapses and what roles should practitioners and scientists play in this process? These are the issues central to the concept of Environmental Literacy (Scholz, 2011).

The overarching goal of environmental education is an environmentally literate citizenry. What does it mean to be environmentally literate? The test of environmental literacy is the capacity of an individual to act successfully in daily life on a broad understanding of how people and societies relate to each other and natural systems, and how they might do so sustainably. This requires sufficient awareness, knowledge, skills, and attitudes to incorporate appropriate environmental considerations into daily decisions about consumption, lifestyle, career, and civics, and to engage in individual and collective action (Scholz, 2011).



**Figure 1.** The Environmental Literacy Ladder (campaign for environmental literacy, 2007)

The ladder below outlines five essential components of environmental literacy. It is

designed to be a loose hierarchy from the simple to the more complex, each building on

the step below. However, as with many models, the phases overlap in real life. Different aspects of environmental education (and related fields such as social marketing) focus on various steps in this ladder, and this seems to be the cause of some of the confusion about what exactly is environmental education. Most important to appreciate is that environmental literacy cannot be achieved without all steps of the ladder; completing any one measure alone is inadequate and will not result in literacy (campaign for environmental literacy, 2007). Environmental education according to the United States Federal Register (1996) is "a learning process that increases people's knowledge and awareness about the environment and its associated challenges, develops the necessary skills and expertise to address the challenges, and fosters attitude, motivations, and commitments to make informed decisions and take responsible actions". This definition is considered by Mbalisi(2009) as comprehensive among other definitions of environmental education enhances critical thinking, problem-solving and effective decision-making skills and enables individuals to weigh various sides of an environmental issue before making informed and responsible decisions. Environmental education enables individuals to acquire some experiences about the physical environment as well as study the natural resources that abound in it for optimal use and consequently get committed protection and conservation of natural resources for the present and future generations. Anijah-Obi (2001) also defines environmental education as: "a field of study which seeks to promote among citizens, not just awareness and understanding of the environment, but man's relationship to it and responsible action necessary to ensure his survival while improving the quality of life" The three crucial elements of environmental education as highlighted by Anijah-Obi (2001) are:

1-Creating awareness and understanding about the environment

2-Recognizing man's relationship, responsibility, attitudes, and commitment to the environment.

3-Developing efficient and effective environmental management skills for the survival of present and future generations  
Environmental education enables people to gain experience in their environment and study natural resources; these resources in optimal use, are quite frequent. The result of environmental education is a commitment to environmental protection and natural resources for the generations of today and tomorrow(Scholz, 2011).

Lack of education on the types, characteristics, and methods of waste disposal can have undesirable effects on humans and the environment. Presently, rapid growth in population and uncontrolled industrialization in large cities are destroying the environment, on the one hand, and causing overconsumption of natural resources, on the other side, (Abdoli, 2006). Solid wastes arise from human activities. They could be regarded as refuse or garbage which is discarded by the owner. However, some materials that are considered as wastes can be reprocessed into valuable products or given away, thus rendering them useful to those who may need them. This could be achieved through proper management of solid wastes (United Nations,2009).

Solid waste management is the collection, storage, transportation, treatment and disposal of wastes in such a way as to render them innocuous to human and animal life, ecology and the environment(Oreyomi, 1998). In other words, waste management could be regarded as a process of treating, handling of refuse, sewage and other wastes that arise from human activities without endangering human health and the environment. The solid waste management techniques are the waste reduction, reuse, and recycling. This is referred to as the 3R's of waste management. It is represented by the waste management hierarchy designed by Waste Aware Business (2009) as shown in the figure below.



Figure 2. Waste Hierarchy (Waste Aware Business, 2009)

The most favored option being a waste reduction (waste prevention and minimization). The least favored choice is sending wastes to landfills. Solid waste segregation technique which enables individuals to segregate wastes at the source of generation is also an important technique that should be developed in individuals in order to attain effective management of wastes. Solid waste disposal methods which are most preferred and considered as environmentally friendly in waste management business are incineration, composting, dumping in approved dumpsites and landfilling. However, littering, open dumping of solid wastes which are practiced by many individuals are not environmentally friendly because they aid in the spreading of diseases and the pollution of the environment (Waste Aware Business, 2009).

