Journal of Computer and Education Research
March 2023 Volume 11 Issue 21
http://dergipark.org.tr/jcer
(ISSN:2148-2896)

Research Article

The Impact of Secondary School Students' Hygiene Habits on Environmental Knowledge

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Article Info

Received: *12 December 2022*
Accepted: *28 February 2023*

Keywords: Secondary school students, environmental knowledge, personal hygiene

10.18009/jcer.1217819

Publication Language: English

Abstract

For sustainable development, hygiene should be specific to general, from personal hygiene to environmental cleaning, and environmental awareness of individuals should be made more permanent. It is estimated that individuals who know the importance of personal hygiene may be more sensitive to the ecological problems of their society. Individuals growing up sensitive to the environment can make the environment more livable. This study aimed to investigate the impact of variables such as gender, class level, residence, educational status of parents, type of residence of the family, hand-face washing, and frequency of bathing on the environmental knowledge of secondary school students. In the study, the survey method among descriptive research was used. The study was conducted with a total of 360 secondary school students studying in the village schools and central schools in Ağrı province in the 2018-2019 academic year. In the study, Environmental Knowledge Test (water-soil pollution) and Hygiene Information Form (face washing, bathing) were used as data collection tools, and their relationship with the variables included in the data collection tools was examined. Mann Whitney U, Kruskal Wallis Tests were used to analyze the data. As a result of the statistical analysis, a significant relationship was found between environmental knowledge and gender, class level, parental education level, and residence; however, no significant relationship was found between environmental knowledge and the frequency of hand-face washing and bathing.

To cite this article: Demir, S., & Haşıloğlu, M. A. (2023). The impact of secondary school students' hygiene habits on environmental knowledge. *Journal of Computer and Education Research*, *11* (21), 112-19. https://doi.org/10.18009/jcer.1217819

Introduction

The sum of living and non-living things forms the environment. Living things are microorganisms, plants, humans and animals, and non-living things are the whole of water, soil, air, natural places, landforms, and human elements. The environment in the living habitat is also a living space where all vital events continue (Armağan, 2006). Environmental knowledge is all information about the solutions created against environmental problems and developments in the ecological field and nature (Erten, 2005). Living things leave some waste to the environment as they maintain their lives. This waste, which mixes with water,

soil and air from the receiving environment, is recycled by material cycles automatically. People's indifference, insensitivity and selfish behaviours towards nature for their own interests have caused environmental problems to become inextricable. Throughout the emergence of humanity and up to now, humans and the environment have always been intertwined and interacted. People have been affected by the environment, and the environment has been affected by people, and therefore the environment has been damaged. This damage has caused significant problems and paved the way for the deterioration of the natural balance (Ocak & Özpınar, 2013).

One of the effective ways to have appropriate environmental knowledge is to give all students environmental education. Environmental education should be considered an interdisciplinary approach within the framework of lifelong education, as it will be used as an environmental tool and educational subject. At this point, it is essential to integrate it into the school curriculum (Alevcan, 2008). For example, in this context, science education plays a crucial role in helping students to be aware of environmental problems and consequently producing solutions. It has been suggested that the activities developed for the prevention of environmental problems and the training of environmentally educated individuals should be put into practice effectively (Ötün, Artun, Atilla, & Tozlu, 2015). The lack of awareness in people about being sensitive to the environment has caused people to affect the environment and create environmental problems negatively, and the balance of nature has begun to be disrupted. Therefore, individuals should be given academic training on this subject and family education starting from their first childhood to create environmental awareness.

Attitude towards the environment is the whole of negative or positive thoughts and behaviours that people serve for nature, such as standards of judgments, anger, fears, uneasiness and awareness of environmental problems (Erten, 2005). Thus, environmental education aims to keep the environment clean, develop positive behaviours and create environmental awareness. From this point of view, it is expected that individuals should have their own hygiene knowledge and consciousness before the environment. As a matter of fact, it is necessary to develop a positive attitude to form such an attitude. Individuals who pay attention to their own hygiene may be more sensitive to the environment. Hygiene, called science that informs and teaches the rules of a healthy life, is a science that synthesizes and applies all health-related information in order to develop and protect the health of people under the names of society and individuals, and to ensure that life continues for

many years more efficiently and healthily. Personal care and hygiene are concepts based on one's habits, beliefs and values. With familial, social and cultural factors, the existing knowledge, needs and behaviours of the person in terms of hygiene and health areas affect hygiene and personal care practices (Yavuz, 2000).

