

ENVIRONMENTAL LITERACY LEVELS OF THE CLASSROOM TEACHERS IN TURKEY: A RESEARCH TOWARDS THE CLASSROOM TEACHERS SERVING IN BURSA

Assoc. Prof. Ph. D. Elif KARAKURT TOSUN
Uludag University Social Sciences Vocational Schools
Ali Osman Sonmez Campus, Osmangazi BURSA TURKEY
ekarakurt@uludag.edu.tr

Assoc. Prof. Ph. D. Sevda GÜRSAKAL
Uludag University Faculty of Economics and Administrative Sciences
Görükle BURSA TURKEY
sdalgic@uludag.edu.tr

Abstract: The educators and the teachers who will give environmental education to children are supposed to have knowledge about the basic issues regarding the environment, to be at a certain sensitivity level about the environmental issues, to assume active roles in the process of reducing the environmental problems and, in this aspect in their daily lives, to exhibit behaviours towards protecting the environmental values.

The teachers who have important duties and responsibilities in the individuals becoming environmentally literate citizens are must be invorenmental literate individuals at the operational level. The primary school period during which the social relations and personalities of the children develop is very important. The classroom teachers educating the children at the age of primary school being "environmentally literate" and these teachers educating their students in this direction will be one of the components contributing to the protection of the environmental values, creation of the awareness concerning the environmental issues and eventually, construction of a sustainable future. In the research carried out with the classroom teachers at the primary schools and depending on the basis of voluntariness within the scope of "*the Survey for the Invironmental Literacy of the Classroom Teachers*", an environmental literacy survey has been applied to 310 teachers.

Keywords: Environmental Literacy, Classroom Teachers, Bursa, Environmental Knowledge, Environmentally Beneficial Behaviour.

INTRODUCTION

Protection of environmental values of the individuals depends on being in positive attitudes towards the environment. Since the individuals are not born having these attitudes, the children sholud be equipped with positive attitudes for the environment from the early ages. Thus, with an effective environmental education to be given to the children from the early ages, it could be made possible to have them be in positive attudes towards the environment. For this, primarily the educators-teachers who are to give this education are supposed to have knowledge about the basic issues regarding the environment, to be sensitive to the environmental issues, to assume active role in the works towards the solution of the environmental problems and to exhibit behaviours towards the protection of the environmental values in their daily lives. In other words these educators-teachers should be "environmentally literate".

Roth (1968), in the later periods, by expanding this topic raised by Roth, the content of the concept has been filed up. In the 1st National Environmental Education Act prepared in the US in 1970, the concept of 'environmental literacy' has been mentioned. In the International Environmental Education Conference held in Tblisi 1977, the concept of 'environmental literacy' has been emphazied and it has been stated that the purpose of the environmental education is to have the individuals acquire environmental literacy. In 1989, a document titled "environmental literacy for every thing" has been published by UNESCO-UNEP. In this

document, environmental literacy has been accepted as the main purpose of the environmental literacy.

Roth has described the concept of environmental literacy in his book she wrote in 1992 "*Environmental literacy: its roots, evolution and directions in the 1990s*". According to this, the environmental literacy refers to (Roth, 1992) knowing the structure-functioning of the environmental systems and having the necessary sensitivity in the process of protecting, improving and ensuring the continuity of the environmental values and acting in this direction. In this description, it becomes obvious that the environmental literacy has four major components as knowledge, behaviour, attitude and sensitivity. Roth indicates that the phenomenon of environmental literacy has a three layer- structure:

Nominal environmental literacy; this is the minimum one among the levels of the environmental literacy. In this most primitive level the natural systems are known, information about the results emerging from the human-environment interactions is obtained.

Functional environment literacy; at this level, besides knowing the human-environment interaction, the positive and negative results of this situation is also known. Since the devastating damages that the humans give to the environment is known, a sense of anxiety prevails. But the stated fear is not always transformed into a positive behaviour towards protecting the environmental values.

There is *operational environmental literacy* in the third category. This represents the highest level of environmental literacy. The ones at this level do not only have a deep knowledge about the environment. At the same time, they have a broad knowledge about effects that their behaviours will create on the environment. A literate at this level expresses his or her feelings and thoughts in a corporate organization (eg. non-government organizations). These people do readings about the literature concerning the environment, write down their thoughts and criticize the current situation. They have a strong sense of responsibility at the point of protection of the environmental values and ensuring the sustainability. They do not only take action at the individual or local level. The global environmental issues are equally important for them (Hogden, 2012: 13). What is important at this stage is whether the knowledge about the environment can be transformed into responsible-beneficial behaviour for the environment or not. In other words, the knowledge, by being internalized by the individuals, is required to shape their daily lives. The environmentally literate individual that Roth describes herein, is consistent with the aim of "for the solution of the environmental problems, by having the individuals acquire the necessary attitudes and behaviours making the more active (Tbilisi)" which is emphasized in the 1978 Tbilisi Declaration.

Elder (2003) indicates that the environmental literacy is a five-stage process and expresses that the environmental literacy can not be accomplished without the completion of the mentioned five-stage process. A success at any stage is not alone sufficient. In this case, it can be said that the the acquisition of the environmental literacy would remain inconclusive (Elder, 2013).

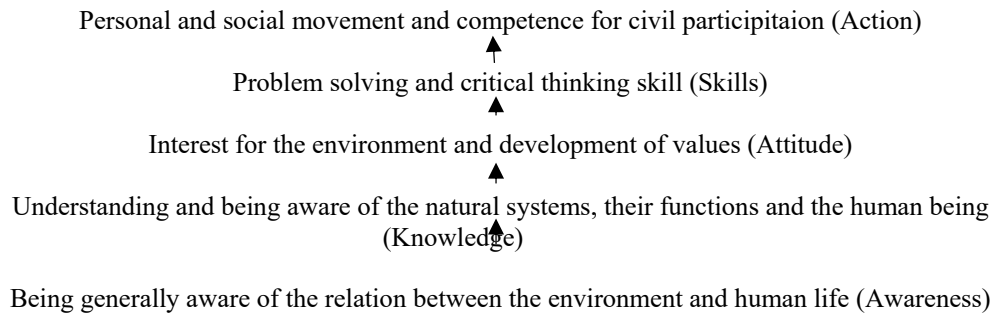


Figure 1: According to Elder The Environmental Literacy Stages (Elder, 2003)

By Morrone and his friends, the case of environmental literacy has been handled in a manner related with the environmentally beneficial behaviour. Accordingly, Morrone and his friends have stated that the individual cannot be considered as environmental literate unless the environmental knowledge that the individuals have is transformed into environmentally beneficial behaviours and have indicated that an environmentally literate individual is required to have fundamental and deep scientific background equipped with environmental value, attitude and skills to transform the knowledge into action (Morrone, Mancl ve Carr, 2001).

As a result, originating from the definitions made, we can say that understanding the natural processes that make the life possible and protecting them with respect is the environmental literacy; and the individual who knows the principles and the limits of the nature, who has accepted living with the nature in harmony is the *environmental literate*. An "environmental literate person" has got information about how his daily life preferences will harm the environment and how these preferences will provide benefits for the environment. Depending on this information he has, while shaping his own life in this direction, on the other hand, he informs the people around himself about this subject.

The teachers who have important duties and responsibilities in making the individuals environmentally literate citizens are required to be environmentally literate individuals at the operational level. It is important to examine the environmental literacy levels and positive behaviours for the environment of the classroom teachers who have important tasks in the process of raising an environmentally sensitive generation. Indeed, in the US National Environmental Act 1990, providing environmental education for the teachers at the local and national level, and integrating them into the environmental education programmes has been aimed. Accordingly, the precondition of accomplishment of the environmental education programs launched at national level has been determined that the teachers who are to give the environmental education should be educated about the environmental values at an adequate level (Chepesiuk, 2007).

Supporting the the process of awareness about the importance of environmental values with the activities towards children would be an important step for the secure tomorrow. The primary school period which is the period when the social relations and personalities of the children develop is of great importance. Hence, the classroom teachers educating the children at the primary school age being "environmentally literate", training their students in this direction will be one of the most important components contributing to the preserving the environmental values and creating awareness regarding the environmental issues and eventually constructing the sustainable future.

Currently, at which level is the environmental literacy of the classroom teachers serving in the primary schools? The questions what is, what should be the roles of the classroom teachers, who have the purpose of bringing up an individual who is intellectual and respectful to the nature by giving contemporary "literacy" education to the children at the primary schools, in the process of providing a sustainable, balanced environmental system have been the basic starting point of this study.

The aim of the research in this context is to determine the environmental literacy levels of the classroom teachers serving in the Osmangazi County which is one of the central counties of the city of Bursa. The Osmangazi County is one of the largest counties of Turkey in terms of population. (According to data from the year 2014 its population is 802,620.)