Effective solid waste management by citizens will entail a reduction of wastes, segregation of wastes into degradable and non-degradable materials, reuse, composting and recycling of wastes. The dumping of wastes in the designated centers is equally needed to maintain clean and healthy environment (Mbalisi, 2009). To control the correct use of this management system, it is necessary to raise people's awareness of the harmful effects of incorrect management of waste. This begins in primary schools because the findings of children at this age are shaped by what they are being taught. Therefore, the educational content can play a sensitive role in this regard (Zamani & Saeedi, 2011). Thus, including the subject of

the three Rs of waste management into school curricula through formal education and/or by showing films and cartoons and using games in informal education can be a very suitable strategy. The future belongs to children; the more appropriately they are educated, the better environmental decisions they will be able to make to protect the world around them when they become adults (Simpson & Java, 2002).

School environmental program, although addressed to students can also influence upon the environmental knowledge, attitude and behavior of adults (parents, teachers, and local community members) through the process of intergenerational influence (Evans et al., 1996). Knowledge seems to have a strong positive relationship with attitudes towards environmental protection and conservation (Heslop et al., 1981). Furthermore, people who know environmental issues are more likely to engage in environmentally acceptable behavior than those who do not possess this knowledge.

Numerous studies have been conducted in different countries on the three Rs of waste management. In 2009, a program entitled "Top Tips to Reduce Waste in Schools" was prepared and implemented in primary and secondary schools in England. This program intended to prevent the production of high volumes of waste in these schools (WARP, 2008). A program called "Waste Wise Schools" began in Australia in 1997 to encourage schools towards zero waste production through less production, reuse, and waste recycling (Cutter Mackenzie A, 2010).

In the 1990s, a program entitled "Mobius" (or "Understanding the Waste Cycle") was designed in Malaysia to educate students at lower secondary level. The purpose of creating this program was to teach students about resolving the problem of growing waste production in the world by employing the management system of less production, reuse, and recycling (Ismail, 1999).

The general purpose of the present research was to identify sustainable changes in the environmental attitude and behavior of students on solid waste management. Its secondary goal was to determine the difference between female and male students on the awareness, attitude and behavior about less waste production, reuse, and recycling before and after education. Since these three components were not dealt with together in Science and Social Studies textbooks for primary school students and only one of them, usually recycling, was explained at each grade, and because none of these textbooks contained anything on producing less waste, the need for conducting this research (which tackled simultaneous raising of awareness among primary school students on all three components of this management system in order of priority) was strongly felt. In this study, primary school students were taught how to produce less waste, reuse waste, and recycle it, and thus act as protectors of the environment.

## 2. MATERIALS AND METHODS

The present research was an applied study. Such studies generally aim to solve problems and difficulties facing human communities for a better life with more suitable facilities. The research method was semi-experimental in which all the conditions and situations that must allow the possibility of controlling all the variables present in the experiential domain are not provided, and the researcher can control only some of them (Khaki, 2012). This research investigated two hypotheses: (1) there is a difference between the environmental attitude of students about waste (using fewer materials and producing less waste, reuse and recycling waste) before and after the educational program by gender,