Hygiene or cleaning removes all kinds of disease-causing factors from the environment to create and maintain a healthy environment. Personal hygiene is a self-care that people protect and maintain their health. Developing and expanding personal hygiene/ cleaning behaviours in society is necessary. Personal hygiene is an application aimed at protecting and improving the health of society and is of great importance in terms of public health. Hand washing is the simplest and most effective method for ensuring food safety in all parts of social life, preventing infections, and preventing the proliferation of food-borne diseases (Bilgin, Evcili, Kaya & Bekar, 2016). The World Health Organization reports that regular hand washing is the lowest cost and most effective cleaning practice in preventing the spread of germs (Snow, White & Kim, 2008). According to the World Health Organization report, when we look at the rates of developing countries, the mortality rate is high and the lack of hygiene ranks third among the top ten causes in terms of lifelong disease burden (WHO, 2009). In cases where personal hygiene is insufficient, illness or death is frequently observed. Students should gain awareness of personal hygiene, make it a habit, and know the problems they will encounter when cleaning is not done, the diseases that may occur, and their effects. Students with the necessary knowledge can be conscious and show positive attitudes and behaviours. Students who know the importance of their own hygiene can be expected to show the same importance and awareness of environmental cleaning. They know that if the environment is not clean, the problems they will experience in their own body will also be experienced in the environment. Therefore, students who pay attention to their own personal hygiene can raise awareness of people for the environment.

The environment is a place that contains living things and covers all vital activities. All humanity must fulfill their duties and responsibilities so that the natural environment is not deteriorated, and future generations can find their natural areas most properly. This is why the first step is to raise awareness in society. It can be ensured that positive behaviours, attitudes and environmental knowledge towards the environment are instilled in people, and they fulfill these duties and responsibilities. However, this task must be specific to general since people should first pay attention to their personal hygiene, know themselves,

and know what they can encounter in cases where they cannot perform their personal hygiene. If a person is aware of their hygiene, only then can they be sensitive to the environment and exhibit positive behaviours and attitudes. In studies like Haşıloğlu, Keleş and Aydın (2011), Avan (2011), it was observed that students' gender affects environmental knowledge. In the study conducted by Avan (2011), it was determined that the type of residence of the students had an impact on environmental knowledge.

Moreover, in studies such as Mete and Filik İşçen (2015), it was stated that students' grade level or age differences had an impact on environmental knowledge. In studies by Haşıloğlu et al. (2011), Güler (2013), it was determined that the education level of the student's mothers affects environmental knowledge. In addition, studies conducted by Haşıloğlu et al. (2011), Ocak and Özpınar (2013) showed that student's father's education level affects environmental knowledge. As a result of the literature reviewed, it was observed that most of the environmental pollution types were mentioned in these studies on environmental pollution. Thus, unlike other studies, this study focused on water and soil pollution by reducing the types of environmental pollution. From this point of view, it was aimed to investigate whether variables such as gender, grade level, place of residence, parental education level, residence type, hand-face washing, and bathing frequency affected the environmental knowledge (water-soil) of secondary school students. For this purpose, answers were sought to the following research questions:

1. Does the student's gender affect environmental knowledge (water-soil)?
2. Does student grade level affect environmental knowledge (water-soil)?
3. Does the place where the student lives affect environmental knowledge (water-soil)?
4. Does the mother's education status of the students affect environmental knowledge (water-soil)?
5. Does the father's education status of the students affect environmental knowledge (water-soil)?
6. Does the type of residence the students live in affect environmental knowledge (water-soil)?
7. Does the hand-face washing habit of students affect environmental knowledge (water-soil)?
8. Does the frequency of taking a bath affect environmental knowledge (water-soil)?

Method

Research Design

This research was carried out with a descriptive-correlational study, one of the quantitative research methods in the correlational survey model. In descriptive research, after the research population is determined, a sample is taken from this population and the sample is examined in terms of variables. On the other hand, correlational studies check whether there is a relationship between the variables. If a relationship is found, the level of this relationship is examined. This relationship can be an increase in one of the variables with the increase in the other, or a decrease in one with a decrease in the other (Kırcaali-İftar, 2006).

Population and Sample

The research population consists of students studying in the 6th, 7th and 8th grades in the province of Ağrı in Turkey. The research sample, on the other hand, consists of 180 students in the city center of Ağrı, which is thought to represent the population, and 180 students studying in a village school in the center of Ağrı, 360 students in total. Table 1 below shows the number of students according to various variables.