METHOD

Several studies have been performed in the world and in Turkey in order to determine the environmental literacy levels of the individuals. In these studies performed, different scales have been used for the determination of the environmental literacy. For example in the years of 2001 -2002, an environmental literacy survey was administered at the Michigan State University which 19890 students participated in. In 2007, an applied study related with environmental literacy was conducted in in Korea with 969 students by Chu, Lee, Ko, Shin, Lee, Mee, Min and Kang. In Turkey, the Environmental Literacy Scale developed at the Michigan State University was applied to the students having education in Ankara by adapting to Turkish by Teksöz, Şahin and Ertepinar.

When Several academic studies carried out in the context of environmental literacy in Turkey are examined, they can be categorized as follows: Examining the environmental literacy levels or environmental sensitivities of the students at the primary school level¹; the studies towards determining the environmental literacy levels or attitudes for the environment of the students having education at various undergraduate programs²; searching for the attitudes of the teachers for the environment or studies related with the assessment of the environmental literacy³.

The Hypothesis of the Study

The hypothesis of the study is as follows: The environmental literacy levels of the classroom teachers are at the *functional environmental literacy level* in the context of the environmental

¹ Some of these studies include the following: Alp, E., Ertepinar, H., Tekkaya, C., & Yilmaz, A. (2006). A study on environmental attitudes and knowledge of elementary school students. Abstract book. *VII. National Science and Mathematics Education Congress*, Gazi University. Ankara. Turkey; Bozkurt, O., and Orhan, A. T. (2004). Identification of the misconceptions they have of elementary school students about acid rain. Abstract book. *VI. National Science and Mathematics Education Congress*. Marmara University, Istanbul, Turkey; Cetin, G., & Ertepinar, G. (2004). The seventh and ninth graders a comparison of the level of understanding some of the concepts of Ecology. Abstract book. *VI. National science and mathematics education congress*. Marmara university. Istanbul, Turkey; Cobanoğlu, E.O., Er, D.Ž., Demirtaş, E., Ozan, & B., Bayrak, C. (2006). Of elementary school students ' perceptions of environmental problems. Abstract book. *15. National Educational Sciences Congress*. Mugla University. Mugla; Darcin S.E., Orhan A.T., Bozkurt O., & Yaman S. (2006). The detection level examination of a class of eighth graders about the ozone layer. *Şakarya university journal of educational sciences*; Yaman, S., Bozkurt, O., Aydın, H., Uşak, M. & Gezer, K. (2005). Primary school students' knowledge levels about greenhouse effect, ozone layer and acid rains. *The mediterranean journal of educational studies*, 10 (2), (pp. 81-95); Yilmaz, O., Boone, W.J., & Andersen, H.O. (2004). Views of elementary and middle school Turkish students toward environmental issues. *International Journal of Science Education*. 26 (12). (pp. 1527-1546).

² Some of these studies include the following: Altan, M. Z. (1998). A call for change and pedagogy: A critical analysis of teacher education in Turkey. *European journal of education*. 33.(pp. 407-508). Berberoglu, G., Tosunoglu, C., (1995). Exploratory and confirmatory factor analyses of an environmental attitude scale (EAS) for Turkish university students. *The journal of environmental education*. 26. (pp. 40-44); Karagozoglu, G., (1991). Teacher education reform in Turkey. *Action in teacher education*, 13. (pp. 26-29.)

³ Some of these studies include the following: Erten, S. (2003). 5. students in the class "of trash reduction" an instructional model for acquiring awareness. *Hacettepe university journal of education*. 25. (pp. 94-103); Guler, T. (2009). Ecology-based environmental education on teachers ' environmental education influence their opinion against it. *Journal of education and science*. 34 (151). (pp. 30- 43); Urey, M. & Şahin, B. (2010). Academic staff of environmental issues and environmental education for feelings, thoughts and behaviors evaluation. *Cukurova University journal of education*. 3(38). (pp.134-149).

literacy category that Roth defines. In other words, the classroom teachers have information about the environmental issues at the basic level, they know about the positive-negative results of the human and environment interaction, since they are aware of the devastating harms of the environmental problems that humanity is facing, a sense of anxiety prevails. But, they are not willing to make a fundamental change in their daily lives towards reducing the environmental problems, they do not take part in the activities at the operational level by joining a corporate organization like non-government organizations in the context of reducing the environmental problems; moreover, they do not follow the scientific publications in order to improve their knowledge on issues related to the environment, they do not express their thoughts at these platforms.

The Importance of the Study

The field study covered within the context of this study being carried out in the city of Bursa which has received immigrants from many regions of Turkey, and in which individuals having diverse socio-cultural features are living will provide the researcher of the information about the environmental literacy levels of the classroom teachers serving all over Turkey. The data to be obtained from this study will provide an important data base for the environment based various researches and projects to be developed for the teachers who will transfer an approach based on sustainable, balanced and intergenerational justice.

Creating the Questionnaire

In the Bursa - Osmangazi County, 1824 classroom teachers have been serving. With 310 of these teachers, the "Environmental Literacy of the Classroom Teachers Survey" has been conducted with the aim of determining their environmental literacy levels. During the process of creating the questionnaire, starting from the conceptual framework of Roth, it has been aimed to determine which one/which ones of the four basic components of environmental literacy which are knowledge, behaviour, attitude and sensitivity cases the classroom teachers participated in the field study have internalized. In this context, the "*Environmental Literacy of the Classroom Teachers Survey*" composed of 100 questions under the headings of *knowledge test, behaviour determination, attitude determination, and sensitivity level* has been applied to the classroom teachers.

In the process of creating the questionnaire, the surveys previously carried out by the academicians as result of literature scanning have been examined. While creating the questionnaire, the working areas of the classroom teachers, the subjects included in the primary school curriculum, the unique environmental values - problems of Turkey and the unique environmental values of the city of Bursa where the study was carried out have been considered. The questions created in this way have been included in the "Environment Knowledge Test" which is the first part of the questionnaire. In the "Environment Knowledge Test", questions in general nature related with environmental issues at national and local scale and environmental values are also included. In the questionnaire, all of the questions included in the "beneficial behaviour for the environment", "attitude towards the environment" and "sensitivity to the environmental issues" sections have been developed by the researchers considering the issues and problems related with the environment.

The questions guiding the research with the subject of determination of the environmental literacy levels of the classroom teachers serving in the city of Bursa are as follows;

- What is the level of knowledge of the classroom teachers serving in Bursa about basic issues related to the environment?

- How are the attitudes of the classroom teachers serving in Bursa at the point of protection and sustainability of the environmental values?
- What is the sensitivity levels of the classroom teachers serving in Bursa for the globally effective environmental problems?
- Is there any meaningful statistical correlation between the environmental literacy levels of the classroom teachers who are the subject of the research and their genders?
- Is there any meaningful statistical correlation between the environmental literacy levels of the classroom teachers who are the subject of the research and their duration of the working hours?

Implementation of the Questionnaire

Initially, the written permission has been taken from the Bursa - Osmangazi County National Education Directorate for the purpose of implementing the " Environmental Literacy of the Classroom Teachers Survey" developed by the researchers with the methods mentioned above. With this permission document received, the primary schools in Osmangazi County have been visited and the school administrators have been interviewed. Work has been conducted in 18 primary schools 2 of which are private and 16 of which are public primary schools. Within the context of "Environmental Literacy of the Classroom Teachers Survey", in the field study conducted with the classroom teachers at the primary schools on the basis of voluntariness, 173 female and 137 male classroom teachers have been interviewed. The interviews lasted approximately 30-35 minutes.

Validity and Reliability Analysis

In the "Environmental Literacy of the Classroom Teachers Survey", three different dimensions as behaviour determination, attitude, and sensitivity are included. Cronbach's alpha coefficients calculated for these dimensions are given in the following table. As seen on the table, the Cronbach Alpha values for these three dimensions are above 70%. This indicates that the determined dimensions are reliable.

Table 1: Values of Cronbach α

Dimension	Items	Mean	C.Alpha
Environmental Behavior Detection	23	3,74	0,88
Attitude Towards The Environment	18	3,95	0,81
Sensitivity To Environmental Issues	15	4,15	0,98

FINDINGS

"The findings of the survey conducted with face-to-face interview method within the context of the field study titled "Environmental Literacy Levels of the Classroom Teachers in Turkey: a Research Towards the Classroom Teachers Serving in Bursa" are as follows:

Demographic Findings

The 55, 8% of the teachers participated in the field study are women, the 37, 7% is between the ages of 39-46. The 90, 6% of the teachers are not members of any NGO, the 33,9% of them have been working for 15-19 years.