(2) there is a difference between the environmental behavior of students about waste (using fewer materials and producing less waste, reuse and recycling waste) before and after the educational program by gender. A self-made questionnaire was the tool used in this research, and the ten groups of questions in it were selected based on topics covered in scientific books and articles and on search within websites, and by considering questions posed in the research to achieve the goals determined for the study. The questionnaire, which was designed based on research variables and Likert Scale, was used to determine the levels of awareness among students about producing less waste, reuse, and recycling. The statistical population consisted of a sixth-grade boy and girl students at two primary schools in District One of Shahr-e-Ray. Two classes were selected from each school, one as the control group and the other as the experimental group, and only the experimental group took part in the educational program. The questionnaire was distributed among experts and managers at the Education and Public Participation Office at the Department of Environment, university professors, and related experts, and their views were utilized in the questionnaire to make it valid. SPSS was used to determine the reliability of the questionnaire, which was confirmed by Cronbach's alpha of 0.81. The students were taught the material on the conservation of resources, less production, reuse and recycling of waste materials. The researcher prepared a booklet entitled, "Teaching Less Production, Reuse, and Recycling of CDs and DVDs" to teach the students. The booklet described how CDs and DVDs are produced, how they can create less waste, and how they can be reused and, at the end of the educational program, training manuals related to the subject (producing less waste, reuse, and recycling) were distributed among the students for them to answer the questions (which included multiple choice questions, word relationships, and crossword puzzles). SPSS version 11.5 was used for the statistical description of the research questions,

Levene's test for analysis of the data, and the T-test for the independent groups.

The method that a researcher uses for data analysis depends on the research objective. This objective can be determined by answering the following questions: (1) how many variables must be analyzed simultaneously? (2) Are only the characteristics of the sample going to be described or inferences are also made about the population from which the sample was taken? Answers to these questions can specify the data analysis method.

Since most of the hypotheses in this research were of the similar type, it was possible to classify the comparative tests into the general parametric (including the T-test) and nonparametric subsets. Use of nonparametric tests does not require any specific presuppositions, but parametric tests need particular presuppositions and, if these presuppositions are not satisfied, the parametric tests cannot be used. Comparative tests have the following presuppositions: (1) data is normally distributed (this is a presupposition of the Kolmogorov-Smirnov test), (2) the observations are independent of each other (this is a presupposition of the Run Test), and (3) dependent variables have been assessed by using the interval scale. All the mentioned presuppositions were tested using suitable statistical tests, and all the variables satisfied the specified conditions. Therefore, based on the circumstances, the T-test was employed (Khaki, 2012).

Compared to most tests, Levene's test is less dependent on data normality and studies equality of variances in different samples. Since variance is the presupposition of the T-test, it can be used together with Levene's test (to achieve higher accuracy) (Khaki, 2012).

In this research, the number of samples has declined (fewer than 30) because the samples were placed in gender, control, pretest, and posttest groups. Therefore, the samples were analyzed using the independent T-test. The number of samples must be large in independent T-tests so that accurate answers can be obtained. That is why dependent T-test was not employed in this research.

### 3. RESULTS

#### 3.1. The difference between the environmental attitude of students to waste (consuming fewer materials and producing less waste, reuse, and recycling waste) before and after the education program by gender

Results of testing hypothesis 1 in control pretest and posttest groups showed that there were no significant differences between these two groups in the average environmental attitude of students on (Table 1).

As shown in this table, since the significance level in Levene's test for boy and girl students was more than five percent (0.327 for the girls and 0.106 for the boys), the T-value and its significance were calculated based on equal variances. The amount of error in this test for the boy and girl students was more than 0.05 (Sig. of 0.834 for the girls and 0.215 for the boys), and the confidence level was less than 0.95. Therefore, the null hypothesis (H<sub>0</sub>), which stated there were no significant differences between these two groups in the environmental attitude to waste, cannot be rejected and is accepted.

As for the experimental pretest and posttest groups, the data in Table 1 shows that there were significant differences between these two groups in average attitude on waste. Since the significance level in Levene's test for the girl students and boys was more than five percent (sig of 0.587 for girls and 0.865 for the boys), the T-value and its significance were calculated based on equal variances. The amount of error in this test for the girl students was less than 0.05 (Sig.=0.016), and its confidence level was 0.95. Therefore, we can conclude that there were significant differences between these two groups (experimental pretest and experimental posttest groups) in average environmental attitude of girl students about waste, and their environmental attitude level rose (from the score of 11.96 in the experimental pretest group to that of 13.10 in the experimental posttest group); i.e., the null hypothesis (H<sub>0</sub>), which points to the lack of any relationship, is rejected (cannot be accepted). For the boy students also, the t-value was less than 0.05 (Sig.=0.030), and the confidence level was

more than 0.95. Therefore, the null hypothesis (H0), which points to the absence of any relationship, cannot be accepted. The average level of attitude in this group also increased

(from the score of 10.44 in the experimental pretest group to that of 11.74 in the experimental posttest group).

