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Research Article

Investigation of University Students' Environmental Behaviors and Ecological Intelligence

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Abstract

The aim of this study is to determine the environmental behavior and ecological intelligence levels of university students, to examine whether some demographic variables differentiate these levels, and to evaluate the relationship and effect between variables and measurement tools. While 281 university students were included in the study, "Environmental Behavior Scale (EBS)" and "Ecological Intelligence Scale for Adults (EISIFA)" were used to measure the data. Descriptive statistics, independent sample T test, one-way analysis of variance ANOVA and Post hoc tests, Pearson Correlation test and regression analysis were used to analyze the data. The internal reliability coefficients for this study were 0.89 for EBS and 0.83 for EISIFA. It can be said that the participants exhibited a high level of EISIFA (4.01±0.54) and a moderate level of EBS (3.45±0.62). While it was determined that there were significant differences between the participants' gender, age, perceived income, department, taking lessons about environment, attending a course, seminar or talk on about the environment, efficient use of leisure time, participation in activities using natural resources and EBS and EISIFA, the activities that most done at leisure time variables did not significantly differentiate EBS and EISIFA. On the other hand, it was determined that there was a moderate positive relationship (r=0.472) between EISIFA and EBS. It was determined that EISIFA level was a significant predictor of EBS (F=79,996; p<0.001) and EISIFA predicted 22% of EBS. As a result of the research, it can be said that university students' environmental behavior and ecological intelligence reveal significant relationships and differences with each other and with various variables.

Keywords: University Students, Environment, Environmental Behaviors, Ecological Intelligence.

Introduction

The environment is built on a balance between human life and natural life. One of the biggest providers of this balance is the behavior of people towards their environment (Genç and Genç, 2013). At the basis of the academic studies carried out in the name of ensuring and sustaining this balance is the concept known as environmental literacy, which consists of attitudes, knowledge, behavior and skills components (Yasaroh et al., 2023). Accordingly, ecological intelligence and environmental behaviors, which are also the subject of this study, are among the elements of this balance.

Global warming, water scarcity, air pollution, soil erosion, depletion of natural resources, deforestation and biodiversity loss are some of the current environmental problems that greatly threaten sustainability and make people vulnerable to disasters and tragedies (Lange and Dewitte, 2019; Maleksaeidi and Keshavarz, 2019; Azadi et al., 2019; Raeisi et al., 2018; Thondhlana and Hlatshwayo, 2018; Niankara and Zoungrana, 2018). Most environmental problems are caused by human actions (Shafiei and Maleksaeidi, 2020). Therefore, nations and people should develop their ecological wisdom and engage in personal and social struggle against climate change (Yıldırım, 2012). In order to prevent environmental problems, protect nature and improve environmental problems, it is also necessary to change individuals' perspectives on the environment and value judgments about the environment (Çimen and Yılmaz, 2011).

Researchers and local governments believe that promoting pro-environmental behaviors can help reduce these problems (Dornhoff et al., 2019; Jena and Behera, 2017; Bleys et al., 2017). This idea emerged in the 1960s and 1970s, leading to increased interest in environmental studies among the academic and scientific communities (Shafiei and Maleksaeidi, 2020). For people in different fields such as farmers (Wang et al., 2018; Walder and Kantelhardt, 2018), students (Chen et al., 2017; de Leeuw et al., 2015; Meyer, 2015; Erdogan et al., 2012), workers (Tian and Robertson, 2019; Paille and Mejía-Morelos, 2014), scientists have all tried to bring scientific knowledge to environmental behavior research.

In these studies, different theories such as Theory of Planned Behavior (Ajzen, 1991), Norm Activation Model (Schwartz, 1975), Value-Belief-Norm Environmentalism Theory (Stern et al., 1999) and Conservation Motivation Theory (Rogers, 1975) have been used to explain behaviors. Among these theories, the Conservation Motivation Theory offers a more inclusive set of predictors for human behavior than others and may help

to increase knowledge about the motivations for pro-environmental behavior (Bockarjova and Steg, 2014).

According to Gifford's (2011) theory of the so-called "Dragons of Inaction" involved in passive attitude towards climate change, there are some psychological barriers that hinder awareness and make people submit to the destruction of the planet: limited cognition, presence of ideologies, comparison with other people, sunk costs of industries, inconsistency with pro-environmental programs, perceived risk in change and limited behavior. In contrast, Conservation Motivation Theory can help identify the barriers and drivers to the acceptance of an environmental adaptive behavior (Shafiei and Maleksaeidi, 2020).

Starting from the ethical responsibility that is at the core of human beings, which suggests that they should always care for Mother Nature and live with respect for the dignity, integrity and rights of themselves and others, it is possible to prevent the phenomenon of environmental pollution by recognizing the concept of ecological intelligence as a capacity that can be developed through a change in mindset and the modification of irrational beliefs produced by rational emotional therapy (Fernández-Dávila, 2023). Because ecological intelligence involves taking into account the messages that nature gives us and developing a just and benevolent commitment to protect it (Goleman, 2009). Therefore, it is important to develop Ecological Intelligence in order to protect the environment and take care of people's rights over nature. From here, it is also possible to mention that these two concepts are intertwined with each other.

Students need not only a conceptual understanding of the relationship between plant and animal ecosystems, but also the underlying reasons for how and why this relationship occurs (Grotzer and Bell Basca, 2003). In this direction, in order to support students to become ecologically literate, it can be gained by introducing students to environmentally friendly practices in their own schools, where they spend most of their time (Muliasari et al., 2023). It has been found that children who spend time in school gardens containing natural environments are more physically active, have higher nutritional awareness, are more civilized towards each other and are more creative (Louv, 2012).