Table 2: Demographic characteristics of the classroom teachers

Gender	Frequency	%	NGO's Membership	Frequency	%
Female	173	55,8	Evet	29	9,4
Male	137	44,2	Hayır	281	90,6
Age	Frequency	%	Tenure	Frequency	%
22-30 age	37	11,9	0-4 yıl	25	8,1
21-38 age	87	28,1	5-9 yıl	37	11,9
39-46 age	117	37,7	10-14 yıl	63	20,3
47- 54 age	52	16,8	15- 19 yıl	105	33,9
55 age and above	17	5,5	20 yıl ve üzeri	80	25,8
Total	310	100,0	Total	310	100,0

Findings Related to Environmental Knowledge

In the questionnaire, there are 36 information questions for the purpose of evaluating the knowledge of the classroom teachers about the environmental system. The number of the correct answers given to the questions have been designated as the environmental knowledge level score. According to this, for environmental knowledge 24,57 ($\pm 4,5$ ss) as the average score, 5 as the minimum score and 33 as the maximum score have been found.

Whether or not the environmental knowledge differ according to gender has been analyzed with two independent sampling "t Test", and as the result of the analysis it has been revealed that the average of the environmental knowledge score does not differ according to gender ($t=0,554$; $p=0,580$).

For the purpose of analyzing whether or not the environmental knowledge levels differ in terms of the working time periods of the teachers, "One-Way Variance Analysis (ANOVA)" has been used. The results of the analysis are listed in the following table.

Table 3: Tenure and teachers ' environmental knowledge levels

	Tenure					F	P	Post-Hoc
	0-4 year (n=35)	5-9 year (n=37)	10-14 year (n=63)	15-19 year (n=105)	20 year + (n=80)			
Environmental Knowledge Scores	21,92	24,00	24,25	25,00	24,57	3,409	0,010	0-4yıl<15-19 yıl 0-4 Yıl<20+

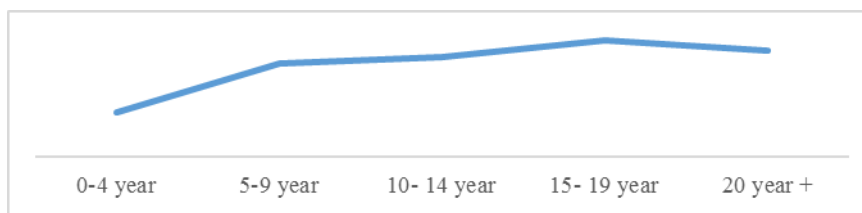


Figure 2: The relation of the working time periods of the classroom teachers with their environmental knowledge levels.

As seen from the table and figure above, the average knowledge level score of the classroom teachers differ in terms of their working time periods. This difference has come out as the ones who have 0-4 years of working period in their profession have lower score compared with the ones who have 15-19 years and 20 years and above. (Post-hoc) Whether or not the environmental knowledge scores of the classroom teachers are associated with the behaviors, attitudes and sensitivity towards the environment has been examined and the following findings have been obtained.

Table 4: The relation of the environmental knowledge scores of the classroom teachers with their behaviours, attitudes and sensitivity towards the environment

	Behavior	Attitude	Sensitivity
Score	0,188**	0,267**	0,158**
Behavior	1,00	0,548**	0,562**
Attitude	0,548**	1,00	0,665**
Sensitivity	0,562**	0,665**	1,00

** p<0,01

When the correlations in table above are analyzed, it can be stated that there are meaningful but rather low positive oriented correlations between the environmental knowledge score and behaviour, attitude towards the environment and sensitivity for the environmental problems.

The Findings Related to the Beneficial Behaviours Towards the Environment

In order to assess whether or not the classroom teachers perform beneficial behaviours towards the environment, a 23-item scale has been created. The answers given to the items are in the form of 1 "never", 2 "rarely", 3 "sometimes", 4 "often" and 5 "always". The Figure 1 showing the items included in the scale created and the averages related with the responses given is placed below:

In the evaluation of the beneficial behaviours of the classroom teachers towards the environment, the analysis have been conducted in this regard in order to determine whether or not the environmental literacy differs according to the period of working time and gender which is the basic matter of the research. Whether or not the beneficial behaviours of the classroom teachers differ according to gender has been analyzed with two independent sampling "t Test". According to the results of the research, the beneficial behaviours towards the environment differ according to gender (t=6,159; sig:0,000). This difference has come out in favour of female classroom teachers. (MeanDifference: 0,323).

Table 5: Group statistics

	Gender	N	Mean	Std. Deviation
Behavior	Female	173	4,0012	,46032
	Male	137	3,6782	,45609

Table 6: Independent sample test

Behavior	Levene's Test for Equality of Variances		t- test for Equality of Means				
	F	Sig.	T	df	Sig. (2 – tailed)	Mean Difference	Std. Error Difference
Equality of Assumed	,644	,423	6,159	308	,000	,32291	,05243
Equality of Variances			6,165	293,103	,000	,32291	,5238

For the purpose of investigating whether or not the environmentally beneficial behaviours of the classroom teachers differ according to the working time period, "One-Way Variance Analysis (ANOVA)" has been used. According to the results of the analysis, statistically meaningful difference have not been found compared with 5% meaningfulness level (F=0,212; sig:0,932).

Table 7: The relationship of behavior with the working time

Working Time	N	Mean	Std. Deviation
0-4 year	25	3,8080	,47371
5-9 year	37	3,8811	,50460
10-14 year	63	3,8292	,39982
15-19 year	105	3,8583	,49533
20 year and plus	80	3,8870	,53400
Total	310	3,8585	,48508

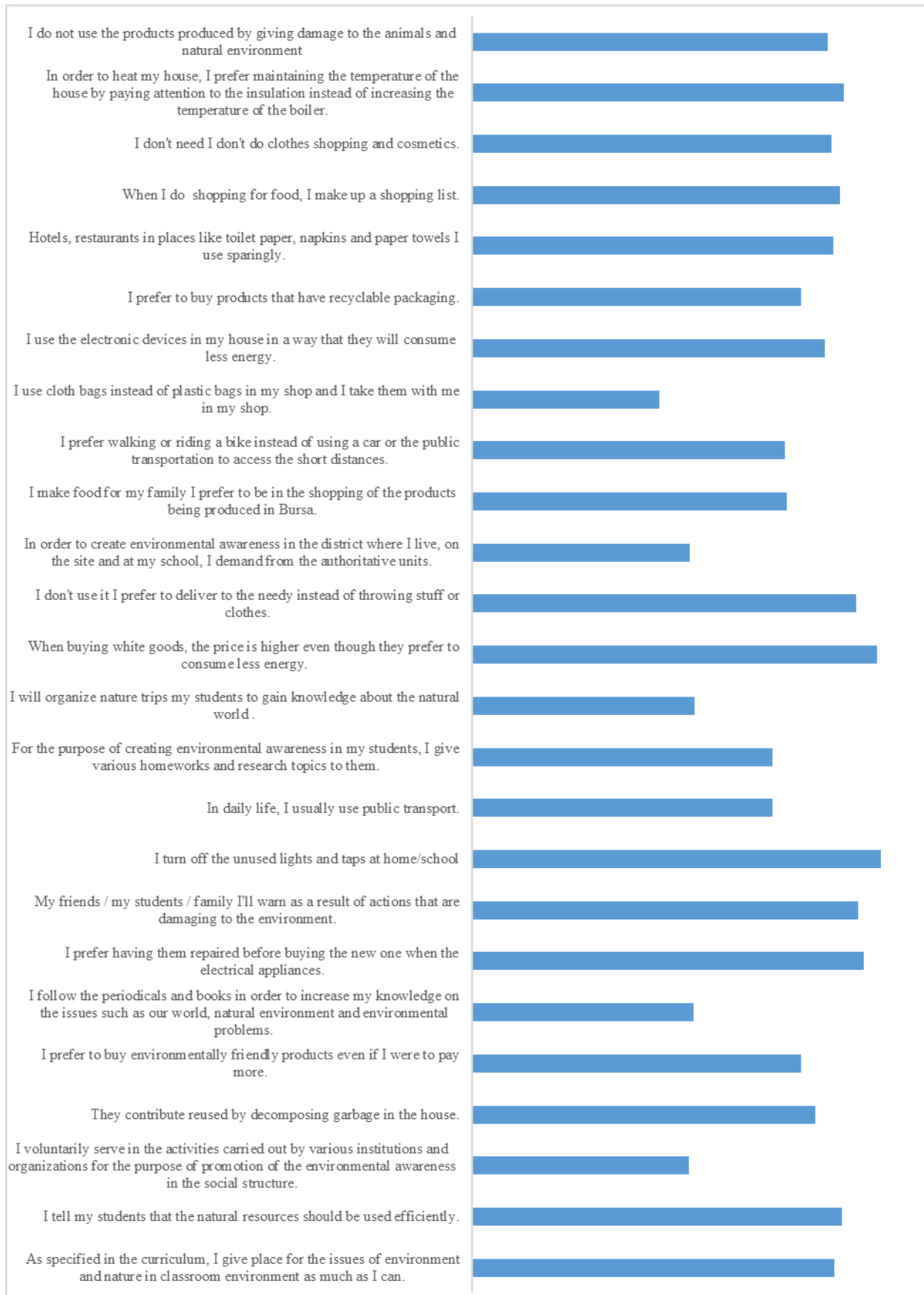


Chart 1: The average of the beneficial behaviours of the classroom teachers towards the environment

As to be seen on the Chart 1, The environmentally beneficial behaviour which received the highest score is as follows:

- "I turn off the unused lights and taps at home/school."

