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A Study on Environmental Literacy of Middle School Students*

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ABSTRACT

This study investigated the environmental literacy levels of middle school students in general. In particular, environmental literacy levels of students were compared in terms of different variables. The research was carried out with the participation of 1248 students studying in public and private schools in the province of Isparta, located in the Mediterranean region of Turkey. In this study, the "Environmental Literacy Scale" developed by Yavuz et al. (2014) was used. As a result, the general environmental literacy of middle school students can be regarded in a good level. The environmental literacy level of female students is at a better level than males'. Environmental literacy hasn't displayed a significant difference statistically among class levels. However; there is a significant difference between public and private school students in favor of public schools. Moreover; the environmental literacy scores of students living in city center were detected higher than the ones living in villages. The environmental literacy level of ones following magazines about environment is significantly higher than the ones who haven't. Similarly, the environmental literacy level of ones following edition about environment through social media or television is significantly higher than those who haven't. Moreover, the behavior level of the ones who thinks environment education at schools is sufficient is determined significantly higher in comparison with the behavior level of the ones who doesn't. Finally, the research was ended with some suggestions for a more effective environment education.

Ortaokul Öğrencilerinin Çevre Okuryazarlığı Üzerine Bir Araştırma

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ÖZ

Bu araştırma, genel anlamda ortaokul öğrencilerinin çevre okuryazarlık düzeylerini araştırmıştır. Özellikle öğrencilerin çevre okuryazarlık düzeyleri farklı değişkenler açısından karşılaştırılmıştır. Araştırma, Türkiye'nin Akdeniz bölgesinde yer alan Isparta ilinde devlet ve özel okullarda öğrenim gören 1248 öğrencinin katılımıyla gerçekleştirilmiştir. Bu çalışmada Yavuz vd. (2014) tarafından geliştirilen "Çevre Okuryazarlığı Ölçeği" kullanılmıştır. Sonuç olarak ortaokul öğrencilerinin genel çevre okuryazarlığının iyi düzeyde olduğu söylenebilir. Kız öğrencilerin çevre okuryazarlık düzeyleri erkeklere göre daha iyi düzeydedir. Çevre okuryazarlığı sınıf düzeyleri arasında istatistiksel olarak anlamlı bir farklılık göstermemiştir. Yine de; devlet okulları ve özel okul öğrencileri arasında devlet okulları lehine anlamlı bir fark vardır. Dahası; il merkezinde yaşayan öğrencilerin çevre okuryazarlığı puanlarının köylerde yaşayanlara göre anlamlı biçimde yüksek olduğu tespit edilmiştir. Çevre ile ilgili dergileri takip edenlerin çevre okuryazarlığı, takip etmeyenlere göre anlamlı derecede yüksektir. Benzer şekilde, çevre ile ilgili yayını sosyal medya veya televizyon aracılığıyla takip edenlerin çevre okuryazarlığı düzeyi, izlemeyenlere göre anlamlı biçimde yüksektir. Ayrıca öğrenim gördükleri okullarında aldıkları çevre eğitiminin yeterli olduğunu düşünenlerin davranış düzeyi açısından çevre okuryazarlığı, düşünmeyenlere göre anlamlı olarak daha yüksek saptanmıştır. Son olarak daha etkili bir çevre eğitimi için bazı önerilerle araştırma sonlandırılmıştır.

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INTRODUCTION

The idea that "environment (nature) can renovate itself" has been an important factor for environment pollution to increase much more rapidly (Bozkurt & Cansüngü, 2002). The unorganized and unsustainable ways to produce in both industries and technology cause climate changes (Miser, 2019). Fettahlıoğlu (2018), points the fact that unsustainable industry and increasing demand for wealth has been destroying natural ecosystems. With increasing problems caused by environment pollution, many countries have made regulations to stop environment pollution. However, these regulations haven't been enough to slow pollution (Soran et al., 2000). Harmful gases emission has been on upper levels between the years 2010-2019 (Intergovernmental Panel on Climate Change, IPCC; 2022) The effects of environmental problems on people's daily lives have increased the attempts to solve these problems. According to Clayton et al. (2019) permanent solutions to preserve the environment well should be developed and studies in education and politics should be carried out simultaneously. Among all the solutions to preserve the environment, education is the most effective tool for the society to get sensitive about the environment (Erten, 2005). As a result, the process to develop more effective and comprehensive teaching methods for environment education has been accelerated (Aslan et al., 2008; Ehrlich & Ehrlich, 2013; Troy Frensley et al, 2020; Şimşekli, 2001).

If it is desired for the future generation to have a better Earth to live on, it is vital to present a well-designed environment education. This education aims for each and all person to have behaviours with which they aim to protect Earth's ecosystems (Marcinkowski & Reid, 2019). According to West, the prior goal of environment education is not to provide only environmental information (Bonnett, 2019; Toomey et al., 2017). It is claimed that environment education will be more effective only if it is given out of the classes and is provided with trips, observation and experience (Cincera et al., 2020; Wals & Benavot, 2017). Erten (2005) points out that when a person gets environment education, that person's attitude towards environment can turn into positive attitudes. Meanwhile, it is highly possible that these positive attitudes can become his/her behaviour. It has also been observed that people who haven't had any environment education can display negative attitudes and behaviours towards environment whereas the ones who have had qualified environment education can behave sensitively towards environment and their behaviours have changed positively (Aslan et al., 2008). From all these points of views, environment education aims to raise citizens who have knowledge about the creatures they see around the environment and who have sensitive understanding of citizenship. The environment education achievements are given through social sciences in primary schools and through both social sciences and science lessons in middle schools in accordance with these aims (Atabek Yiğit et al, 2019; Fettahlıoğlu, 2018).

The main aim of the governments has become that the public consists of environmental literate individuals (Stevenson et al., 2013). Environmental literacy was first used by Roth in 1968. According to Roth's definition, the ones who have fundamental knowledge about their environment are called as

environmental literate (Roth, 1968). Environmental literacy consists of some behaviours such as comprehending of environment, having environmental knowledge and skills, displaying environmental attitudes. Moreover, it provides the people with a long lasting and sustainable relationship with the areas they live in (McBride et al., 2013; Roth, 2002). Being an environmental literate person requires to have a nature-respected life. Having a sensitive environmental awareness in consume habits is an example for that. In addition, environmental literacy requires to have knowledge, attitude and skills and to take action choosing the right environmental factors (Koç et al., 2018; Özcan & Demirel, 2019).

According to Goulgouti et al. (2019), environmental literate individuals are determined to display environmental behaviours. Today especially in developed countries it has become more important to have individuals who have had environment education and environmental literacy (Hook, 2015). According to Kinslow, et al. (2019) environmental problems get much more complicated. It is only possible to stop this situation with a public consisting of environmental literate people who have scientific thinking skills.

Environmental literacy means more than having knowledge (Clayton, 2003). Environment literate individuals must be enthusiastic to protect the environment and when necessary they must be ready to take action (Gifford & Sussman, 2012). The points discussed before must be individual's behaviour patterns and they must behave accordingly. To achieve this goal, environment education must be provided in early childhood because it is considered that the earlier a child gets environment education the more permanent and effective environmental literate behaviours they will have. Besides these facts, the studies about environment have shown that environment concept is shaped in childhood (Ernst & Theimer 2011; Bloyd Null et al., 2021; Braun et al., 2018). Therefore; raising individuals having a high level environmental literacy must be led by the scientists and educationists (Stafford & Jones, 2019). Today's children will be the ones who will face consequences of environment problems. In order to face them properly, they need to have environmental knowledge and problem solving skills (Damerell, et al, 2013). The environmental literacy skills that are achieved in early ages will guide the behaviours they display in the future (Ayverdi, 2021; Bonnet, 2019; Kıyıcı, et al., 2014; Mifsud, 2012). At this point, determining individuals' environmental literacy levels are essential to detest the deficiencies of existing environmental education (Gan, 2021; Liu et al, 2015).

The purpose of this study is to examine middle school students' environmental literacy in terms of attitude and behaviour. From this point of view, the main problem statement is "What is the environmental literacy level of middle school students studying in the province of Isparta in Turkey?". Starting with this statement, the answers for the sub-problems below are sought:

The environmental literacy level of middle school students:

1. Does it differ significantly by gender?
2. Does it differ significantly by class level?
3. Does it differ significantly by type of school they attend?

4. Does it differ significantly by residential area of the school they attend?

5. Does it differ significantly by income level of families?

6. Does it differ significantly by whether individuals or parents follow the editions about environment or not?

7. Does it differ significantly by whether individuals follow environmental editions on social media, Internet or television?

8. Does it differ significantly by whether the students think the environment education at schools is sufficient or not?

9. Does it differ significantly by the residential area the students live? (they must live in this area at least 5 years)

METHOD

Research Design

In this study Survey method, one of the quantitative methods, was used in order to determine middle school students' (5th,6th, 7th, 8th) environmental literacy level. Survey method was carried out to find answers for "what is the status of the case researched" and "what is our situation" (Büyüköztürk et al., 2011). Survey method is a method that is used to present some qualities of the determined group. The selected sample must have the quality to represent the universe. Questionnaire is the most preferred data tool in Survey method (Fellows & Lui, 2008). It is attempted to have a generalization about universe with this method. For this reason, it was tried to get (sample) quantitative data form a massive community which can represent the universe. The survey method presents data which can be base the other possible future studies (Büyüköztürk et al., 2011).