Table 1. The number of students by variables

In the Gender Variable	The Number of Females 171
	The Number of Males186
In Grade Level Variable	6th grades 81
	7th grades 150
	8th grades 129
In Place of Residence Variable	Village 180
	City center 180
Residence Type	Slum - single story 200
	Apartment 157
Mother's Educational Status Variable	Illiterate 107
	Primary school 122
	Secondary School 79
	High school 41
	Graduate 10
Father's Educational Status Variable	Illiterate 13
	Primary School 98
	Secondary School 113
	High School 90
	Graduate 45

The reason for the inconsistency seen in the numbers in the table above is because of the student's inability to fill in the data collection tools and to express themselves.

Data Collection Tools

Data collection tools applied to secondary school students in village and city centers consist of an environmental knowledge test and personal hygiene information form. The researcher developed an environmental knowledge test to measure the state of the student's knowledge about the environment, and a personal hygiene information form was developed to measure whether or how often the students do their personal cleaning. The environmental knowledge test consisting of 25 questions developed by the researcher was applied to 100 students. For item analysis, 27% of the sample was taken and upper and lower groups were formed. After the necessary adjustments were made by looking at the item analysis results, the test consisting of 25 questions was applied to 100 students, and the item analyses were conducted again. The calculated item statistics of the four-choice multiple-choice achievement test with 25 questions, including the problems experienced in daily life in accordance with the science curriculum related to water and soil pollution, were calculated. The test consisted of 25 questions with 4 options, 3 options were distracters and 1 option was the correct answer. During the development of the knowledge test, the opinions of 3 branch teachers and a faculty member with a master's degree in science were taken and applied. The data collection tool was finalized in line with the feedback about the scope and content of the questions and their suitability for the group level to which the test would be applied. With these questions, it was tried to determine how much knowledge the students had about these pollutions that are frequently experienced in the environment they live in.

The Personal Hygiene Form previously developed by Altınsoy (2008) was used in the research. Using this form, it was examined whether there is a significant relationship between environmental information (water-soil pollution) and personal hygiene. Some items in the personal hygiene information form could not be used. The reasons for not using these items were that the students did not have enough information about themselves and their families, they did not know what the tools and equipment used for cleaning were, and the tools and equipment used for cleaning were not available in their homes. In addition, some items were removed from the form because it was not possible to make a comparison since the students gave ex parte answers to the variables in the form. The student's gender, grade

levels, parental education status, place of residence, type of residence, hand-face washing, and frequency of bathing were used from the personal hygiene information form. Since the house characteristics of the place of residence and the socio-economic structures of the people are similar, the residence type, which was initially given as 'Slum', 'Single-story, constructed, garden house', 'Apartment', 'Other' were coded in 2 options as 'slum-single story' and 'apartment'. In the question of bathing frequency, 'Every day' and 'twice a week' options were combined and coded as 'at least twice a week', 'once a week' and 'every two weeks to compare student data better. In the current study, the relationship between environmental knowledge (water-soil pollution) was examined by looking at the frequency of hand-face washing and bathing habits, which is the most extensive cleaning, judging by the most contaminated hand and face.

Data Analysis

The answers given by the students to each question were analyzed with the quantitative method. The survey method, which is a sub-branch of descriptive research, was used. When the results were examined, it was seen that the distribution of total scores was not normal; therefore it would not be appropriate to apply parametric analysis over the scores, and thus, the nonparametric analysis should be used. In this study, skewness and kurtosis values were not in the range of -2 and +2 as George and Marley (2010) indicated. For those with more than two variables, the Kruskall Wallis test (testing the significance of the difference between the means of three or more groups in non-normally distributed groups) was used. The environmental Knowledge Test was prepared and applied in the research. In addition, the relationship with some variables included in the Personal Hygiene Information Form (hand-face washing, bathing frequency) was examined.

Findings

The relationship between secondary school students' gender and environmental knowledge is given in Table 2.

Table 2. Mann Whitney U test results between gender and environmental knowledge of students

Group	N	Mean rank	Rank sum	U	P
Females	171	204,80	35020	11492	**0,000**
Males	186	155,28	28883		

*p< 0.01

The Mann-Whitney U test examined the relationship between students' gender and environmental knowledge. There is a positive relationship between students' gender and environmental knowledge. A P value less than 0.05 indicates a significant difference. The fact that the average and total rank of male students is lower than that of female students indicates that female students' environmental knowledge is higher than that of male students. The relationship between the place where secondary school students live and environmental knowledge is given in Table 3.