Table 8: Lights and taps off

	Frequency	%
Never	0	0
Rare	2	0,6
Sometimes	10	3,2
Often	67	21,6
Always	231	74,5
Total	310	100,0

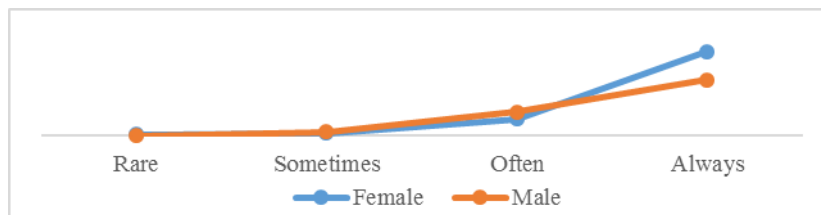


Figure 3: Teachers' turning off the unused lights/taps according to their gender

While the 80% of the female teachers have given the response "always", this ratio has declined to 67% for the male teachers. In terms of working time period, it is observed that the ratios are close to each other (Figure 3).

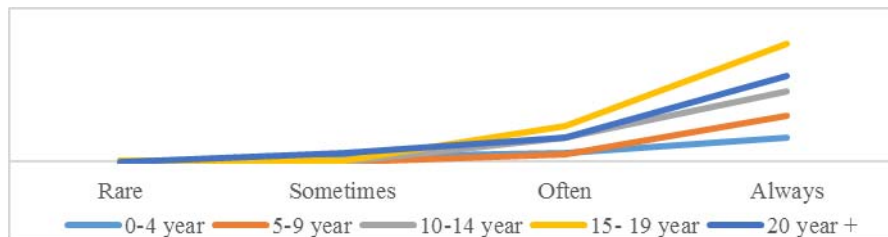


Figure 4: Teachers' turning off the unused lights/taps according to the working time period

Again, as to be seen on Chart 1, one the environmentally beneficial behaviours that received lowest score is like that:

"I voluntarily accept duty in the works carried out by means of various institutions and organizations in order to create and promote environmental awareness in the social structure and give support to these works."

Table 9: Voluntary work in order to create environmental awareness

	Frequency	%
Never	64	20,6
Rare	99	31,9
Sometimes	95	30,6
Often	36	11,6
Always	16	5,2
Total	310	100,0

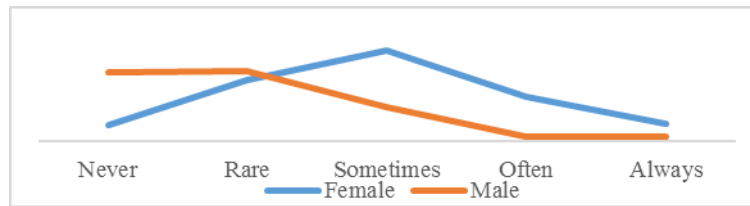


Figure 5: Voluntary work of the classroom teachers on the environmental issues according to their gender

One of the basic criteria in the context of environmental literacy is individual's doing voluntary works in order to create environmental awareness in the community and for this purpose, participating in the activities of various non-government organizations. Within the scope of the field study, the classroom teachers' fulfilling frequency of this behaviour has remained quite low. The ratio of the teachers who responded as "often" and "always" has remained at the level of 16,8% (Table 9). When this case is examined in the context of gender, while this ratio for the female teachers (The sum of the responses often and always) is at the level of 26,6%, the ratio has dropped to 4,4% for the male teachers (Figure 5). When considered in the context of working time period, a significant difference has been observed in between (Figure 6).

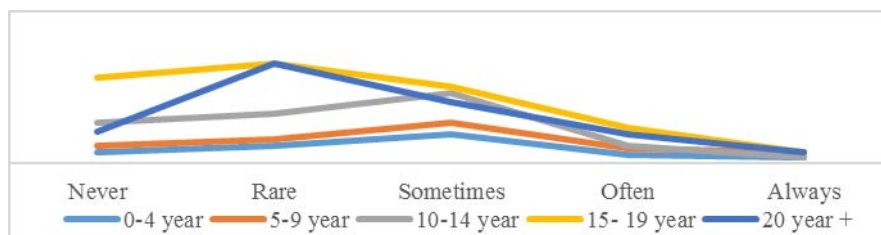


Figure 6: Voluntary Work of the teachers on the environmental Issues according to their working time period.

When the Chart 1 is examined in general, it can be said that while the teachers participated in the field study behave more sensitively on the issues that concern especially themselves, their families and their homes, they are less willing to fulfill the behaviours towards working voluntarily with the purpose of expanding the environmental awareness in the individuals and to take action actively in the process of protecting the environment. In addition, moving from the survey data, it is seen that the frequency of the female classroom teachers fulfilling the environmentally beneficial behaviours is higher in comparison with the male classroom teachers.

Attitudes Towards Protecting the Environmental Values

In order to determine the environmental literacy levels of the classroom teachers for the purpose of determining their attitudes at the point of protection and sustainability of the environmental values, 18 questions have been prepared. The responses given to the questions are as in the form of 1 "I strongly disagree", 2 "I disagree", 3 "I am undecided", 4 "I agree", and 5 "I strongly agree". The averages of the responses that the classroom teachers gave to the statements contained in the prepared scale are as seen on the Chart 2.

In the evaluation of the attitudes of the classroom teachers towards the environment, gender and the working time period have been considered as the basic evaluation criteria. In the direction of these criteria, whether or not the attitudes towards the environment differ

according to the gender has been analyzed with the "Mann Whitney U Test"⁴. According to the results of the analysis, it has been found out that the attitudes towards the environment differ according to the gender and this difference is in favour of the classroom teachers.

Table 10: Group statistics

Attitude	Gender	N	Mean	Std. Deviation
	Female	173	4,0853	,36845
Male	137	3,7880	,48251	

Table 11: Test statistics (a)

	Attitude
Mann – Whitney U	7382,000
Wilcoxon W	16835,000
Z	-5,706
Asymp. Sig. (2 – tailed)	,000

a. Group Variable: Gender

In the evaluation of attitudes of the classroom teachers towards the environment in terms of working time periods, the "Kruskal Wallis Test"⁵ has been used. According to the results of the analysis, it has been revealed that attitudes towards the environment do not differ in terms of working hours.

Table 12: Test statistics (a.b)

	Attitude
Chi – Square	2,849
Df	4
Asymp. Sig.	,583

a. Kruskal Wallis Test

b. Group Variable: Working Time

Table 13: The relationship of attitude with the working time

Working Time	N	Mean	Std. Deviation
0-4 year	25	3,9520	,38092
5-9 year	37	4,0432	,38571
10-14 year	63	3,9183	,44225
15-19 year	105	3,9386	,49445
20 year and plus	80	3,9613	,43538
Total	310	3,9539	,44711

⁴ Because the variances are not homogeneous group Kruskal- Wallis test used.