The universe of this research consists of middle school students studying in the city center, districts and villages in Turkey in the 2019-2020 academic year. The sample of the research is 1248 middle school students studying in the center, districts and villages of Isparta province in the 2019 - 2020 academic year. It is seen that 60.1% of these students are girls and 39.9% are boys. When examined in terms of class variables, 30.8% are 8th grade, 23.3% are 7th grade, 24.0% are 6th grade, 21.8% are 5th grade.

The "convenience sampling method" was used in the research. In this method, the aim is to prevent the loss of time, money and workforce (Büyüköztürk et al., 2011).

Data Collection Tools

As a measurement tool, developed by Yavuz et al. (2014) "Environmental Literacy Scale" was used. The scale was applied to 348 students studying in middle schools in Hendek District of Sakarya Province. As a result, it was stated that it is a valid and reliable scale that can measure environmental literacy. The items of the scale were arranged in a 5-point Likert type. Substances; (5) strongly agree, (4) agree, (3) undecided, (2) disagree, (1) strongly disagree.

Yavuz et al. (2014) raw scale consists of 39 items. As a result of the factor analysis, 19 items with factor loadings below .30 were removed and a final scale with 20 items and two factors was obtained. These factors are 10 items describing the behavioral dimension and 10 items describing the attitude dimension. The Cronbach Alpha reliability coefficient of the scale was determined as 0.84 by Yavuz et al. (2014). In this study, it was measured as 0.83.

Data Collection Process

It was foreseen to get the data face to face would be difficult due to Covid-19 pandemic. For this reason, firstly, the scale was transferred into digital platform via Google forms. Besides, a meeting was held including the researcher with 6 postgraduate students and advisor for 60 minutes. The independent variables (demographic variables) to be asked prior to scale were determined in this meeting. Then Ethics Committee permission was taken. Moreover, the conduction permission was taken from the Provincial Directorate of National Education. In the last step, a shortened link was formed for Google form in which the scale is placed. The data was collected by sharing the link and permissions on digital media.

While analysing whether data via distributed normally or not, coefficient of skewness and kurtosis were used. If any of the skewness or kurtosis values are within the limits of 2 more or 2 less than the mean, it is accepted that these data exhibit a normal distribution (George & Mallery, 2010). Similarly, Can (2020, pp. 87) states that if the skewness or kurtosis values remain between the limits of -1.96 and +1.96, the data is considered to be normally distributed. While examining the differences between the groups, parametric tests were used since all the data displayed normal distribution. These are Independent sample t-Test and One-Way ANOVA tests. In case of significant difference in the ANOVA test, a pairwise comparison was made by applying the Scheffe test.

Ethical Considerations

This article was found ethically appropriate with the decision of Süleyman Demirel University Social and Human Sciences Ethics Committee numbered 90/3 on 22.04.2020.

RESULTS

In this part of this research, the findings and commentary regarding the analysis of the data which were obtained as a result of this study are presented.

Table 1. *Distribution of participants by demographic variables*

Demographic variables		**N**	**%**
Gender	Female	750	60.10
	Male	498	39.90
	Total	1248	100.00
Class level	8th Grade	385	30.85
	7th Grade	291	23.32
	6th Grade	300	24.04
	5th Grade	272	21.79
	Total	1248	100.00
Type of School	Public school	976	78.21

	Private school	272	21.79
	Total	1248	100.00
The residential area of the school	City center	835	66.91
	District center	240	19.23
	Village	173	13.9
	Total	1248	100.00
The status of family income	0-2000	288	23.08
	2001-4000	374	29.97
	4001-6000	265	21.23
	6001-8000	120	9.62
	8001-More	201	16.11
	Total	1248	100.00
Is there any environmental edition that you or one of your family members follow?	Yes	242	19.39
	No	1006	80.61
	Total	1248	100.00
Is there any environmental edition you follow on social media. Internet or television?	Yes	526	42.15
	No	722	57.85
	Total	1248	100.00
Do you think environment education at schools is sufficient?	Yes	681	54.57
	No	567	45.43
	Total	1248	100.00
The residential area where you have spent most of your life. (at least five years)	City	816	65.38
	District	227	18.19
	Village	205	16.4
	Total	1248	100.00

When the distribution of students according to their demographic characteristics is examined, it is seen that 60.1% are girls and 39.9% are boys. When examined in terms of class variable, it is seen that 30.8% of them are 8th grade, 23.3% are 7th grade, 24.0% are 6th grade, and 21.8% are 5th grade. When their distribution according to school types is examined, it was determined that 78.1% of them were public schools and 21.9% of them were private schools. When the distribution of students according to the location of the school is examined, it was determined that 66.9% of them received education in the city centre, 19.2% in the district centre, and 13.9% in the village schools. When examined in terms of family income, 23.1% of them had 0-2000TL, 30.0% of them had 2000-4000TL, 21.2% had 4000-6000TL, 9.6% had 6000-8000TL, 16.1% had an income of 8000TL and above. When the distribution of environmental editions follow-up is examined, it is seen that 19.4% followed and 80.6% did not. When the distribution of students according to their status of following environmental broadcasts on social media or the internet is examined, it was determined that 42.1% followed and 57.9% did not. When the distribution of students according to their level of finding environmental education at school sufficient, it was determined that 54.6% of them found it sufficient, and 45.4% did not find it sufficient. It was determined that 65.4% of the students spent most of their lives in the city centre, 18.2% in the district and 16.4% in the village.

Table 2. *Normality test results of environmental literacy levels*

Sub-dimensions	Standard Deviation	$\bar{X}$	Median	Skewness	Kurtosis
Behaviour	6.18	37.64	38.00	-0.220	-0.293

Attitude	3.35	46.78	48.00	-1.299	1.440
Environmental literacy	8.31	84.42	85.00	-0.420	-0.175

While analyzing data distributions, arithmetic mean, median, skewness and kurtosis coefficients from central tendency measurements were used. When the median and arithmetic mean values are close to or equal to each other, and any of the skewness or kurtosis values are within the limits of ±2, the distribution of the obtained data is considered to have a normal distribution (George and Mallery, 2010).

Findings Regarding the Comparison of Environmental Literacy Levels with Demographic Characteristics

Table 3. *Central tendency measures regarding gender*

Sub-dimensions	Gender	Median	Kurtosis	Skewness
Behaviour	Female	38.00	-0.206	-0.249
	Male	37.00	-0.186	-0.400
Attitude	Female	48.00	-1.448	1.208
	Male	47.00	-1.046	0.533
Environmental literacy	Female	86.00	-0.418	-0.020
	Male	84.00	-0.320	-0.460

When Table 4 is examined, it is seen that the skewness or kurtosis values are within the limits of +2 and -2. Kurtosis or skewness values between +2 and -2 indicate that the data exhibit a normal distribution (George and Mallery 2010). Similarly, Can (2020, p. 87) states that the data are considered to be normally distributed when any of the skewness or kurtosis values are between -1.96 and +1.96. In this direction, the t-test, which is one of the parametric tests, was compared according to the gender of the participants. The results are given in Table 4.

Table 4. *Independent sample t-test results regarding the gender of the students*

Sub-dimensions	Gender	N	$\bar{X}$	s.s	t	Sd	p
Behaviour	Female	750	38.15	5.94	3.541	1246	0.000*
	Male	498	36.87	6.46			
Attitude	Female	750	47.21	3.00	5.387	1246	0.000*
	Male	498	46.13	3.73			
Environmental literacy	Female	750	85.36	7.73	4.813	1246	0.000*
	Male	498	83.00	8.94			

The t-test results for the analysis of students' environmental literacy levels by gender are presented in Table 5. According to Table 4, environmental literacy levels of students differ significantly according to their genders (t= 4.813; p=0.000; p<0.05). Girls' environmental literacy levels ($\bar{X} = 85.36$) are higher than boys' environmental literacy levels ($\bar{X} = 83.00$). In terms of both sub-dimensions, significant differences were determined according to the gender status of the students (t= 3.541; p=0.000; p<0.05), (t= 5.387; p=0.000; p<0.05). Girls' behaviour levels ($\bar{X} = 38{,}15$) are higher than boys' behaviour levels ($\bar{X} = 36.87$). Attitude levels of girls ($\bar{X} = 47.21$) are higher than that of boys ($\bar{X} = 46.13$).

Table 5. *Central tendency measures regarding students' grade levels*

Sub-dimensions	Gender	n	$\bar{X}$	s.d	Median	Skewness	Kurtosis
Behaviour	8th grade	385	37.24	6.39	37.00	-0.056	-0.549
	7th grade	291	36.85	5.81	37.00	-0.092	0.015
	6th grade	300	37.63	6.07	38.00	-0.287	-0.366
	5th grade	272	39.08	6.19	39.50	-0.585	0.368
Attitude	8th grade	385	46.49	3.44	47.00	-1.169	0.976
	7th grade	291	46.88	3.11	48.00	-1.336	1.948
	6th grade	300	47.14	3.10	48.00	-1.244	1.107
	5th grade	272	46.69	3.71	48.00	-1.401	1.544
Environmental literacy	8th grade	385	83.73	8.65	85.00	-0.319	-0.354
	7th grade	291	83.73	7.75	84.00	-0.323	0.013
	6th grade	300	84.77	8.06	85.50	-0.456	-0.093
	5th grade	272	85.76	8.53	88.00	-0.666	0.079

When Table 5 is examined, it is seen that the kurtosis and skewness values are within the limits of +2 and -2. The values of kurtosis or skewness between +2 and -2 indicate that the data exhibit a normal distribution (George & Mallery 2010). Similarly, Can (2020, pp. 87) states that the data are considered to be normally distributed when the skewness or kurtosis values are between -1.96 and +1.96. In this direction, the examination of the participants according to their grade levels was made with Anova, one of the parametric tests. The results are given in Table 6.