**Table 1.** Comparison of the average environmental attitude levels in girl and boy students in the control pretest and posttest, experimental pretest and posttest, and control and experimental posttest groups on waste

Statistical groups							
Variable	Group	Number of girls	Average for girls	The standard deviation for girls	Number of boys	Average for boys	The standard deviation for boys
Environmental attitude level of students on waste (producing less waste, reuse, and recycling)	Control pretest	29	12.14	1.684	32	10.91	1.729
	Control posttest	27	12.04	1.891	34	10.26	2.365
	Experimental pretest	26	11.96	1.708	32	10.44	2.431
	Experimental posttest	29	13.10	1.698	35	11.74	2.466
	Control posttest	27	12.04	1.891	34	10.26	2.365
	Experimental posttest	29	13.10	1.698	35	11.74	2.466

**Test for independent groups**

Environmental attitude level of students on waste (producing less waste, reuse, and recycling)	Gender	Leven's test		Independent T test			
		F test	significance	T value	Freedom degree	significance	Mean difference
Equal variances	Girls	0.978	0.327	0.211	54	0.834	0.10
	Boys	2.683	0.106	1.251	64	0.215	0.64
Unequal variances	Girls			0.210	52.169	0.834	0.10
	Boys			1.263	60.394	0.211	0.64
Equal variances	Girls	0.299	0.587	-2.483	53	0.016	-1.14
	Boys	0.029	0.865	-3.217	65	0.030	-1.31
Unequal variances	Girls			-2.482	52.277	0.016	-1.14
	Boys			-2.223	64.901	0.030	-1.31
Equal variances	Girls	0.025	0.876	-2.224	54	0.030	-1.07
	Boys	0.135	0.714	-2.540	67	0.013	-1.48
Unequal variances	Girls			-2.215	52.310	0.31	-1.07
	Boys			-2.542	66.990	0.013	-1.48

The analytic findings of the same hypothesis for the control and experimental posttest groups showed that there were significant differences between these two groups in both genders in the average environmental attitude level regarding the waste. Since the significance level in Levene's test for the boy and girl students was more than five percent (0.876 for the girls and 0.714 for the boys), the T-value and its significance for both genders were calculated based on equal variances. Considering the amount of error in

the T-test for girls was less than 0.05 (Sig.=0.030), and the confidence level was more than 0.95, we can conclude that the null hypothesis (H0), which indicates the lack of any relationship, is rejected. Based on the data in Table 1, the environmental attitude level of the students in the control posttest group was 12.04 and in the experimental pretest group 13.10. This shows that the attitude level of students in the experimental posttest group was higher than that of the control posttest group. For the boy students, the amount of

error in the T-test was less than 0.05 (Sig = 0.013), and the confidence level was more than 0.95. Therefore, we can conclude that there were significant differences between these two groups in environmental attitude on the waste. The average attitude level of these students was 10.26 in the control posttest group and 11.74 in the experimental posttest group; i.e., the attitude level of the boy students in the experimental posttest group was higher than that of the control posttest group (their score was higher than that of the control posttest group by 1.48).

These results indicate that the educational program was effective in raising environmental attitude among girl and boy students regarding the waste, but the increase in environmental attitude level of the boy students was higher compared to that of the girl students. The researcher believes this could be due to the higher interest the boy students showed in the subject taught in the educational program.

### **3.2. The difference between the environmental behavior of students about waste before and after the education program by gender**

After testing hypothesis 2, the results showed that in control pretest and posttest groups there were no significant differences between these two groups in the average environmental behavior of students on waste (Table 2).