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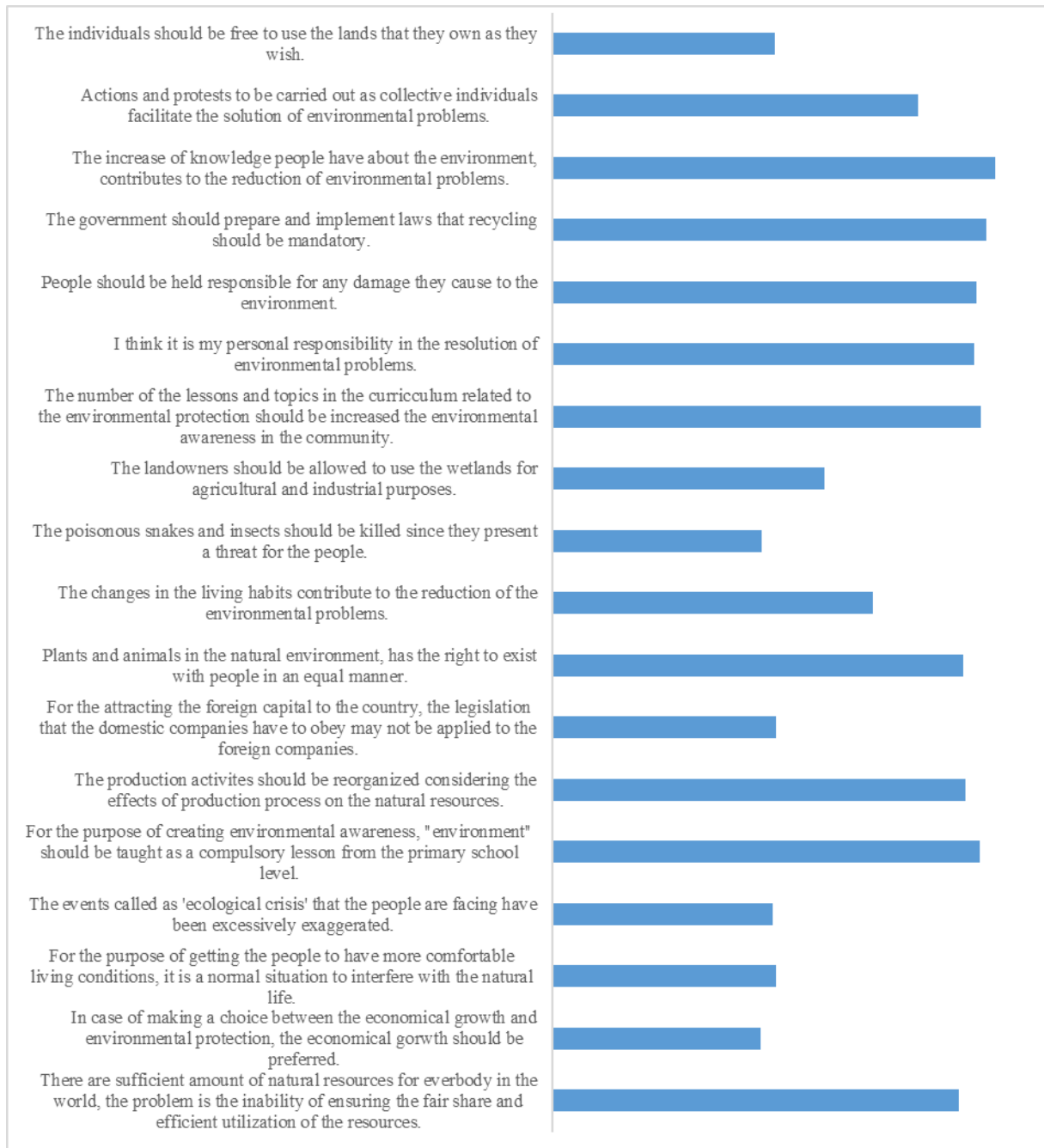


Chart 2: The average of the attitudes of the classroom teachers towards the environmental values

Of the questions asked in order to determine the attitudes of the classroom teachers the response to which the highest score was given is in the form of "Increase of the knowledge of the people in the subject of environment contributes to the reduction in the environmental problems".

Table 14: According to the classroom teachers does the increase in the environmental knowledge of the people reduce the environmental problems

	Frequency	%
Strongly Disagree	2	0,6
Disagree	3	1
Undecided	9	2,9
Agree	117	37,7
Absolutely agree	179	57,7
Total	310	100,0

95,5% of the classroom teachers agree to the opinion that with the increase of the knowledge of the people about the subject of environment the environmental problems will reduce (Table 14).

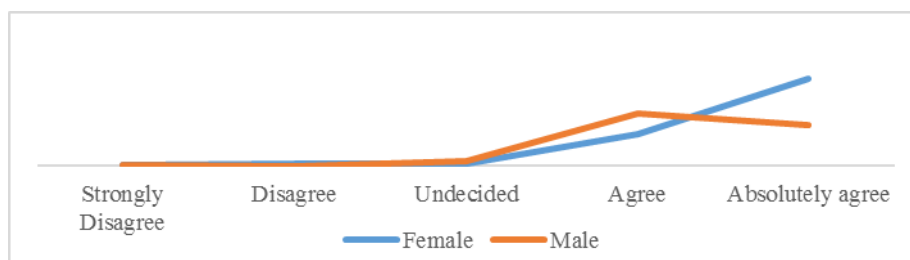


Figure 7: The effect of the environmental knowledge of the classroom teachers on environmental protection according to their genders

For this question, while the 53,3% of the male classroom teachers have given a response as "I agree", the 70,5% of the female classroom teachers have given a response as "I strongly agree" (Figure 7). There is no considerable difference between the thoughts of the teachers with regard to the working time period (Figure 8).

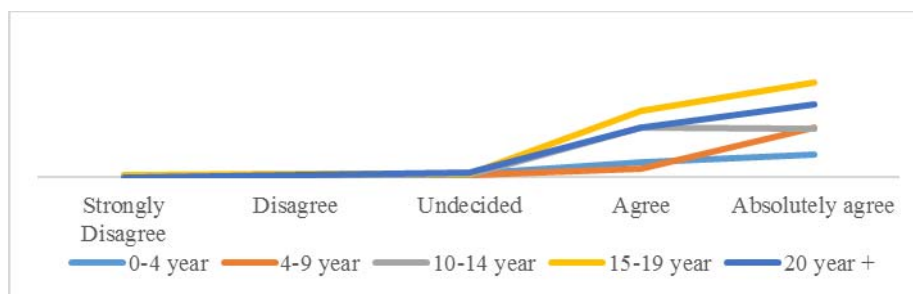


Figure 8: The effect of the environmental knowledge of the classroom teachers on environmental protection according to their working time periods

The statement which received the lowest score is as in the form of "If there will be a choice between economic growth and environmental protection, economic growth should be preferred.". The 70,9% of the teachers do not agree to this question (Table 15). In fact, this case is a logically positive case in terms of protection of the environmental values.

Table 15: According to the classroom teachers, should economic growth be preferred to environmental protection?

	Frequency	%
Strongly Disagree	77	24,8
Disagree	143	46,1
Undecided	71	22,9
Agree	13	4,2
Absolutely agree	6	1,9
Total	310	100,0

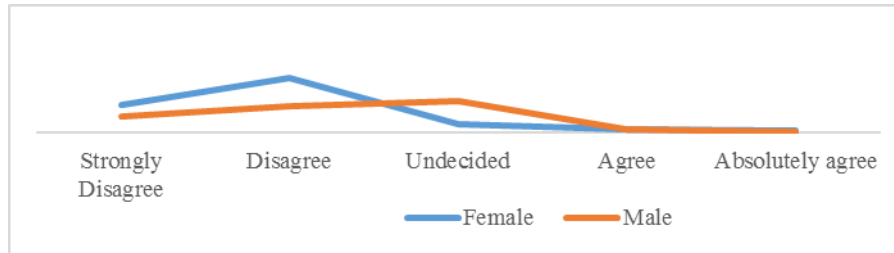


Figure 9: The classroom teachers' preference of economic growth to environmental protection according to their genders

When the genders of the classroom teachers and the responses given to this question is compared, the female classroom teachers have given the answer "I disagree" at the rate of 56,1%, and the male classroom teachers have given the answer "I am undecided" at the rate of 40,1% (Figure 10).

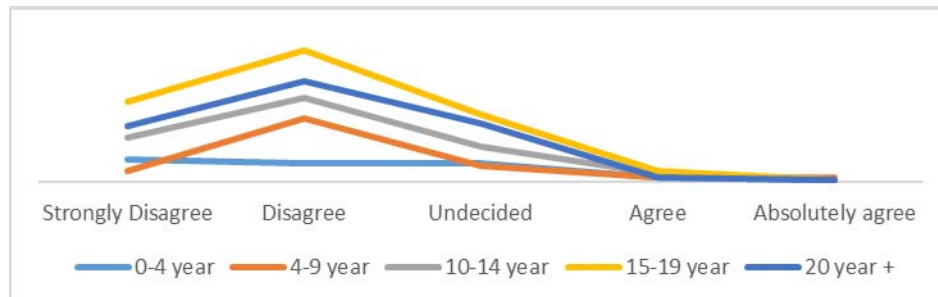


Figure 10: The classroom teachers' preference of economic growth to environmental protection according to working time periods

When the thoughts of the classroom teachers are examined in the context of working time periods, it is seen that the highest ratio has been concentrated on the answer "I disagree" in all categories (Figure 10).