Table 6. *Anova test results regarding students' grade levels*

Sub-dimensions	Grade	Square sum	sd	Square mean	F	p	Significant difference (Scheffe)
Behaviour	Intergroup	804.364	3	268.121	7.114	0.000*	(5>8)
	In-group	46887.962	1244	37.691			(5>7)
	Total	47692.326	1247				(5>6)
Attitude	Intergroup	77.243	3	25.748	2.296	0.076	
	In-group	13950.275	1244	11.214			
	Total	14027.518	1247				
Environmental literacy	Intergroup	851.783	3	283.928	4.140	0.006*	(5>8)
	In-group	85322.521	1244	68.587			(5>7)
	Total	86174.304	1247				(5>6)

Anova results for the analysis of students' environmental literacy levels according to grade levels are presented in Table 6. According to Table 6, the difference between students' environmental literacy levels and grade levels is statistically significant (F=4.140; p=0.006; p<0.05). Environmental literacy levels of 5th grade students ($\bar{X} = 85.76$) compared to 8th grade students ($\bar{X} = 83.73$), 7th grade students ($\bar{X} = 83.73$) and 6th grade students ($\bar{X} = 84.77$) is higher. In terms of behaviour sub-dimension, significant differences were determined according to the grade levels of the students (F=7.114; p=0.000;

p<0.05). Behaviour levels of 5th grade students ($\bar{X}$ = 39.08) compared to 8th grade students ($\bar{X}$ = 37.24), 7th grade students ($\bar{X}$ = 36.85) and 6th grade students ($\bar{X}$ = 37.63) is higher. The source of the difference between the groups were determined by the Scheffe test, one of the post-hoc tests. It was observed that the environmental attitude levels did not show a statistically significant difference according to the grade level (p=0.076, p>0.005).

Table 7. *Median kurtosis and skewness results for students' school type*

Sub-dimensions	School type	Median	Skewness	Kurtosis
Behaviour	Public school	38.00	-0.228	-0.160
	Private school	37.00	-0.135	-0.685
Attitude	Public school	48.00	-1.319	1.532
	Private school	48.00	-1.223	1.056
Environmental literacy	Public school	85.00	-0.459	-0.035
	Private school	84.00	-0.280	-0.545

When Table 8 is examined, it is seen that the kurtosis and skewness values are within the limits of +2 and -2. The fact that the kurtosis or skewness values are in the range of +2 to -2 indicates that the data exhibit a normal distribution (George & Mallery 2010). The results are presented in Table 8.

Table 8. *Independent sample t-test results for school type*

Sub-dimensions	School type	N	$\bar{X}$	s.s	t	Sd	p
Behaviour	Public school	975	37.98	6.06	3.568	1246	0.000*
	Private school	273	36.42	6.47			
Attitude	Public school	975	46.75	3.38	-0.543	1246	0.587
	Private school	273	46.88	3.26			
Environmental literacy	Public school	975	84.74	8.22	2.526	1246	0.012*
	Private school	273	83.30	8.55			

According to Table 8, environmental literacy levels of students differ significantly according to the type of school they attend (t= 2.526; p=0.012; p<0.05). It was observed that the environmental literacy level of those studying in a public school ($\bar{X}$ = 84.74) was higher than the environmental literacy level of students studying in a private school ($\bar{X}$ = 83.30). The difference in students' Behaviour levels according to the type of school they attend shows statistical significance (t= 3.568; p=0.000; p<0.05). The Behaviour level of public middle school students ($\bar{X}$ = 37.98) was measured to be higher than the Behaviour level of private middle school students ($\bar{X}$ = 36.42). It was observed that there was no significant difference in terms of environmental attitude level (t= -0.543; p=0.587; p<0.05).

Table 9. *Central tendency measures regarding residential area of schools*

Sub-dimensions	Residential area of the school	n	$\bar{X}$	s.s	Median	Skewness	Kurtosis
Behaviour	City center (1)	835	37.92	6.27	38.00	-0.257	-0.353
	Town center (2)	240	37.26	5.91	37.00	-0.178	-0.139
	Village (1)	173	36.86	6.09	37.00	-0.142	-0.041
Attitude	City center (1)	835	46.88	3.33	48.00	-1.321	1.514
	Town center (2)	240	46.80	3.10	48.00	-1.308	1.932
	Village (3)	173	46.24	3.76	48.00	-1.149	0.630
Environmental literacy	City center (1)	835	84.80	8.42	86.00	-0.459	-0.203

	Town center (2)	240	84.05	7.91	85.00	-0.552	0.357
	Village (3)	173	83.10	8.24	84.00	-0.128	-0.416

When Table 9 is examined, it is seen that the kurtosis and skewness values are within the limits of +2 and -2. The fact that the kurtosis or skewness values are in the range of +2 to -2 indicates that the data exhibit a normal distribution (George & Mallery 2010). The results are given in Table 10.

Table 10. *Anova test results for the residential area where the students' schools are located Normality test results of environmental literacy levels*

Sub-dimensions	Grade	Square sums	Sd	Square mean	F	p	Scheffe
Behaviour	Intergroup	203.541	2	101.77	2.668	0.070	
	In-group	47488.786	1245	38.144			
	Total	47692.326	1247				
Attitude	Intergroup	58.987	2	29.494	2.629	0.073	
	In-group	13968.531	1245	11.22			
	Total	14027.518	1247				
Environmental literacy	Intergroup	452.281	2	226.141	3.284	0.038*	(3<1)
	In-group	85722.023	1245	68.853			
	Total	86174.304	1247				

According to Table 10, environmental literacy levels of students differ significantly according to the settlement area where their schools are located (F=3.284; p=0.038; p<0.05). Environmental literacy level ($\bar{X}$ = 84.80) of those whose schools are located in a city center is higher than that of those whose schools are in a village ($\bar{X}$ = 83.10). The source of the difference between the groups was determined by the Scheffe test, one of the post-hoc tests. In terms of both sub-dimensions, no significant difference was determined according to the settlement variable (F=2.668; p=0.070; p<0.05), (F=2.629; p=0.073; p<0.05).

Table 11. *Central tendency measures regarding students' income levels*

Sub-dimensions	Income level	N	$\bar{X}$	s.s	Median	Skewness	Kurtosis
Behaviour	0-2000TL (1)	288	38.48	5.74	39.00	-0.286	-0.095
	2000-4000TL (2)	374	37.67	5.79	38.00	-0.047	-0.369
	4000-6000TL (3)	265	36.96	6.62	37.00	-0.222	-0.089
	6000-8000TL (4)	120	38.04	6.08	39.00	-0.356	-0.625
	8000TL and more (5)	201	37.06	6.85	38.00	-0.151	-0.693
Attitude	0-2000TL (1)	288	46.59	3.36	47.00	-1.247	1.434
	2000-4000TL (2)	374	46.57	3.49	48.00	-1.364	1.665
	4000-6000TL (3)	265	46.86	3.31	48.00	-1.296	1.318
	6000-8000TL (4)	120	47.37	2.94	49.00	-1.162	0.782
	8000TL and more (5)	201	46.99	3.34	48.00	-1.275	1.138
Environmental literacy	0-2000TL (1)	288	85.07	7.77	85.00	-0.489	-0.113
	2000-4000TL (2)	374	84.24	8.03	85.00	-0.439	0.168
	4000-6000TL (3)	265	83.82	8.69	84.00	-0.385	-0.130
	6000-8000TL (4)	120	85.41	8.29	86.00	-0.508	-0.510
	8000TL and more (5)	201	84.05	9.02	84.00	-0.279	0.608

When Table 11 is examined, it is seen that the kurtosis and skewness values are within the limits of +2 and -2. The fact that the kurtosis or skewness values are in the range of +2 to -2 indicates that the

data exhibit a normal distribution (George & Mallery 2010). The results are given in Table 12.

Table 12. *Anova test results of students' income status*

Sub-dimensions	Income Level	Square sum	sd	Square mean	F	p	Scheffe
Behaviour	Intergroup	410.454	4	102.613	2.698	0.029*	(2<4)
	In-group	47281.87	1243	38.039			
	Total	47692.33	1247				
Attitude	Intergroup	78.664	4	19.666	1.752	0.136	
	In-group	13948.85	1243	11.222			
	Total	14027.52	1247				
Environmental literacy	Intergroup	374.303	4	93.576	1.356	0.247	
	In-group	85800	1243	69.027			
	Total	86174.3	1247				

The results of the Anova test for the analysis of the environmental literacy levels of the students according to the income status of the family are presented in Table 13. According to Table 12, it was seen that the environmental literacy levels of the students did not differ significantly in terms of income (p=0.247; p<0.05). However, in terms of Behaviour sub-dimension, it was observed that there was a significant difference according to income status (F=2.698; p=0.029; p<0.05). Behaviour levels of those whose income is 6000-8000TL ($\bar{X} = 38.04$) are higher than those whose income is 2000-4000TL ($\bar{X} = 37.67$). The source of the difference between the groups was determined by the Scheffe test, one of the post-hoc tests. In the attitude sub-dimension, there is no significant difference according to income status (p=0.136; p<0.05).