Since the significance level in Levene's test for boy and girl students was more than five percent (0.570 for the girls and 0.164 for the boys) as shown in this table, the T-value and its significance were calculated based on equal variances. The amount of error in this test for the boy and girl students was more than 0.05 (Sig. of 0.503 for the girls and 0.282 for the boys), and the confidence level was less than 0.95. Therefore, the null hypothesis (H<sub>0</sub>), which stated there were no significant differences between these two groups in the average environmental behavior on waste, cannot be rejected and is accepted.

As for the experimental pretest and posttest groups, the data in table 2 shows that there were significant differences between these two groups in average environmental behavior on waste. Since the significance level in

Levene's test for the girl and boy students was more than five percent (Sig. of 0.186 for the girls and 0.786 for the boys), the T-value and its significance in two genders were calculated based on equal variances. The amount of error in this test for the girl students was less than 0.01 (Sig.=0.003), and its confidence level was more than 0.99. Therefore, we can conclude that there were significant differences between these two groups (experimental pretest and experimental posttest groups) in the average environmental behavior of girl students about waste. So, the null hypothesis (H<sub>0</sub>), which points to the lack of any relationship, is rejected (cannot be accepted). Based on the data in Table 2, their environmental behavior level rose (from the score of 15.28 in the experimental pretest group to that of 17.97 in the experimental posttest group). For the boys, the amount of error in T-test is less than 0.01 (Sig=0.001), and its confidence level was more than 0.99. So, we can conclude that there were significant differences between these two groups (experimental pretest and experimental posttest groups) in the average environmental behavior of boy students about waste, and their awareness level rose (from the score of 13.77 in the experimental pretest group to that of 16.66 in the experimental posttest group).

The analytic findings of the same hypothesis for the control and experimental posttest groups showed that there were significant differences between these two groups in both genders in the average environmental behavior level regarding the waste. Since the significance level in Levene's test for the girl students and boys was less than five percent (Sig. of 0.303 for the girls and 0.928 for the boys), the T-value and its significance were calculated based on equal variances. Considering the amount of error in the T-test for girls was less than 0.05 (Sig.=0.013) and the confidence level was more than 0.95, we can conclude that the null hypothesis (H<sub>0</sub>), which indicates the lack of any relationship, is rejected and there were significant differences between these two groups (experimental posttest group and control posttest group) in average environmental behavior of girl students about waste. The data in Table 2 shows that the level of the environmental



behavior of girl students in the control posttest group was 15.97 and in the experimental pretest group 17.97. The amount of error in the T-test for boys was less than 0.01 (Sig.=0.005), and the confidence level was more than 0.99. Therefore, we can conclude that there were significant differences between these two groups (experimental posttest group and control posttest) in the average environmental behavior of boy students about waste. The environmental

behavior level of the boy students in the experimental posttest group was higher than that of the control posttest group (their score was higher than that of the control posttest group by 2.57).

These results indicate that the educational program was effective in raising environmental behavior among girl and boy students regarding the waste.

**Table 2.** Comparison of the average environmental behavior levels in girl and boy students in the control pretest and posttest, experimental pretest and posttest, and control and experimental posttest groups on waste

Statistical groups							
Variable	Group	Number of girls	Average for girls	The standard deviation for girls	Number of boys	Average for boys	The standard deviation for boys
Environmental behavior level of students on waste (producing less waste, reuse, and recycling)	Control pretest	26	16.50	2.717	31	14.97	2.726
	Control posttest	29	15.97	3.111	32	14.09	3.586
	Experimental pretest	25	15.28	2.923	35	13.77	3.598
	Experimental posttest	29	17.97	3.386	35	16.66	3.694
	Control posttest	29	15.97	3.111	32	14.09	3.586
	Experimental posttest	29	17.97	3.386	35	16.66	3.394