As seen on both of the tables above, while the attitudes of the classroom teachers at the point of protecting and maintaining the environmental values has shown parallelism with each other in the context of working time period, the female classroom teachers have been higher than the male classroom teachers in the context of gender.

Sensitivity to Environmental Problems and Issues

There are 15 questions in the sensitivity scale developed for the purpose of determining the sensitivity levels of the classroom teachers towards the environmental problems that is

effective on the global scale and that negatively affects all living and non-living beings. The answers given to the items are in the form of 1 "I am not worried at all", 2 "I am very little worried", 3 "I am undecided", 4 "I am a little worried" 5 "I am very worried".

Whether or not the sensitivity of the classroom teachers towards the environment differs according to gender has been analyzed with "Mann Whitney U Test". According to the results of the analysis, it has been found out that the sensitivities towards the environment differ according to the gender and this difference is in favour of female classroom teachers.

Table 16: Group statistics

	Gender	N	Mean	Std. Deviation
Sensitivity	Female	173	4,5942	,55897
	Male	137	3,6044	1,09798

Table 17: Test statistics (a)

	Sensitivity
Mann – Whitney U	5286,000
Wilcoxon W	14739,000
Z	-8,432
Asymp. Sig. (2 – tailed)	,000

a. Group Variable: Gender

For the purpose of analyzing the sensitivity of the classroom teachers towards the environment in the context of working time period, the "Kruskal Wallis Test" has been used, and according to the test findings, it has been found out that the sensitivities towards the environment do not differ according to the working time period.

Table 18: The relationship of sensitivity with the working time

Working Time	N	Mean	Std.Deviation
0-4 year	25	4,4187	,74940
5-9 year	37	4,3243	,76838
10-14 year	63	4,0519	,98995
15-19 year	105	4,1206	1,07648
20 year and plus	80	4,1275	,96085
Total	310	4,1568	,97311

Table 19: Test statistics (a.b)

	Sensitivity (Worry)
Chi - Square	3,247
Df	4
Asymp. Sig.	,517

a. Kruskal Wallis Test

b. Group Variable: Working Time

The averages of the responses that the teachers have given to the items included in this group are as seen on Chart 3.

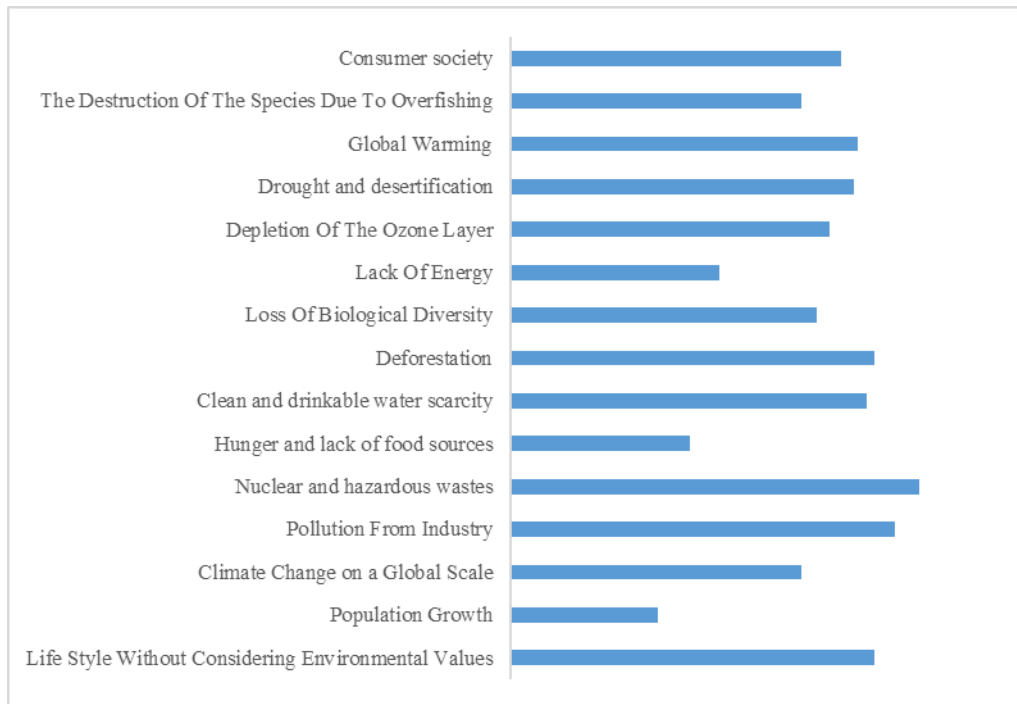


Chart 3: The average of the sensitivities of the classroom teachers towards the environmental problems

In the questionnaire prepared for the purpose of measuring the sensitivity levels of the classroom teachers towards the environmental problems witnessed globally, it is seen on the table above that the classroom teachers are the most sensitive (worried) against "nuclear and hazardous waste", and they are the least sensitive against the "population growth".

Table 20. Worry about the population growth

	Frequency	%
I'm not worried never	27	8,7
I am a lot less worried	41	13,2
Undecided	38	12,3
I am a little worried	76	24,5
I am very worried	128	41,3
Total	310	100,0

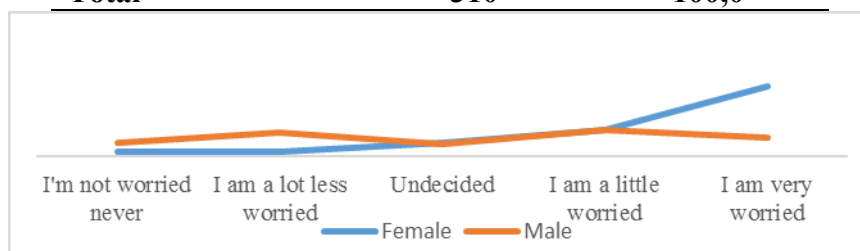


Figure 11: The sensitivity of the Classroom Teachers against the Population Growth According to their Genders

While the 80,6% of the responses of the female classroom teachers have concentrated on the choices "I am a little and very worried", the ratio of the ones from among the male classroom teachers who gave these answers is at the level of 47,4% (Figure 11).

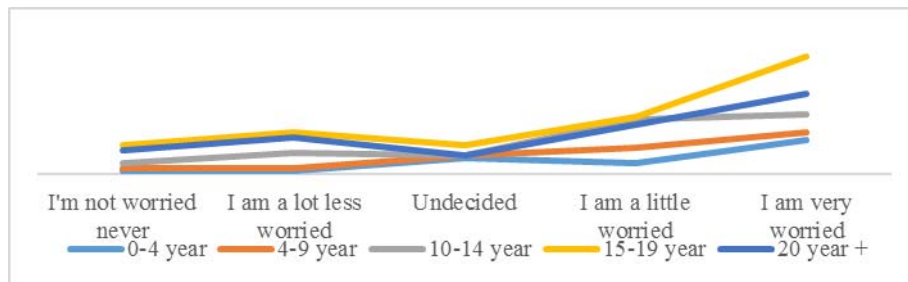


Figure 12: The sensitivity of the classroom teachers against the population growth according to their working time periods

In the context of working time periods, the response that the teachers in all categories have given at the highest rate is "I am very worried".

Table 21: Worry about nuclear and hazardous waste

	Frequency	%
I'm not worried never	0	0
I am a lot less worried	32	10,3
Undecided	21	6,8
I am a little worried	48	15,5
I am very worried	209	67,4
Total	310	100,0

The environmental problem that the classroom teachers are the most worried about is nuclear and hazardous wastes. The response of the 82,9% of the teachers have concentrated on the choices "I am a little and very worried".

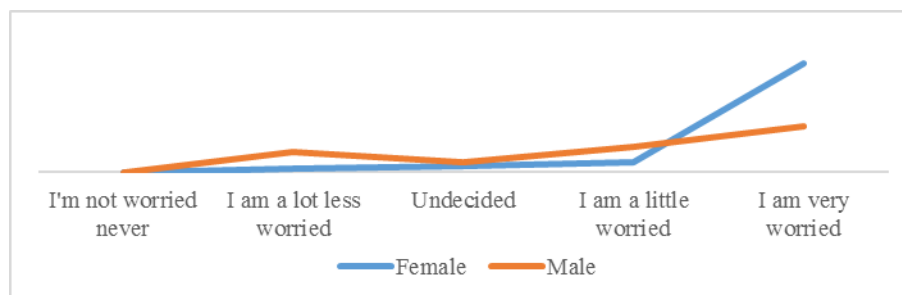


Figure 13: The sensitivity of the classroom teachers against the nuclear and hazardous wastes According to their genders

As seen in Figure 13, while the sensitivity of the female classroom teachers against the mentioned environmental problem is higher, it is seen that the classroom teachers have responded in parallel to each other in terms of working time periods (Figure 14).