Table 13. *Central tendency measures regarding environmental journal follow-up*

Sub-dimension	Environmental Journal Follow-up	Median	Skewness	Kurtosis
Behaviour	Yes	40.00	-0.381	-0.193
	No	37.00	-0.186	-0.275
Attitude	Yes	49.00	-1.649	1.340
	No	48.00	-1.224	1.278
Environmental literacy	Yes	88.00	-0.714	0.317
	No	84.00	-0.379	-0.196

When Table 14 is examined, it is seen that the kurtosis and skewness values are between +2 and -2. The values of kurtosis or skewness between +2 and -2 indicate that the data exhibit a normal distribution (George & Mallery, 2010). The results are given in Table 15.

Table 14. *Independent sample t-test results regarding environmental journal follow-up*

Sub-dimension	Environmental Journal Follow-up	n	$\bar{X}$	s.s	t	sd	p
Behaviour	Yes	242	39.76	5.89	6.002	1246	0.000*
	No	1006	37.14	6.15			
Attitude	Yes	242	47.25	3.55	2.454	1246	0.014*
	No	1006	46.66	3.30			
Environmental literacy	Yes	242	87.01	8.30	5.453	1246	0.000*
	No	1006	83.80	8.20			

According to Table 14, environmental literacy levels of students differ significantly according to

whether they follow or not follow an environmental journal (t= 5.453; p=0.000; p<0.05). Environmental literacy levels of those who follow journals ($\bar{X}$ = 87.01) are higher than those who do not follow journals ($\bar{X}$ = 83.80). In terms of both sub-dimensions, significant differences have been determined according to whether the students followed a journal or not (t= 6.002; p=0.000; p<0.05), (t= 2.454; p=0.014; p<0.05). Behaviour levels of those who follow environmental magazines ($\bar{X}$ = 39.76) are higher than those who do not ($\bar{X}$ = 37.14). Attitude levels of students who follow a magazine ($\bar{X}$ = 47.25) are higher than those who do not ($\bar{X}$ = 46.66).

Table 15. *Central tendency measures regarding environmental broadcast follow-up through social media or television*

Sub-dimensions	Environmental broadcast follow -up	Median	Skewness	Kurtosis
Behaviour	Yes	39.00	-0.168	-0.442
	No	37.00	-0.206	-0.301
Attitude	Yes	48.00	-1.287	1.360
	No	48.00	-1.280	1.351
Environmental literacy	Yes	87.00	-0.433	-0.015
	No	84.00	-0.383	-0.311

When Table 15 is examined, it is seen that the kurtosis and skewness values are between +2 and -2. The values of kurtosis or skewness between +2 and -2 indicate that the data exhibit a normal distribution (George & Mallery, 2010). The results are given in Table 16.

Table 16. *Independent sample t-test results regarding environmental broadcast follow-up through social media or television*

Sub-dimension	Environmental broadcast follow -up	n	$\bar{X}$	s.s	t	sd	p
Behaviour	Yes	526	39.05	5.81	7.005	1246	0.000*
	No	722	36.62	6.25			
Attitude	Yes	526	47.11	3.13	3.084	1246	0.002*
	No	722	46.53	3.49			
Environmental literacy	Yes	526	86.17	7.81	6.513	1246	0.000*
	No	722	83.15	8.44			

According to Table 16, environmental literacy levels of students differ significantly according to whether they follow or not follow an environmental broadcast (t= 6.513; p=0.000; p<0.05). Environmental literacy levels of those who follow environmental broadcast ($\bar{X}$ = 86.17) are higher than those who do not follow its ($\bar{X}$ = 83.15). In terms of both sub-dimensions, significant differences were determined according to whether or not students follow a broadcast about the environment via social media or television (t= 7.005; p=0.000; p<0.05), (t= 3.084; p=0.002).; p<0.05). Behaviour levels of those who follow environmental publications ($\bar{x}$=39.05) are higher than those who do not follow environmental publications ($\bar{X}$ = 36.62). Again, the attitude levels of those who follow the publications about the environment ($\bar{X}$ = 47.11) are higher than those who do not follow the publications about the environment ($\bar{X}$ = 46.13).

Table 17. *Central Tendency measures regarding students' finding the environmental education sufficient or not sufficient at school*

Sub-dimensions	Finding Environmental Education Sufficient	Median	Skewness	Kurtosis
Behaviour	Yes	38.00	-0.204	-0.290
	No	37.00	-0.209	-0.333
Attitude	Yes	48.00	-1.346	1.567
	No	48.00	-1.201	1.064
Environmental literacy	Yes	86.00	-0.472	-0.013
	No	84.00	-0.359	-0.333

When Table 17 is examined, it is seen that the kurtosis and skewness values are between +2 and -2. The values of kurtosis or skewness between +2 and -2 indicate that the data exhibit a normal distribution (George & Mallery, 2010). The results are given in Table 18.

Table 18. *Independent sample t-test results regarding students' finding environmental education sufficient at school*

Sub-dimensions	Finding Environmental Education Sufficient	n	$\bar{X}$	s.s	t	sd	p
Behaviour	Yes	681	38.06	5.98	2.618	1246	0.009*
	No	567	37.14	6.39			
Attitude	Yes	681	46.67	3.49	-1.269	1246	0.205
	No	567	46.91	3.18			
Environmental literacy	Yes	681	84.73	8.21	1.443	1246	0.149
	No	567	84.05	8.43			

According to Table 18, it is seen that the environmental literacy level of the students does not differ significantly according to the level of finding the environmental education given at school sufficient (p=0.149; p<0.05). However, in terms of Behaviour sub-dimension, it has been observed that there is a significant difference in terms of finding environmental education at school sufficient (t= 2.618; p=0.009; p<0.05). Behaviour levels of those who find environmental education at school sufficient ($\bar{X}$ = 38.06) are higher than those who do not find environmental education at school sufficient ($\bar{X}$ = 37.14). In terms of attitude sub-dimension, no significant difference was measured according to the status of finding environmental education sufficient at school (p=0.205; p<0.05).

Table 19. *The results of central tendency regarding the residential area students spend most of their lives*

Sub-dimensions	Residential Area	N	$\bar{X}$	s.s	Median	Skewness	Kurtosis
Behaviour	City	816	37.83	6.27	38.00	-0.226	-0.365
	Town	227	37.48	5.91	38.00	-0.308	-0.053
	Village	205	37.07	6.09	37.00	-0.127	-0.167
Attitude	City	816	46.91	3.33	48.00	-1.376	1.782
	Town	227	46.64	3.10	48.00	-0.964	0.318
	Village	205	46.42	3.76	48.00	-1.284	1.112
Environmental literacy	City	816	84.74	8.42	86.00	-0.445	-0.200
	Town	227	84.12	7.91	85.00	-0.523	0.136
	Village	205	83.49	8.24	84.00	-0.244	-0.251

When Table 19 is examined, it is seen that the kurtosis and skewness values are between +2 and -2. The values of kurtosis or skewness between +2 and -2 indicate that the data exhibit a normal distribution (George & Mallery, 2010). The results are given in Table 20.

Table 20. *Anova test results regarding the residential area students spend most of their lives*

Sub-dimensions	Residential Area	Square Sum	sd	Square Mean	F	p
Behaviour	Intergroup	104	2	52	1.360	0.257
	In- group	47588.33	1245	38.224		
	Total	47692.33	1247			
Attitude	Intergroup	43.765	2	21.883	1.948	0.143
	In-group	13983.75	1245	11.232		
	Total	14027.52	1247			
Environmental literacy	Intergroup	282.375	2	141.187	2.047	0.130
	In-group	85891.93	1245	68.99		
	Total	86174.3	1247			

According to Table 20, the environmental literacy levels of the students do not differ significantly in terms of the overall scale and both dimensions according to the place of residence where they spend most of their lives.

CONCLUSION AND DISCUSSION

In the study in which 1248 middle school students participated, the average environmental literacy scores of the participants were found to be $\bar{X} = 84.42$ on a scale of 0-100. This result is above the arithmetic mean ($\bar{X} = 60.0$). In this sense, it can be said that the environmental literacy of the participants participating in the research is above the average. Şahin (2020) and Güler (2013) measured middle school students' environmental knowledge and environmental behavior scores, which are sub-components of environmental literacy, as moderate. In this sense, it can be said that environmental literacy of middle school students should be developed. Troy Frensley et al. (2020) found a positive and significant relationship between middle school students' environmental literacy levels and their active participation in environmental activities. In this sense, presenting environmental education in a way that is the focus of active participation and with activities outside the classroom will contribute positively to the development of environmental literacy.