Table 3. Mann-Whitney U test results between students' place of residence and environmental knowledge

Group	N	Mean rank	Rank sum	U	P
City center	180	199,45	35900,50	12789,50	**0,001**
Village	180	161,55	29079,50		

*p< .05

The relationship between the place of residence and environmental knowledge was analyzed according to the data obtained from the Mann-Whitney U test. The data obtained from the analysis are given in Table 3. It was observed that there was a significant difference between the student's place of residence and their knowledge about the environment (U=12789,50, p<.05). Considering the mean rank, it was seen that the environmental knowledge of the students living in the city center was higher than those of the students living in the village. The relationship between the grade level of secondary school students and environmental knowledge is given in Table 4.

Table 4. Kruskal Wallis test results between students' grade level and environmental knowledge

Group	N	Mean rank	SD	X^2	p	Significant difference
6th Grade	81	135,41				
7th Grade	150	172,96	2	32,527	**0,000**	**1-2** **1-3** **2-3**
8th Grade	129	217,58				

*p< 0.01

Kruskal Wallis test was applied for the relationship between students' grade level and environmental knowledge. The analysis results showed a significant difference between the student's grade level and environmental knowledge. Looking at the mean rank, it was seen that the 8th grades were the highest, the 7th grades were the lowest, and the 6th grades

were the lowest. This showed that as the student's grade levels increased, their environmental knowledge also increased in parallel. The relationship between secondary school students' mother education status and environmental knowledge is given in Table 5.

Table 5. Kruskal Wallis test results between students' mother education status and environmental knowledge

Group	N	Mean rank	SD	X^2	Significant difference
Illiterate	107	156,73			
Primary school	122	188,20			1-2
Secondary school	79	187,39	4	10,126	1-3
High school	41	187,49			1-5
Graduate	10	239,80			

*p< .05

The Kruskal Wallis test was used to analyze whether the students' environmental knowledge differed according to their mother's education level. In the analysis, it was determined that there was a significant difference between the education level of the mother and environmental knowledge (χ^2=10.126, p<.05). When the educational status of the mothers was examined in five different groups, the highest rank was seen in the students with graduate mothers, and the lowest rank was seen in the students with illiterate mothers. It was seen that the average rank of mothers who graduated from high school and secondary school was almost the same.

Reanalysis was performed to determine the differentiation among the five groups. In the analysis, there was a significant difference between the education status of the mothers of the students who were 'illiterate' and the mothers of the students who were "primary school graduates", between "illiterate" and "secondary school", between "illiterate" and "university graduates". It is seen that the education level of the mother with the highest environmental knowledge of the students is "graduate", and the lowest is "illiterate". The relationship between the father's education level of secondary school students and environmental knowledge is given in Table 6.

Table 6. Kruskal Wallis test results between students' father's educational status and environmental knowledge

Group	N	Mean rank	SD	X^2	p	Significant difference
Illiterate	13	162,850				
Primary school	98	164,70				2-5
Secondary school	113	165,66	4	13,581	0,009	2-4
High school	90	197,87				3-4
Graduate	45	218,54				3-5

*p< .05

The relationship between the father's education status and environmental knowledge was analyzed with the Kruskal Wallis test. There was a significant difference between environmental knowledge and the father's education level (χ^2=13.581, p<.05). It was determined that students whose father's educational status was 'graduate,' had stronger knowledge of the environment. The rank averages of the students whose father's education level was "primary school", "secondary school" and "illiterate" seemed to be very close to each other.

Reanalysis was performed to determine among which groups the significant difference was. In the analysis, a significant difference was found between the students whose father's educational status was "primary school" and those whose father's educational status was "graduate". It was seen that there was a significant difference between the students whose father's educational status was "primary school" and whose father's educational status was "graduate", between those whose father's educational status was "secondary school" and whose father's educational status was "high school", and those whose father's education status was "secondary school" and whose father's educational status was "graduate". Considering the opinions given by the students, it is seen that as the father's education level increased, the student's knowledge about the environment increased, and as the father's education level decreased, the students' knowledge about the environment decreased. The relationship between the secondary school students' type of residence and environmental knowledge is given in Table 7.