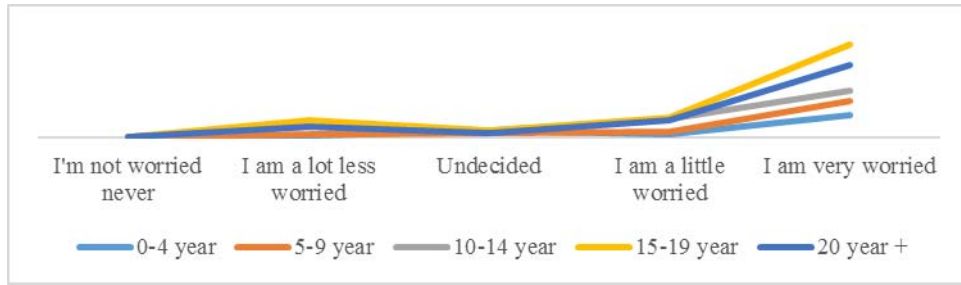


Figure 14: The sensitivity of the classroom teachers against the nuclear and hazardous wastes According to their working time periods

The Relationship Between The Dimensions Of Environmental Literacy

Table 22: Group statistics

Gender	N	Mean	Std. Deviation	Std. Error Mean
Behavior				
Female	173	4,0012	,46032	,03500
Male	137	3,6782	,45609	,03897
Attitude	173	4,0853	,36845	,02801
Female	137	3,7880	,48251	,04122
Male				
Sensitivity				
Female	173	4,5942	,55897	,04250
Male	137	3,6044	1,09798	,09381

Table 23: Independent Sample Test

	Levene's Test for Equality of Variances		t- test for Equality of Means		
	F	Sig.	t	df	Sig. (2- tailed)
Behavior					
Equal variances assumed	,644	,423	6,159	308	,000
Equal variances not assumed			6,165	293,103	,000
Attitude					
Equal variances assumed	24,533	,000	6,151	308	,000
Equal variances not assumed			5,965	248,674	,000
Sensitivity					
Equal variances assumed	119,102	,000	10,295	308	,000
Equal variances not assumed			9,612	191,186	,000

Table 24: Test statistics (a)

	Attitude	Sensitivity
Mann- Whitney U	7382,000	5286,000
Wilcoxon W	16835,000	14739,000
Z	-5,706	-8,432
Asymp. Sig.	,000	,000

a. Group Variable: Gender

In the table above, whether or not the attitudes of the classroom teachers for the environment differ according to gender has been analyzed with two sampling "t Test", and whether or not the levels of attitude and sensitivity differ according to gender has been analyzed with "Mann Whitney U Test" since the group variances are not homogeneous. According to the results of the "Levene Test", the group variances have come out homogeneous on the behaviour scale ($\text{sig} > 0,05$), but on the attitude and sensitivity scales, the group variances have not come out homogeneous ($\text{sig} < 0,05$). For that reason, the differences between the genders have been analyzed with "t Test" for the behaviour scale, and with the "Mann Whitney U Test" for the other two.

According to the results of either the "t Test" or the "Mann Whitney U Test", the behaviour, attitude and sensitivity levels of the female classroom teachers against the environment has come out to be higher compared with the male classroom teachers.

CONCLUSION AND RECOMMENDATIONS

Environmentally literate individuals are needed in order to protect the environmental values in the social structure and ensure its sustainability. The presence of the environmentally literate individuals is directly linked to the behaviours shaped by the environmental educations given from the early ages. In order to internalize the gains towards the environmental literacy in the individuals, the programs related to environmental awareness should be developed transferred to individuals from the early ages. Environmental literacy is a never-ending process. The environmental education starting at the nursery school level should be organized at the primary school, secondary school and higher education institutions and even in various dimensions and depths in daily lives of the individuals with the lifelong education philosophy. But, it is also important that the individuals who will direct the gains and the educations to be given towards making the individuals environmentally literate that is the educators are supposed to have certain level of competence in this regard. Another issue which is important for the environmental awareness to be instilled in the children is the existence of a role model understanding the environmental system and protecting it for its continuity. In other words, the educators who know the functioning and the elements of the environmental system are not alone sufficient. At the same time, role model educators who will actively take action for the sustainability of this system by preserving it are required. Therefore, in addition to the knowledge of the educators about the environment, their attitudes-sensitivities and behaviours should be in a mutually supportive manner.

The classroom teachers that the children first encounter in the official education system in Turkey and who are the next role models after their parents are among the most important actors at the point of creation and sustainability of the environmental awareness in the individual at the infancy age.

Within the scope of this study, the data of the field study which was carried out towards determining the environmental literacy levels of the classroom teachers in the Osmangazi County of the city of Bursa for the purpose of revealing the current states of the classroom teachers about the environmental issues, problems and values can be summarized as follows:

- a. The classroom teachers have a general knowledge level about the environmental issues, problems and values. (In the knowledge test, The average of the teachers out of 33 full points is at the level of 24,57%).

- b. In addition, with regard to the environmental issues and values, the attitudes of the the classroom teachers have a perspective that will contribute to protecting and enabling the sustainability of the environmental values. Within the context of environmental issues and values, the attitudes of the classroom teachers for the issues such as protecting the environment, implementing the legal regulations in this framework, and that the education process is important in creating the environmental consciousness in the individuals are in the supportive manner in ensuring the protection and sustainability of the environmental values.
- c. The sensitivity levels of the classroom teachers against the environmental problems experienced globally and negatively affecting all living and non-living beings is high. In other words, they consider the environmental problems occurring on a global scale importantly and feel worried.
- d. Finally, it is required that the classroom teachers should make changes in their daily behaviours in order to minimize the damage to the environment by being aware of the behaviours in the sense that Roth define, should orient the individuals in the community to behave in this direction, should carry out necessary reading and research in order to increase their knowledge about the environmental issues, should work actively either personally or through NGOs. In other words, they should be a role model for the protection and sustainability of the environmental values in the community in terms of their behaviours. Hence, when the environmentally beneficial behaviours of the classroom teachers is examined in general, it is seen that their behaviour avarage is at the level of 3,78 (out of 5 full points). And this reveals that the behaviours of the classroom teachers are in a way that they will provide benefit to the environment. However, when the the behaviours included in the questionnaire are examined it is seen that the classroom teachers behave in a way to provide benefit to the environment especially on the issues that concern themselves - their families - their homes (Chart 1). But, when the environmentally beneficial behaviours of the classroom teachers who have participated in the field study is examined within the context of "functional environmental literacy" defined by Roth, the picture that comes out changes. Namely;
- The average of the behaviour "I voluntarily serve in the activities carried out by various institutions and organizations in order to create and promote environmental cnssciousness in the social structure and give support to these activities." is 2,49. (See Table 9)
 - The average of the behaviour "For the purpose of raising environmental consciousness in the neighbourhood, on the site, at my school and so on, I demand from the authoritative units to carry out various activities" is 2,50.

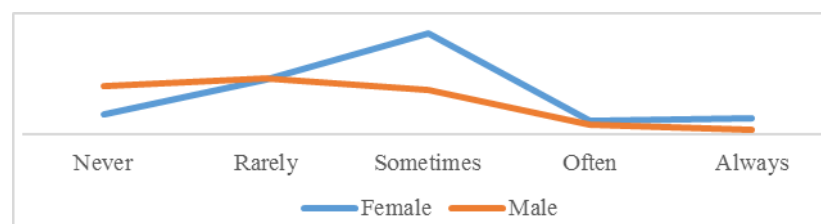


Figure 15: According to Their Genders, The Classroom Teachers' Making Efforts in the Neighbourhood They Live In in order to Raise Environmental Consciousness.

As seen on the Figure 19, a rather small portion of the male and female classroom teachers have given the answer "often" and "always" (14,5% and 8,7%, respectively).

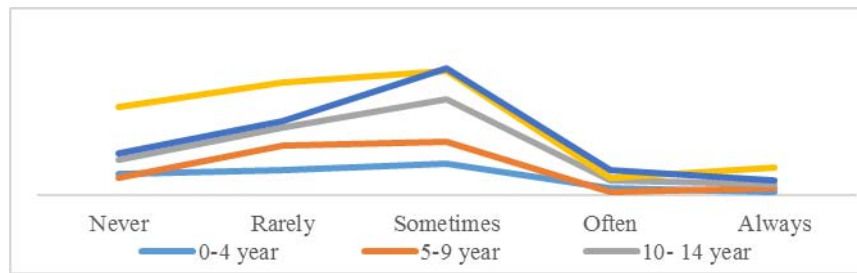


Figure 16: According to the working time period, the classroom teachers' making efforts in the neighbourhood they live in order to raise environmental consciousness.