A significant difference was determined between the environmental literacy levels of middle school students and the gender variable. Environmental literacy levels of female students are better than male students. When this situation is examined in terms of attitude and Behaviour dimensions of environmental literacy levels, it is also seen that female students have higher level of environmental attitudes and environmental Behaviours than male students (Table 5). Similarly, Karatekin & Aksoy (2012), in their study with teacher candidates, reported that female students' environmental literacy levels were higher than male students. Kahyaoğlu & Özgen (2012), in their study with teacher candidates, stated that the environmental literacy levels of female students were significantly higher than male students. Similarly, Demirtaş et al. (2018) and Ağtaş et al. (2019) measured the environmental literacy and environmental attitude levels of female students to be higher than male students, respectively. Doğan & Keleş (2020) stated that the environmental attitude and environmental Behaviour scores of 8th grade female students were higher than male students. Can, et al. (2016) measured that the environmental attitude levels differed in favor of female students in their study with middle school students. However,

results that do not support this result are also available in the literature. In their study, Akıllı & Genç (2015) measured the environmental Behaviour scores of male students higher than that of female students. Aydin & Çepni (2012), on the other hand, in their study in which they examined the attitudes of middle school students towards the environment, determined that the attitudes did not differ according to the gender variable. Similarly, Kışoğlu et al. (2016) measured that the environmental Behaviour scores of teacher candidates did not differ according to gender. Uyar & Temiz (2019) stated that the gender variable did not make a significant difference on the level of environmental literacy. As a result, it is reported that environmental literacy of female students is mostly higher than that of males. The probable reason for this may be that female students are more social and interested in their environment. However, the real reason for this needs to be examined by new studies.

Environmental literacy shows a significant difference according to grade levels. This difference is in favor of 5th grade students (Table 7). Goldman et al. (2007) determined in their study with pre-service teachers in Israel that the environmental literacy scores of students who are close to graduation are lower than the scores of first grade teacher candidates. Doğan & Keleş (2020) measured the environmental awareness scores of 8th grade students to be higher than the scores of 12th grade students. Şahin (2020) measured the environmental literacy level scores of the 5th grade students higher than the 6th and 7th grade students. On the other hand, Akıllı & Genç (2015) stated that as the grade level rises, there is a significant increase in the scores obtained from the environmental literacy sub-dimensions. Kapan (2020) stated that as the grade level of nursing department students' increases, their environmental literacy level also increases. Özcan & Demirel (2019) stated that students evaluate environmental problems better as their grade level rises. In another study, Karatekin & Koç (2013) stated that the grade level variable had no effect on the environmental literacy levels of geography teachers. As a result, it is common in the literature that as the grade level increases, environmental literacy or its components decrease. This is likely due to the inability to balance new information about the environment with old ones. Again, test anxiety experienced at upper class levels may have a negative effect on environmental literacy. However, the real reason for this needs to be examined, especially with qualitative and longitudinal studies.

Environmental literacy attitude sub-dimension scores do not differ significantly according to classes (Table 7). Similarly, Şahin (2020) stated that he did not measure a significant difference between grade levels in terms of emotion sub-dimension. There are many studies that do not measure a significant difference between class level and environmental attitude (Ağtaş et al., 2019; Yıldız & Yüksel 2019; Zengin & Kunt, 2013). On the other hand, Akıllı & Genç (2015) stated that as the grade level rises, there is a significant increase in the scores obtained in the knowledge and attitude sub-dimensions. However, Doğu & Şahin (2018) reported that environmental attitude scores of 3rd grade students are higher than 4th grade students. As a result, the literature tells us that there are no significant changes in the attitude dimension of environmental literacy according to the grade level. The possible reason for this may be that significant changes in an affective variable such as attitude require long periods of time.

There is a significant difference between environmental literacy Behaviour sub-dimension scores

and grade level (Table 7). This difference is in favor of 5th graders among 5th, 6th, 7th and 8th grades. Similarly, Stevenson et al. (2013) measured that the environmental Behaviour performance of middle school students decreased as age increased. Yıldız & Yüksel (2019) measured significant differences between the 12th and 10th grades in favor of the 12th grade, and between the 9th and 10th grades in favor of the 9th grade in terms of the Behaviour sub-dimension. Again by Şahin (2020), the scores of the 5th grade students in the Behaviour sub-dimension were measured significantly higher than the 6th and 7th grade students. In a different way, Kışoğlu et al. (2016) measured that the environmental Behaviour scores of the 4th grade teacher candidates were higher than those of the 1st grade teacher candidates. Doğu & Şahin (2018) stated that there was no significant difference between the environmental Behaviour dimension and the grade level. Belen (2020), on the other hand, determined in her study with middle school students that the environmental attitude scores of 12th grade students were higher than that of 11th grade students. Karakaya, et al. (2018) measured that class level did not have a significant effect on environmental Behaviour. McBeth & Volk (2009), in their study with 6th and 8th grade students, reported that 6th grade students' scores for taking action towards their environment were higher than 8th grade students. As a result, all kinds of opinions exist in the literature almost homogeneously. However, as the grade level increases, it is a desired result that the Behavioural scores increase. The possible reasons why this is not clearly seen in the literature need to be investigated by new studies.

In this study, it was determined that there is a significant difference between the environmental literacy levels of middle school students and the school type variable (Table 9). Public middle school students are at a better level than private middle school students in terms of environmental literacy levels. Likewise, also in the sub-dimension of Behaviour, public school students are at a better level than private school students. Differently, Doğan & Keleş (2020) state that the environmental awareness of public middle school students is lower than those of private middle school students. Stevenson et al. (2013) reportes that the environmental Behaviour performance of private school students is higher than that of public school students. Sönmez & Yerlikaya (2017) measure that the environmental attitudes of private school students are higher than those of public middle school students. Ağtaş et al. (2019), on the other hand, measure that there is no significant difference between imamhatip middle schools and other middle schools in terms of environmental attitudes. Aşılıoğlu (2004) states that environmental trips in public schools are more than in private schools. Based on this information, this may be the possible reason why public school students came to the fore in this study in terms of environmental literacy levels. However, this needs to be investigated by new studies.

Environmental literacy of middle school students shows a significant difference in terms of the residential area of the school (Table 11). Environmental literacy scores of students living in the city center are higher than those living in villages. Similarly, Williams (2017) found the environmental literacy levels of students living in the city center to be higher than those living in rural areas. Yürüdür et al. (2017), on the other hand, found that the environmental literacy means scores of students studying in towns are significantly higher than those in the city center. In terms of attitude sub-dimension scores, there is no statistically significant difference according to the residential area of school. Similarly,

Öküzcüoğlu (2019) could not measure a significant relationship between the level of environmental attitude and the residential area of school. According to the Behavioural sub-dimension scores, there is no statistically significant difference in terms of the residential area of school (Table 11). Varlı (2014) and Uyar & Temiz (2019) reported similar results in terms of environmental Behaviour. Again, Erbasan & Erkol (2020) found in their study with classroom teachers that environmental knowledge test scores did not show a significant difference according to the area of residence. Similarly, Şenyuva & Bodur (2016) reported that the environmental literacy levels of university students do not change according to the residential area of schools. In this study, the first possible reason for the environmental literacy of middle school students to be significant in favor of students living in the city center may be that they get more qualified environmental education. The second possible reason may be that those living in the city center face environmental problems more than others. However, the real reason for this needs to be revealed primarily through qualitative research.

Environmental literacy scores do not show a statistically significant difference in terms of family income levels (Table 13). Similarly, Karatekin & Aksoy (2012) stated that the environmental literacy of education faculty students does not change according to their families' monthly income. Again, Şahin (2020) and Kapan (2020) stated that environmental literacy did not show a significant difference according to the income level of the family.

In terms of attitude sub-dimension, no significant difference was determined according to income status (Table 13). Similarly, Ağtaş et al. (2019) and Öküzcüoğlu (2019) also reported that environmental attitudes do not differ significantly according to the monthly income of the family. Again, Demirtaş, et al, (2018) state that the family income level does not affect the environmental knowledge and attitude level of the student.

Environmental Behaviour scores of those with income between 6000 and 8000 TL were found to be significantly higher than those with an income between 2000 and 4000 TL (Table 13). Similarly, Erkılıç (2019) stated in his study that environmental literacy increases as income level increases. Again, Kılıç & Girgin (2019) stated that as the income level of the family increases, the student's attitude and Behaviour towards the environment is positively affected. Demirtaş & Çinici (2019) on the other hand, stated that the environmental attitude scores decrease as the income level of the family increases. Tarkoçin et al. (2017) measured that income level does not make a significant difference on environmental literacy. When we combine the relevant literature and the findings of this study, it can be said that environmental literacy does not differ according to income level.

Environmental literacy levels of students differ significantly depending on whether they or a family member follow a magazine about the environment (Table 15). This difference is in favor of those who follow the journal. Measuring significant differences in terms of the overall scale and its two sub-dimensions (Behaviour, attitude) (Table 16) is significant. Again, environmental literacy levels differ significantly according to whether or not they follow a broadcast from visual media (social media or television) (Table 17). This difference is in favor of those who follow the broadcast. Measuring

significant differences in terms of the overall scale and its two sub-dimensions (Behaviour, attitude) (Table 18) strengthens the finding. If we summarize the data obtained from Tables 15 and 17: it can be said that following a publication, whether written or visual, makes a significant positive contribution to environmental literacy. Similarly, Koç et al. (2018) stated that communication tools (books, magazines, social media, internet, documentaries, newspapers, etc.) positively affect the level of environmental literacy. Öztürk & Erten (2020) stated that reading environmental problems from the newspaper has a significant effect on environmental attitude and Behaviour. In addition, Balçın & Cavus (2020) stated that the environmental literacy levels of students who prepare projects using digital resources are higher than those who do not.