Table 7. Mann Whitney U test results between type of residence and environmental knowledge

Group	N	Mean rank	Rank sum	U	p
Slum-one- story	200	158,44	**31688,50**	11588,500	0,000
Apartment	157	205,19	32214,50		

*p< 0.01

The relationship between the student's type of residence and environmental knowledge was analyzed with the Mann-Whitney U test. There was a significant relationship between the student's type of residence and environmental knowledge (U=11588,500, p<.05). The environmental knowledge of the students living in the apartment was higher than those living in the slum-one-story house. When the mean rank was examined, the mean rank of the ones living in apartments was higher than the ones living in single-story houses.

The relationship between hand-face washing and the environmental knowledge of secondary school students is given in Table 8.

Table 8. Mann Whitney U test results between students' hand-washing and environmental knowledge

Group	N	Mean rank	Rank sum	U	p
Yes	184	180,17	33151,00	15517,000	0,751
No	172	176,72	30395,00		

*p>.05

The analysis between students' hand-face washing and environmental knowledge was analyzed with the Mann-Whitney U test. It can be seen in the table that there was no significant difference between hand-face washing and environmental knowledge (U=15517,000, p>.05). The mean rank of the students who said "yes" to hand-face washing in the morning and the mean rank of the students who said "no" was very close to each other. The lack of differentiation could be because it did not show a homogeneous distribution. The relationship between the frequency of bathing and the environmental knowledge of secondary school students is given in Table 9.

Table 9. Mann-Whitney U test results between students' bath frequency and environmental knowledge

Group	N	Mean rank	Rank sum	U	P
At least twice a week	248	187,96	46613,50	11790,500	**0,29**
At most once a week	111	162,22	18006,50		

*p> .05

The analysis between students' students' bathing frequency and environmental knowledge was analyzed with the Mann-Whitney U test. There was no significant difference between students' bathing frequency and environmental knowledge (U=11790,500, p>.05). The mean rank of the answers given by the students to the frequency of bathing was very close to each other.

Conclusion and Discussion

The current study determined the students' knowledge about water and soil pollution. Interpretations were made by looking at the statistical analyzes of environmental information (water-soil pollution) by adding the frequency of hand-face washing and bathing selected from the personal hygiene information. The results of the research are discussed below. There is a positive relationship between students' gender and environmental knowledge. It is seen that female students' environmental knowledge is higher than male students. When students were compared in terms of gender according to environmental knowledge, attitude towards the environment, environmentally friendly behaviours and environmental awareness, Bozdemir (2011) found that female students were more conscious in terms of environmental knowledge, more positive in terms of environmental attitudes and behaviours, and more positive in terms of environmental awareness compared to male students. Both studies determined that the environmental knowledge of female students was more positive than that of male students. Female students have more environmental knowledge than male students because of differences in customs and traditions, family and environment, gender roles, and physiological and emotional characteristics. Uluçınar Sağır, Aslan and Cansaran (2008) found a significant difference between gender and environmental knowledge by applying the t-test to 7th- and 8th-grade students. In the study of Akıllı and Genç (2015), it is understood that gender makes a significant difference in the environmentally responsible behaviour dimension, one of the sub-dimensions of environmental literacy. However, when the sub-dimensions were examined separately, it was seen that there was no significant difference between knowledge and gender. The different results of the studies may be because the studies are in different places, the socio-economic status of the students, family traditions-customs and cultures are different.

There was a significant difference between the student's place of residence and their knowledge of the environment. It was determined that the environmental knowledge of the students living in the city center was higher than those living in the rural areas. Özdemir (2003) determined a significant difference between students studying in big cities and those studying in rural areas, in favor of students studying in big cities, according to the location of their schools. He stated that the location of the schools and the educational opportunities of the schools may have brought about this result. As a result of the research in the literature, it

can be predicted that the reason for the differentiation between the student's place of residence and their environmental knowledge is the different conditions in the environment where the students live.

There was a significant difference between the grade level and the students' environmental knowledge. This is because as the students get older, their knowledge increases, they can make more conscious observations, and their thinking skills develop more as their grade levels increase. In the study conducted by Akıllı and Genç (2015), it is seen that grade levels made a significant difference in the sub-dimensions of environmental literacy. There was also a significant difference between knowledge and grade level, sub-dimensions of environmental literacy.