In the context of working time period, the frequency of performing this behaviour of the classroom teachers shows parallelism.

- The average of the behaviour "I follow periodicals, newspapers, books and internet resources increase my knowledge accumulation on the issues such as our world natural environment and environmental problems." is at the level of 2,54.

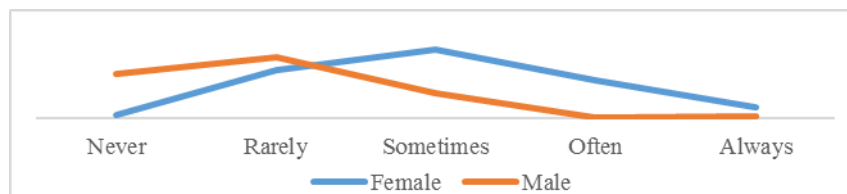


Figure 17: According to their genders, the classroom teachers' following the publications related to the environment

When the classroom teachers are asked how they acquire the knowledge about the environmental system and the environmental problems and, whether or not they follow the periodic or non-periodic publications for this purpose, the 40,5% of the female classroom teachers have given the answer "sometimes", 45,3% of the male classroom teachers have given the answer "rarely" (Figure 21).

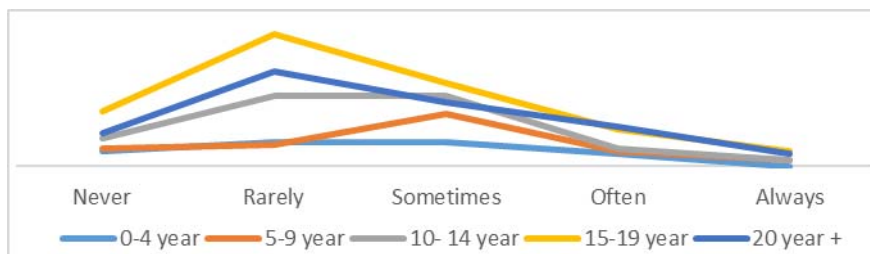
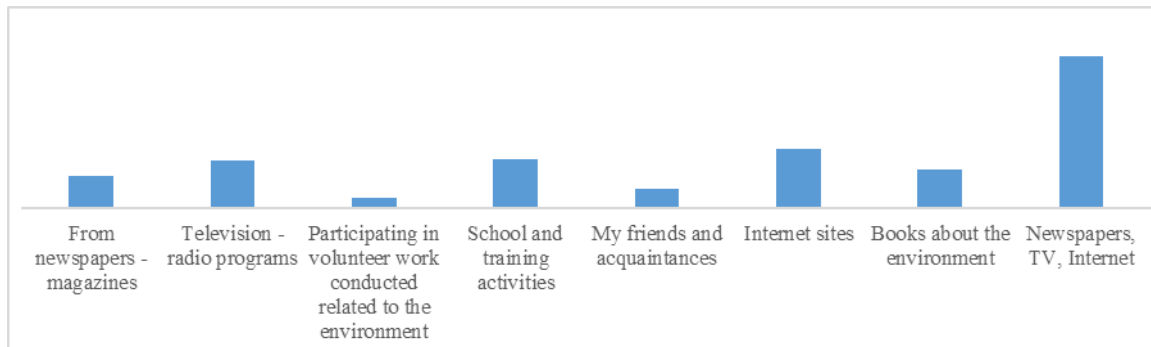


Figure 18: According to the working time periods, the classroom teachers' following the publications related to the environment

With regard to the working time periods, the responses of the teachers have concentrated on the choices "rarely" and "sometimes".

Within the scope of the field study, the classroom teachers have been asked through which channels they acquire knowledge about the issues such as our world, the environmental system, environmental problems and so on. The responses that the classroom teachers gave to this question is seen on Chart 4.



Grafik 4: The cannells of the classroom teachers of acquiring the knowledge about the environmental system and the problems

As also seen on the Chart 4, while a very small portion of the classroom teachers acquire the the knowledge about the environment from the books related with the issue (9,4%), by participating in the volutary activities (2,6%) and through school-education activities (11,9%), an the rest of the classroom teachers obtain the knowledge about the environment - As Rorth stated in the part of functional environmental literacy (Roth,1992)- through secondary resources.

- Finally, the NGO memberships of the classroom teachers who have parcipated in the field study and responded the questionnaire have been investigated in order to determine whether or not they perform any activity at the operational level within the body of any non-government organization conducting works in the issues related with the environment. Accordingly, the NGO memberships of the classroom teachers are as follows:

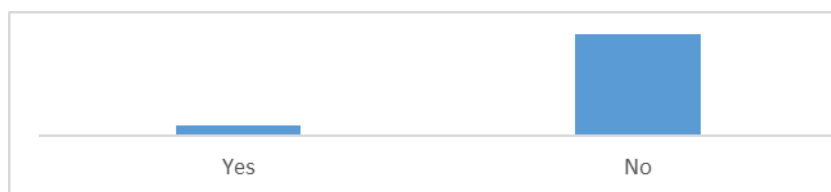


Chart 5: The NGO memberships of the classroom teachers

When the non-government organizations of which the classroom teachers are the members, while the 90,6%of the classroom teachers are not the members of any NGOs, the 9,4% of them are the members of an NGO. While a great number of classroom teachers who are member of an NGO are the mebers of a labour union related with the profession of teaching, and while only 1 classroom teacher each is the member of a citizen association and The Turkish Education Foundation, 5 classroom teachers (1,6%) are members of one non-government organization (TEMA) conducting activities related with the environment.

As a result, starting from the analysis made in the knowledge, behaviour, attitude and sensitivity sections above, it is possible to make the following determination: The classroom teachers participated in the field study are at the functional environmental literacy level of the environmental literacy dimensions that Roth defined in the scientific framework. Accordinly,

the classroom teachers who participated in the field study conducted in Bursa-Osmangazi County;

- They have basic level knowledge in environmental issues,
- They are aware of the positive-negative consequences of the human and environment interaction.
- A sense of worry prevails since they are aware of the devastating damages of the environmental problems that the humanity is facing,
- However, they are not willing to make a fundamental change in their daily lives towards reducing the environmental problems.
- They do not carry out any activity at the operational level by playing a leading role in the framework of creating environmental consciousness in the social structure.
- They do not carry out activities at the operational level by taking part in an organization like a non-government organization in the context of reducing the environmental problems.
- Finally, they do not follow the scientific publications in order to increase their knowledge about the environmental issues. Moreover, they do not express their thoughts related with the environmental system and environmental problems in various academic platforms, by means of periodic-non periodic publications etc.

The field study conducted regarding the "Environmental Literacy of the Classroom Teachers" have revealed that the existence of the knowledge about the environmental system and environmental problems in the individuals can convert this knowledge into environmentally beneficial behaviour. In the meantime, that the attitudes, sensitivities and worries of the individuals about the environmental issues are towards protecting the environmental values can not bring along the development of the environmental consciousness (Erten, 2005; Erten, 2003).

In the 21st century we are in, the environmental problems have been threatening the existence of all of the living and non-living being primarily the mankind on the earth. In case of failure in producing the effective solution methods in shortest time possible, it is inevitable to experience an irreversible catastrophe. The only way to avoid this catastrophe is that the people abandon their current thoughts and behaviours. Education is the most effective tool for the existence of a sustainable environmental system. Environmental educations should be given from the earliest ages possible in order to create environmental consciousness and appropriate behaviour patterns.

However, in environmental education, an other matter which is as important as the individuals who are to receive the education is that the educators who will give the education being role models with their knowledge, attitudes and behaviours related with the environment. Eventually, as continuously indicated in the academic literature, the matters such as observation, imitation, etc. becomes significant as well as the knowledge given during the education process. Therefore, the educators are primarily required to be role models appropriate to the education given.

On 19.01.2011, in accordance with the protocol signed between the Ministry of Education, In-Service Training Department and TEMA, with a program consisting of 77 hours for the teachers, "Ecological Literacy Teacher Education" was given in Yalova. They can be spread all over the country by increasing the numbers and the types of similar educations. It is possible to develop different programs by cooperating with the Ministry of Education and the Universities.

As a result, the environmental literacy levels of the classroom teachers who are the first educators that the children encounter after their parents has an important place within the framework of the sustainable world target. Therefore, special programs should be developed towards classroom teachers who are currently in active service. In order to internalize the environmental consciousness in the teachers who are to give environmental educations, in-service training programs should be prepared and nature trainings-nature camps should be organized for the educators.

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