Environmental literacy levels of students do not change significantly depending on whether they find environmental education sufficient or not (Table 19). There is a significant difference in favor of those who find environmental education at school sufficient only in the sub-dimension of Behaviour (Table 19). Similarly, Uzun & Sağlam (2007) found that those who took environment and human courses had higher environmental Behaviour scores than those who did not. On the other hand, Karatekin & Aksoy (2012) stated that environmental literacy levels of students who receive environmental education at school are high.

Environmental literacy does not differ significantly according to the residential area where students spend most of their lives (at least 5 years) (Table 21). There are studies showing similarities with this result (Şenyuva & Bodur, 2016; Arık & Yılmaz, 2017; Koç et al. 2018; Şahin, 2020; Zengin & Kunt, 2013). Differently, Uzelli et al. (2021) measured the environmental ethics scores of students who spent a long part of their life in the village as higher. Atabek-Yiğit & Küçükbaş-Duman (2019) measured that the environmental literacy levels of those living in the city center are higher than those living in towns and villages.

RECOMMENDATIONS

Environmental literacy of students is positively affected by following a printed or digital publication. In this context, it may be beneficial to encourage publications on the environment, whether digital or printed. For this purpose, focusing on such studies in both formal and non-formal education processes will make a positive contribution. In this context, activities on the environment in schools can be carried out not in classrooms, but outside of class by experiencing in the environment. Finally, the environmental literacy levels of the students living in the city center have been significantly higher than the others (district, village). In particular, qualitative studies can be conducted to determine the real reason for this.

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GENİŞLETİLMİŞ ÖZET

Giriş: Günümüzde toplumun çevre okuryazarı bireylerden oluşması hükümetlerin temel amacı olmuştur (Stevenson vd., 2013). Çevre okuryazarlığı terimi ilk olarak 1968 yılında Charles Roth tarafından kullanılmıştır. Roth'un tanımına göre Çevresi hakkında temel bilgi düzeyine sahip bireylere çevre okuryazarı bireyler denilmektedir (Roth, 1968). Çevre okuryazarlığı, çevreyi anlamak, çevresel bilgi ile beceriye sahip olmak ve çevresel tutum göstermek gibi davranışları kapsar. Bu davranışlar bireyin çevresi ile olumlu bir bağ kurmasını sağlar. Ayrıca insanların yaşamlarını sürdürdüğü alanlarla aralarındaki ilişkinin uzun vadeli ve sürdürülebilir olmasını sağlar (Berkowitz, Borrie, Brewer ve McBride 2013; Roth, 2002). Çevre okuryazarı bir birey olmak, doğaya saygılı bir yaşam sürmeyi gerektirir. Tüketim alışkanlıklarında çevre hassasiyet bilincine sahip olmak buna bir örnektir. Çevre okuryazarlığı aynı zamanda bilgi, beceri ve tutum sahibi olmayı ve uygun çevresel faktörleri seçerek harekete geçmeyi gerektirir (Koç, Çorapçıgil ve Doğru, 2018; Demirel ve Özcan, 2019).

Çevre okuryazarlığı, bilgi sahibi olmaktan öte bir anlam içermektedir (Clayton, 2003). Çevre okuryazarı bireyler çevreyi korumaya karşı istekli ve gerektiğinde harekete geçmek için hazır olmalıdır (Gifford ve Sussman, 2012). Belirtilen hususlar bireyde davranış haline gelmeli ve kalıcı olarak yerleşmelidir. Erken yaşta alınan çevre eğitimi sonucu bireyde oluşan çevre okuryazarlığı davranışlarının daha etkili ve kalıcı olacağı düşünülmektedir. Ek olarak çevre eğitimiyle ilgili çalışmalar çevre kavramının çocukluk döneminde temellendiğini göstermektedir (Ernst ve Theimer 2011; Bloyd Null, Feeser ve Kurtzhals, 2021; Braun, Cottrell ve Dierkes, 2018). Bu noktada çevre okuryazarlık düzeyi yüksek bireyler yetiştirilmesi bilim insanları ve eğitimcilerin ortak sorumluluğunda olmalıdır (Stafford ve Jones, 2019). Bugünün çocukları yarının çevre sorunlarının yükünü taşıyacak kişilerdir. Bu ağır yük ile başa çıkabilmeleri için çevresel bilgi ve sorun çözme becerisine sahip olmaları gerekmektedir (Damerell, Howe ve Milner-Gulland, 2013). Öğrencilerin erken yaşlarda kazandığı çevresel okuryazarlık becerileri ileride sergiledikleri davranışa rehberlik edecektir (Kıyıcı, Yavuz ve Yiğit, 2014; Bonnet, 2019; Ayverdi, 2021; Mifsud, 2012). Bu noktada bireylerin çevre okuryazarlık düzeylerinin belirlenmesi var olan çevre eğitiminin eksiklerinin görülmesi açısından kritik önem arzeder (Gan, 2021).

Buradan hareketle bu araştırmanın ana problem cümlesi "Isparta ili sınırları içerisinde öğrenim gören ortaokul öğrencilerinin çevre okuryazarlık düzeyleri ne durumdadır?" şeklindedir. Bu ana problemden yola çıkılarak aşağıdaki alt problemlere cevaplar aranmıştır:

Ortaokul öğrencilerinin çevre okuryazarlık düzeyleri:

1. Cinsiyete göre anlamlı bir farklılık göstermekte midir?
2. Sınıf düzeyine göre anlamlı bir farklılık göstermekte midir?
3. Öğrenim gördükleri okulun türüne göre anlamlı bir farklılık göstermekte midir?
4. Öğrenim gördükleri okulun bulunduğu yerleşim yerine göre anlamlı bir farklılık göstermekte midir?
5. Ailelerinin gelir seviyesine göre anlamlı bir farklılık göstermekte midir?

6. Bireyin ya da ailesinin çevre ile ilgili takip ettiği dergi olup olmamasına göre anlamlı bir farklılık göstermekte midir?

7. Bireylerin sosyal medya, internet ya da televizyondan takip ettiği çevre ile ilgili bir yayın olup olmamasına göre anlamlı bir farklılık göstermekte midir?

8. Öğrencilerin okulda verilen çevre eğitimini yeterli bulup bulmamasına göre anlamlı bir farklılık göstermekte midir?

9. Öğrencinin yaşadığı (en az beş yıl) yerleşim yerine göre anlamlı bir farklılık göstermekte midir?

Yöntem: Bu araştırmada ortaokul öğrencilerinin (5. 6. 7. ve 8. sınıf) çevre okuryazarlık düzeylerini belirlemek amacıyla Nicel araştırma yöntemlerinden Tarama (Survey) modeli kullanılmıştır. Tarama (Survey) modeli, araştırılmak istenen olayın "durumu nedir?", "ne durumdayız?" sorularına cevap bulmak amacıyla yürütülür (Büyüköztürk vd., 2011; Karasar, 2009). Çalışmanın örneklemini ise 2019-2020 eğitim-öğretim yılında Isparta il merkezi, ilçe ve köylerde öğrenim gören 5. 6. 7. ve 8. sınıf ortaokul öğrencileri oluşturmuştur. Çalışmada 1248 ortaokul öğrencisinden veri toplanmıştır. Bu öğrencilerin demografik değişkenleri Tablo 2'de verilmiştir. Ölçme aracı olarak Yavuz vd. (2014) tarafından geliştirilen "Çevre Okuryazarlığı Ölçeği" kullanılmıştır. Yaşanılan Covid 19 salgını sebebiyle verilerin yüz yüze toplanmasının güç olacağı öngörülmüş ve bu nedenle ilk önce ölçek Google formlar aracılığıyla dijital ortama aktarılmış ve veri toplama dijital ortamda gerçekleştirilmiştir.