Test for independent groups							
Environmental behavior level of students on waste (producing less waste, reuse, and recycling)	Gender	Leven's test		Independent T test			
		F test	significance	T value	Freedom degree	significance	Mean difference
Equal variance	Girls	0.326	0.570	0.675	53	0.503	0.53
	Boys	1.982	0.164	1.086	61	0.282	0.87
Unequal variances	Girls			0.680	52.969	0.499	0.530
	Boys			1.091	57.772	0.280	0.87
Equal variance	Girls	1.793	0.186	-3.094	52	0.003	-2.69
	Boys	0.075	0.786	-3.311	68	0.001	-2.89
Unequal variances	Girls			-3.128	51.999	0.003	-2.69
	Boys			-3.311	67.953	0.001	-2.89
Equal variance	Girls	1.083	0.303	-2.342	56	0.023	-2.00
	Boys	0.008	0.928	-2.877	65	0.005	-2.56
Unequal variances	Girls			-2.342	55.603	0.023	-2.00
	Boys			-2.881	64.755	0.005	-2.56

In studies conducted under the titles of "Top Tips to Reduce Waste in Schools," in England (WARP, 2008), "Waste Wise Schools" (Cutter Mackenzie, 2010) in Australia, and "Mobius,"

("Understanding the Waste Cycle") in Malaysia on the role played by education in less production, reuse, and recycling waste in increasing awareness level of students, all of

them emphasized the decisive role of education in upgrading environmental awareness, attitude and behavior of students, and in all of them the environmental attitude and behavior level of students on these three management elements rose after the educational programs.

Results of the research by Merma. K (2008) entitled, "an assessment of students' Environmental attitude and behaviors and the effectiveness of their school recycling programs" a questionnaire with 15 question was used for gathering the information about students' environmental attitude and behavior regarding waste management. The results indicated that environmental attitude and behavior level of the girl students raised more than boys after education programs.

Based on research carried out by Ballantyne *et al.* (2001), programs of environmental teaching (such as the program of Waste Wise Schools) could lead to children changing the behavior of their parents.

Results of the study by Armstrong (2004) at two Waste Wise Schools confirmed those of the research Ballantyne, Fein, and Packer conducted in 2001 and showed that the 3R's programs changed the ideas and behaviors of students and their parents regarding waste, and stated that children could have the influence of a catalyst in influencing their parents.

#### 4. DISCUSSION AND CONCLUSION

The results obtained from the present study were as follows: (1) the educational program was effective in increasing the environmental attitude and behavior of girl, and boy students on waste(reduced waste, reuse, and recycling)(2) awareness of boys about all three subjects raised more than girls

In a study conducted by the Society of the Protectors of the Earth, in which all chapters and parts of different Science and Social

Studies textbooks of the elementary school level were reviewed and the obtained information was compared with the content of several books and catalogues available on reputable websites regarding the management systems for less production, reuse, and waste recycling (in order of priority) (Anonymous, 2014), it was found that the critical points regarding waste management (the 3 Rs) were not referred to, or only a few related pictures and activities were shown or mentioned. Therefore, to make sustainable changes in the school culture in line with the minimization of waste, it is necessary that students of all levels (from preschool to high school) be trained on the three elements of the management system (the 3 Rs) together in order of priority (conservation of resources, production of less waste, and the reuse and recycling of waste).

In confirmation of the positive effect of education on children, it can be stated that we are all aware that if we tell children to stop doing something without giving any reason, we cannot change their attitude and behavior because children are not aware of the consequences of their behavior. Therefore, we must educate them (Mrema, 2008). This situation is quite similar to that of less production, reuse, and recycling of waste. If we tell children to produce less waste and reuse and recycle waste without teaching them the conservation of resources, positive results will not be obtained.

Finally, we suggest that this management system be taught to students in schools of various Iranian cities considering their geographical conditions through multiple activities such as showing films, slides, and posters, playing competitive games, and presence in the natural environment it means that educating the citizens both formally, informally and non-formally should be sustained.

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