Atasoy (2005) found in his study that there was a significant difference between the 6th and 8th grades and 7th and 8th grades in terms of knowledge level, and it was revealed that the mean scores of the students in the environmental knowledge tests were also low. According to De Haan and Kuckartz (1998), attitudes towards the environment, environmental knowledge and positive behaviours all constitute environmental awareness. In the region where the study was conducted, it is seen that the people's environmental knowledge was lacking; however, most individuals did not have any positive behaviour toward the environment. So far, studies conducted in the field of environmental awareness have stated that environmental knowledge's effect on positive behaviours towards the environment is not strong.

In the study conducted by Akyol and Kahyaoğlu (2012), it was seen that the 6th, 7th and 8th-grade students' existing knowledge about the environment were also different in terms of success level. It was determined that cognitive development increased as the grade level increased, and accordingly, the level of knowledge about environmental knowledge increased. A significant difference was found between environmental knowledge, which was the focus of the research, and the grade levels of the students.

There was a significant difference between the mother's education level and environmental knowledge. In the study conducted by Güler (2013), it was determined that the general environmental knowledge levels of the 8th-grade students were moderate. In addition, a significant difference was found in the level of environmental knowledge according to the mother's education level. In the study by Akıllı and Genç (2015), it was seen that mothers' education levels significantly differed in the sub-dimensions of environmental

literacy, and there was a difference between mothers' education status and knowledge in environment sub-dimensions. As a result of the research in the literature, it can be concluded that educated mothers instill environmental knowledge in their children, and mothers with low education levels do not give their children the necessary information about the environment. It was determined that there was a significant difference between the student's environmental knowledge and the father's educational status. In their study, Laza, Lotrean, Pintea, and Zeic (2009) examined environmental knowledge and behaviour and attitudes towards the environment of students in the 7-8 age group. It was concluded that the school and parent education status affected the students' positive environmental knowledge, attitudes and behaviours. In the study by Akıllı and Genç (2015), it was seen that father's education levels made a significant difference in the sub-dimensions of environmental literacy, and there was a significant difference between the knowledge in the sub-dimension of environmental literacy and father's education level. The reason students' environmental knowledge is affected by the father's educational status may be that their fathers are role models for their children, and the opportunity to transfer information is provided due to good father-child communication. As a result of the descriptive statistics made by Uluçınar Sağır et al. (2008), it was seen that there was no significant relationship between the environmental knowledge scores of the students according to the education level of the father. The differences in the results obtained from the studies may be due to the variability of communication between families and the differences in the questions in the material applied to the students.

There was a significant relationship between the student's residence type and environmental knowledge. Students living in multi-story buildings or apartments had a lot of knowledge about the environment. The reasons for this may be that the socio-economic status of the families living in the apartments and the environmental conditions around the houses are better, that they have more information about the environment due to the house they live in and the socio-cultural differences of the families.

When the results of the research were examined, it was seen that there was no significant difference between hand-face washing and bathing habits and environmental knowledge. Environmental knowledge of the students who do not wash their hands and faces and have less bathing frequency is very close to students who wash their hands and faces in the morning, and those who have a regular bathing frequency. It shows that cleaning

habits do not affect environmental information. This may be because students with environmental knowledge unconsciously do what they see from their family, environment and peers, or they do not internalize and do what they see from their environment.

In the literature studies, no data such as scales and questionnaires were found to examine the relationship between the frequency of morning face washing and bathing habits and environmental knowledge. Similar studies examined the relations between gender, socioeconomic status and hygiene.

Some recommendations can be made for future research:

Educational lessons about the environment that attract children's attention can be included in school curriculums.

Since the students living in the village have less environmental knowledge than those living in the center, educational trips can be organized for those.

Since male students' knowledge of the environment is lower than that of female students, an animated film about the environment can be created and watched by male students, which may attract their attention.

Environmental knowledge of mothers and fathers with low education levels should be increased. To do this, environmental information seminars can be given in which the participation of families will be ensured. Personal hygiene products or tools can be introduced to the students together with the necessary health institutions, and the importance of using them and how to use them can be shown in practice.

Acknowledgement

This research was produced from the master's thesis of the first author under the supervision of the second author.

Ethical Committee Permission Information

Name of the board that carries out ethical assessment: Ağrı İbtahim Çeçen University Social and Humanities Scientific Research Ethics Board

The date and number of the ethical assessment decision: 18.11.2022-2022/56774

Author Contribution Statement

Sedenay DEMİR: *Conceptualization, literature review, methodology, implementation, data analysis, translation, and writing.*

Mehmet Akif HAŞILOĞLU: *Conceptualization, literature review, methodology, data analysis, translation, and writing.*

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