Sonuç ve Tartışma: Ortaokul öğrencilerinin çevre okuryazarlık düzeyleri ile cinsiyet değişkeni arasında anlamlı bir fark belirlenmiştir. Kız öğrencilerin çevre okuryazarlık düzeyleri erkek öğrencilerden daha iyi düzeydedir. Bu durum çevre okuryazarlık düzeylerinin tutum ve davranış boyutları açısından incelendiğinde de yine aynı şekilde kız öğrencilerin erkek öğrencilerden daha yüksek çevresel tutum ve çevresel davranışlara sahip oldukları görülmüştür (Tablo 5). Benzer biçimde Karatekin ve Aksoy (2012), öğretmen adaylarıyla yaptığı çalışmada kız öğrencilerin çevre okuryazarlık düzeylerinin erkek öğrencilere göre yüksek bulduğunu rapor etmiştir. Yine, Kahyaoğlu ve Özgen (2012), öğretmen adaylarıyla yaptığı çalışmada kız öğrencilerin çevre okuryazarlık düzeylerinin erkek öğrencilere göre anlamlı olarak yüksek olduğunu belirtmiştir. Benzer olarak Akbulut, Demirtaş ve Özşen (2018) ve Ağtaş Bektaş ve Güneri (2019) sırasıyla kız öğrencilerin çevre okuryazarlık ve çevresel tutum düzeylerini erkek öğrencilere göre yüksek olarak ölçmüştür. Doğan ve Keleş (2020), 8. sınıf kız öğrencilerin çevresel tutum ve çevresel davranış puanlarının erkek öğrencilere göre yüksek olduğunu belirtmiştir. Akkuş, Can ve Üner (2016), ortaöğretim öğrencileriyle yaptığı çalışmada çevresel tutum düzeylerinin kız öğrenciler lehine farklılaştığını ölçmüştür. Fakat bu sonucu desteklemeyen sonuçlar da alan yazında mevcuttur. Akıllı ve Genç (2015), çalışmalarında erkek öğrencilerin çevresel davranış puanlarını kız öğrencilere göre yüksek olarak ölçmüşlerdir. Aydın ve Çepni (2012) ise ilköğretim ikinci kademe öğrencilerinin çevreye yönelik tutumlarını inceledikleri çalışmada cinsiyet değişkenine göre tutumların farklılaşmadığını belirlemişlerdir. Benzer olarak Kışoğlu vd., (2016), öğretmen adaylarının çevresel davranış puanlarının cinsiyete göre farklılaşmadığını ölçmüştür. Temiz ve Uyar (2019) cinsiyet

değişkeninin çevre okuryazarlık düzeyi üzerinde anlamlı bir farklılaşma yaratmadığını belirtmiştir. Sonuç olarak yapılan araştırmalarda ağırlıklı biçimde kız öğrencilerin çevre okuryazarlıklarının erkeklere kıyasla yüksek olduğu rapor edilmektedir. Bunun muhtemel sebebi kız öğrencilerin daha sosyal ve çevreleriyle ilgili olmaları olabilir. Ancak bunun gerçek sebebinin yeni araştırmalarca incelenmesi gerekir.

Çevre okuryazarlığı sınıf düzeylerine göre anlamlı bir farklılık göstermektedir. Bu farklılık 5. sınıf öğrencileri lehinedir (Tablo 7). Goldman, Pe'er ve Yavetz (2007) İsrail'de öğretmen adaylarıyla yaptıkları çalışmada mezun olmaya yakın olan öğrencilerin çevre okuryazarlık puanlarının 1. sınıf öğretmen adaylarının puanlarına göre düşük olduğunu belirlemiştir. Doğan ve Keleş (2020) 8. sınıf öğrencilerinin çevresel farkındalık puanları 12. sınıf öğrencilerinin puanlarına göre yüksek olarak ölçülmüştür. Şahin (2020) 5. sınıf öğrencilerinin aldıkları çevre okuryazarlık düzeyi puanlarını 6. ve 7. sınıf öğrencilerine göre yüksek ölçmüştür. Farklı olarak Akıllı ve Genç (2015) sınıf seviyesi arttıkça çevre okuryazarlığı alt boyutlarından alınan puanlarda da anlamlı bir artış olduğunu belirtmiştir. Kapan (2020), hemşirelik bölümü öğrencilerinin sınıf seviyesi arttıkça çevre okuryazarlık düzeylerinin de arttığını belirtmiştir. Demirel ve Özcan (2019) öğrencilerin sınıf seviyesi yükseldikçe çevre sorunlarını daha iyi değerlendirdiklerini belirtmiştir. Başka bir çalışmada Karatekin ve Koç (2013) sınıf seviyesi değişkeninin coğrafya öğretmenlerinin çevre okuryazarlık düzeyleri üzerinde etkisinin olmadığını belirtmiştir. Sonuç olarak alan yazında ağırlıklı biçimde sınıf seviyesi arttıkça çevre okuryazarlığı veya bileşenlerinin düştüğü görüşü hâkimdir. Bunun muhtemel sebebi çevreye dair yeni bilgilerle eskilerinin dengelenememesi olabilir. Yine üst sınıf seviyelerinde yaşanan sınav kaygısının çevre okuryazarlığına olumsuz bir etkisi olabilir. Ancak bununu gerçek sebebinin özellikle nitel ve boylamsal araştırmalarla incelenmesi gerekir. Çevre okuryazarlığının tutum alt boyut puanları sınıflara göre anlamlı farklılık göstermemektedir (Tablo 7). Benzer biçimde Şahin (2020) duygu alt boyutu açısından sınıf seviyeleri arasında anlamlı bir fark ölçmediğini belirtmiştir. Sınıf seviyesi ile çevresel tutum arasında anlamlı bir farklılığın ölçülmediği birçok araştırmada mevcuttur (Yıldız ve Yüksek 2019; Ağtaş, Bektaş ve Güneri 2019; Zengin ve Kunt, 2013). Farklı olarak Akıllı ve Genç (2015) sınıf seviyesi artıkça bilgi ve tutum alt boyutlarında alınan puanlarda anlamlı bir artış olduğunu belirtmiştir. Buna rağmen Doğu ve Şahin (2018) ise 3. sınıf öğrencilerinin çevresel tutum puanlarının 4. sınıf öğrencilerine göre yüksek olarak rapor etmiştir. Sonuç olarak alan yazın bize çevre okuryazarlığının tutum boyutunda sınıf seviyesine göre anlamlı değişimler olmadığını söylemektedir. Bunun muhtemel sebebi tutum gibi duyuşsal bir değişkendeki kayda değer değişimlerin uzun zaman dilimleri gerektirmesi olabilir. Çevre okuryazarlığı davranış alt boyut puanları ile sınıf seviyesi arasında anlamlı bir fark bulunmaktadır (Tablo 7). Bu fark 5. 6, 7 ve 8. sınıflar arasında 5. sınıflar lehinedir. Benzer olarak Stevenson vd., (2013) ortaokul öğrencilerinde yaş arttıkça çevresel davranış performanslarında düşüklük olduğunu ölçmüştür. Yıldız ve Yüksek (2019) davranış alt boyutu açısından 12. sınıf ve 10. sınıf arasından 12. sınıf lehine, 9. ve 10. sınıf arasında 9. sınıf lehine anlamlı farklar ölçülmüştür. Yine Şahin (2020) davranış alt boyutunda 5. sınıf öğrencilerinin aldıkları puanları 6. sınıf ve 7. sınıf öğrencilerine göre anlamlı biçimde yüksek ölçülmüştür. Farklı biçimde Kışoğlu vd., (2016) ise 4. sınıf öğretmen adaylarının çevresel davranış

puanlarının 1. sınıf öğretmen adaylarınınkine göre yüksek olduğunu ölçmüştür. Doğu ve Şahin (2018) ise çevresel davranış boyutu ile sınıf seviyesi arasında anlamlı bir farkın olmadığını belirtmiştir. Belen (2020) ise ortaöğretim öğrencileri ile yaptığı çalışmada 12. sınıf öğrencilerin çevresel tutum puanlarının 11. sınıf öğrencilerine göre yüksek olduğunu saptamıştır. Karakaya, Avgın ve Yılmaz, (2018) ise sınıf seviyesinin çevresel davranış üzerinde anlamlı bir etkisinin olmadığını ölçmüştür. McBeth ve Volk (2009), 6. ve 8. sınıf öğrencileriyle yaptığı çalışmada 6. sınıf öğrencilerinin çevrelerine yönelik eyleme geçme puanlarının 8. sınıf öğrencilerine göre yüksek olduğunu rapor etmiştir. Sonuç olarak alan yazında her türden görüş hemen hemen homojen biçimde mevcuttur. Ancak sınıf düzeyi arttıkça davranış puanlarının artması istenen bir sonuçtur. Literatürde bunun çok net biçimde görülmemesinin muhtemel nedenlerinin yeni araştırmalarca incelenmesi ihtiyacı vardır.

Bu araştırmada ortaokul öğrencilerinin çevre okuryazarlık düzeyleri ile okul türü değişkeni arasında anlamlı bir fark olduğu belirlenmiştir (Tablo 9). Devlet ortaokulu öğrencileri çevre okuryazarlık düzeyleri açısından özel ortaokul öğrencilerinden daha iyi düzeydedir. Yine aynı şekilde davranış alt boyutunda da devlet okulu öğrencileri özel okul öğrencilerinden daha iyi düzeydedir. Farklı olarak Doğan ve Keleş (2020), devlet ortaokulu öğrencilerinin çevresel farkındalıklarının özel ortaokulda okuyan öğrencilere göre düşük olduğunu belirtmiştir. Stevenson vd., (2013) ise özel okul öğrencilerinin çevresel davranış performanslarının devlet okulu öğrencilerine göre yüksek olduğunu rapor etmiştir. Sönmez ve Yerlikaya (2017) ise özel okul öğrencilerinin çevre tutumlarının devlet ortaokulu öğrencilerine göre yüksek olduğunu ölçmüştür. Ağtaş Bektaş ve Güneri (2019) ise imamhatip ortaokulu ve diğer ortaokullar arasında çevresel tutum açısından anlamlı farklılığın olmadığını ölçmüştür. Aşılıoğlu (2004) devlet okullarında yapılan çevresel gezilerin özel okullara göre daha fazla olduğunu söylemektedir. Bu bilgiden hareketle devlet okulu öğrencilerinin bu araştırmada çevre okuryazarlık düzeyleri açısından ön plana çıkmalarının muhtemel sebebi bu olabilir. Ancak bunun yeni araştırmalarca incelenme ihtiyacı vardır.

Ortaokul öğrencilerinin çevre okuryazarlıkları okulun bulunduğu yerleşim yeri açısından anlamlı bir farklılık göstermektedir (Tablo 11). İl merkezinde yaşayan öğrencilerin çevre okuryazarlık puanları köyde yaşayanlara göre yüksektir. Benzer biçimde Williams (2017) şehir merkezinde yaşayan öğrencilerin çevre okuryazarlık düzeylerini kırsal kesimde yaşayanlara göre yüksek bulmuştur. Yürüdür, Hastürk ve Köklünar, (2017) ise kasabada öğrenim gören öğrencilerin çevre okuryazarlığı puan ortalamalarının şehir merkezindekilerin puan ortalamalarından anlamlı derecede daha yüksek olduğunu tespit etmişlerdir. Tutum alt boyut puanları açısından okulun bulunduğu yerleşim yerine göre istatistiksel olarak anlamlı bir farklılık bulunmamaktadır. Benzer biçimde Öküzcüoğlu'da (2019) çevresel tutum düzeyi ile okulun bulunduğu yerleşim yeri arasında anlamlı bir ilişki ölçmemiştir. Davranış alt boyut puanlarına göre okulun bulunduğu yerleşim yeri açısından istatistiksel olarak anlamlı bir farklılık bulunmamaktadır (Tablo 11). Varlı (2014) ve Uyar ve Temiz'de (2019) çevresel davranış açısından benzer sonuçlar rapor etmişlerdir. Yine Erbasan ve Erkol da (2020) sınıf öğretmenleri ile yaptıkları çalışmada çevre bilgi testi puanlarının yerleşim yerine göre anlamlı bir farklılık göstermediğini bulmuşlardır. Benzer biçimde Şenyuva ve Bodur'da (2016) üniversite öğrencilerinin çevre okuryazarlık

düzeylerinin yerleşim yenine göre değişmediğini rapor etmişlerdir. Bu araştırmada ortaokul öğrencilerinin çevre okuryazarlıklarının il merkezinde yaşayan öğrenciler lehine anlamlı çıkmasının muhtemel ilk sebebi daha nitelikli çevre eğitimi almaları olabilir. İkinci muhtemel sebep ise il merkezinde yaşayanların çevre sorunlarıyla diğerlerine kıyasla daha fazla karşılaşıyor olmaları olabilir. Ancak bunun gerçek sebebinin öncelikli olarak nitel araştırmalarla ortaya konması gerekir.

Çevre okuryazarlığı puanları aile gelir düzeyleri açısından istatistiksel olarak anlamlı bir farklılık göstermemektedir (Tablo 13). Benzer şekilde Karatekin ve Aksoy da (2012) eğitim fakültesi öğrencilerinin çevre okuryazarlıklarının ailelerinin aylık gelirine göre değişmediğini ifade etmiştir. Yine Şahin (2020), Kapan (2020) ve Çimen ve Benzer (2019) ailenin gelir düzeyine göre çevre okuryazarlıklarının anlamlı bir farklılık göstermediğini belirtmişlerdir.

Tutum alt boyutu açısından da gelir durumlarına göre anlamlı bir farklılık belirlenmemiştir (Tablo 13). Benzer biçimde Ağtaş, Bektaş ve Güneri (2019) ve Öküzcüoğlu da (2019) çevresel tutumların ailenin aylık gelirine göre anlamlı bir farklılaşma göstermediğini rapor etmiştir. Yine Demirtaş ve Akbulut ve Özşen (2018) aile gelir düzeyinin öğrencinin çevresel bilgi ve tutum düzeyini etkilemediğini ifade etmiştir. Gelir durumu 6000- 8000TL arasında olanların çevresel davranış puanlarının 2000-4000TL arasında olanlara göre anlamlı biçimde daha yüksek olduğu ölçülmüştür (Tablo 13). Benzer biçimde Erkılıç (2019) çalışmasında, gelir düzeyi arttıkça çevre okuryazarlıklarının arttığını belirtmiştir. Yine Kılıç ve Girgin, (2019) ailenin gelir düzeyi yükseldikçe öğrencinin çevreye yönelik tutum ve davranışın olumlu yönde etkilendiğini ifade etmiştir. Demirtaş ve Çinici ise (2019) zıt biçimde ailenin gelir düzeyi yükseldikçe çevresel tutum puanlarının düştüğünü belirtmiştir. Tarkoçin, Bilmez ve Kurt-Gökçeli ise (2017) gelir düzeyinin çevre okuryazarlık üzerinde anlamlı bir fark oluşturmadığını ölçmüştür. İlgili alan yazın ve bu araştırmanın bulgularını harmanladığımızda özet olarak çevre okuryazarlığının gelir düzeyine göre farklılaşmadığı söylenebilir.

Öğrencilerin çevre okuryazarlık düzeyleri kendilerinin veya aileden birinin çevre ile ilgili bir dergi takip edip/etmeme durumlarına göre anlamlı farklılık göstermektedir (Tablo 15). Bu farklılık dergi takip edenler lehinedir. Ölçeğin geneli ve iki alt boyutu (davranış, tutum) açısından da anlamlı farklılıkların ölçülmesi (Tablo 16) anlamlıdır.

Yine çevre okuryazarlık düzeyleri görsel medyadan (sosyal medya ya da televizyon) bir yayın takip edip/etmeme durumlarına göre anlamlı farklılık göstermektedir (Tablo 17). Bu farklılık yayın takip edenler lehinedir. Ölçeğin geneli ve iki alt boyutu (davranış, tutum) açısından da anlamlı farklılıkların ölçülmesi (Tablo 18) bulguyu kuvvetlendirmektedir. Tablo 15 ve 17'den elde edilen verileri özetleyecek olursak: ister yazılı ister görsel yayından bir yayın takip etmek çevre okuryazarlığına kayda değer olumlu katkı sunmaktadır denilebilir. Benzer biçimde Koç, Çorapçıgil ve Doğru (2018), iletişim araçlarının (kitap, dergi, sosyal medya, internet, belgesel, gazete, vb.) çevre okuryazarlık düzeyini olumlu yönde etkilediklerini belirtmiştir. Öztürk ve Erten (2020) çevre sorunlarını gazeteden okumanın çevresel tutum ve davranış üzerinde anlamlı bir etkisinin olduğunu ifade etmektedir. Ayrıca Balçın ve Çavuş (2020) dijital kaynaklar kullanarak proje hazırlayan öğrencilerin çevre okuryazarlık düzeylerinin yapmayanlara

göre yüksek olduğunu belirtmiştir.

Öğrencilerin çevre okuryazarlık düzeyleri okuldaki çevre eğitimini yeterli bulup/bulmama durumlarına göre anlamlı biçimde değişmemektedir (Tablo 19). Sadece davranış alt boyutunda okuldaki çevre eğitimini yeterli bulanlar lehine anlamlı bir farklılık vardır (Tablo 19). Benzer biçimde Uzun ve Sağlam (2007) çevre ve insan dersi alanların çevresel davranış puanlarını almayanlara göre daha yüksek olarak ölçülmüştür. Karatekin ve Aksoy ise (2012) okulda çevre eğitimi alan öğrencilerin çevre okuryazarlık düzeylerinin yüksek olduğunu belirtmiştir.

Çevre okuryazarlığı öğrencilerin yaşamlarının büyük çoğunluğunu geçirdiği (en az 5 yıl) yerleşim bölgesine göre anlamlı farklılık göstermemektedir (Tablo 21). Bu sonuç ile benzerlik gösteren çalışmalar mevcuttur (Şenyuva ve Bodur, 2016; Arık ve Yılmaz, 2017; Çimen ve Benzer, 2019; Koç, Çorapçıgil ve Doğru, 2018; Şahin, 2020; Zengin ve Kunt, 2013). Farklı biçimde Uzelli, Yılmaz ve Eşer (2021) yaşamının uzun bir bölümünü köyde geçiren öğrencilerin çevresel etik puanlarını daha yüksek olarak ölçülmüştür. Atabek-Yiğit ve Küçükbaş-Duman ise (2019) il merkezinde yaşayanların ilçe ve köyde yaşayanlara göre çevre okuryazarlık düzeylerinin daha yüksek olduğunu ölçmüştür.

Öneriler: Öğrencilerin çevre okuryazarlığının basılı yâda dijital bir yayın takip etmelerinden olumlu etkilenmektedir. Bu bağlamda ister dijital ister basılı olsun çevre üzerine yayınların özendirilmesi faydalı olabilir. Bu amaçla hem örgün hem de yaygın eğitim süreçlerinde bu tür duyurulara ağırlık verilmesi olumlu katkı sağlayacaktır. Okullarda çevre üzerine etkinlikler sınıflarda değil de dış ortamda tecrübe ederek yapılabilir. Son olarak il merkezinde yaşayan öğrencilerin çevre okuryazarlık düzeyleri diğerlerine (ilçe, köy) kıyasla anlamlı biçimde yüksek ölçülmüştür. Bunun gerçek sebebinin belirlenmesine yönelik özellikle nitel yapıda araştırmalar yapılabilir.