According to David Orr (1991), who first introduced the idea of ecological literacy, no student should graduate without a curriculum that includes the following topics (Louv, 2010); laws of thermodynamics, basic principles of ecology, carrying capacity, energy science, least-cost end-use analysis, ways to live well in one place, limits of technology, right scale, sustainable agriculture and forestry, stable economy, environmental ethics. Ecological intelligence is a type of intelligence that can be developed through education (Özden et al., 2021).

Daniel Goleman, who wrote Ecological Intelligence as the third of his books Social Intelligence and Emotional Intelligence, defines ecological intelligence as a heuristic for the capacity to perceive the connections between human activities and their consequences in natural and social systems (Goleman, 2009). According to Daniel Goleman, individuals with high ecological intelligence can be environmentally sensitive producers and consumers by understanding their impact, supporting improvements and sharing what they have learned (Goleman, 2010; Meydan and Kutlu, 2014). Accordingly, ecological intelligence plays a role in consumer actions to address or measure global ecological issues (Özden and Özışık Yapıcı, 2021). Moreover, it can teach how to overcome these dangers and how to jointly produce solutions (Akkuzu, 2016).

Environmental education is a structure that brings together different disciplines and covers all segments of society (Grodzieska-Jurczak et al., 2006). Its aim is to develop people's ecological literacy. Ecological literacy is one of the necessary parts for preventing environmental problems and creating a healthy environment (Yasaroh et al., 2023). In this way, the necessary knowledge and understanding can be gained to become a sustainable society (Chu et al., 2007). Sustainable use of the environment means that today's needs can be met without jeopardizing the lives of future generations. Environmental education leads to a better quality of life through changing attitudes and behaviors. Environmental education, which is especially important for the younger generation, helps university students acquire knowledge, skills, attitudes and values about the environment (Erol and Gezer, 2006). Therefore, environmental education in higher education programs should enable students to understand environmental problems and relate them to economic, legal and political mechanisms (Teksöz et al., 2010).

Ecological intelligence is a subset of ecological literacy. As a matter of fact, while ecological literacy, holistic perspective or being related to sustainability makes this concept more inclusive, ecological intelligence constitutes a main subset of the concept of ecological literacy (Kujumdzieva et al., 2019). Environmental education is the only element that supports ecological literacy and ecological intelligence. In this direction, it is possible to examine ecological intelligence under different perspectives in terms of increasing ecological intelligence. From this point of view, ecological intelligence is examined under three perspectives. First of all, ecological intelligence should have a holistic perspective, because there are visible and invisible networks between biotic and abiotic factors in the world (Okur Berberoğlu, 2020). Every behavior, whether related to consumption or not, directly or indirectly affects the environment. In fact, ecological intelligence is a social and collective process that requires a holistic sensitivity, and the need to transfer this ability across generations requires a holistic approach to ecological intelligence (Özden et al., 2021). From a holistic perspective, it is the species that matters, not the individual. Species are permanent, while individuals change in a cycle (Karaküçük and Akgül, 2016). Another important sub-dimension of ecological intelligence is social intelligence, which refers to people's social responsibilities in terms of sustainability (Okur Berberoğlu, 2020). Social

intelligence is a sub-dimension of responsibility towards nature that explains consumers' social responsibilities for sustainability (Özden et al., 2021). The last but most important part of ecological intelligence is economy (Kujumdzieva et al., 2019). People should be able to think that all their needs such as food, clothing, and shelter are based on natural resources and therefore, this critical thinking should lead to economically responsible behavior (Okur Berberoğlu, 2020). Consumers should be aware of the need to prevent human and environmental exploitation and be conscious of the need to protect natural resources for sustainable development (Özden et al., 2021). In this direction, people should be aware of their impacts on the environment and the need to prevent these impacts and feel them as a need.

Based on the assumption that environmental behavior interacts with ecological intelligence to a certain extent, the research aimed to reveal the basic problems. In this study, which aims to determine the levels of environmental behaviors of university students and to reveal their relationships with various variables, answers to the following questions were sought in this study;

1. At what level are university students' environmental behaviors and ecological intelligence levels in total scores and sub-dimensions?
2. Do university students' environmental behaviors and ecological intelligence differ according to various variables (gender, age, income level, field of study, taking an environmental course before, etc.)?
3. Is there a significant relationship between university students' environmental behaviors and their ecological intelligence and its sub-dimensions?
4. Do university students' environmental behaviors have a significant effect on their ecological intelligence?

Materials and Methods

The information about the material and method (research model, population and sample, data collection, data collection tools and analysis) of this study, which aims to determine the levels of university students' environmental behaviors and to reveal their relationships with various variables, is given in this section.

Research Model

Quantitative research method was used in the study. The descriptive survey model, one of the survey models, was utilized. A descriptive survey offers some quantification, usually a frequency analysis of a research group. The aim is to find the extent to which the existing literature supports a particular proposition or reveals an interpretable pattern (King and He, 2005). This research was found ethically appropriate by Gazi University Ethics Commission in accordance with the decision taken at its meeting dated 10.05.2022 and numbered 09.

Research group

University students studying in different fields at Gazi University in the academic year 2021-2022 participated in this study. While selecting the sample of the study, university students were selected using convenience sampling method, which is one of the non-probability based sampling types. Convenience sampling method is used to select cases that are easy to access and cheap to examine (Benoot et al., 2016).

Data Collection

Two different methods were used to collect the research data. First, the research data were obtained digitally by using secure digital forms. Through the Google Forms application on the internet, 117 participants were reached. Then, the data collection tools (personal information form and scales) were materially reproduced and filled in by hand (paper and pen). In total, 281 valid data forms were obtained, 117 of which were digital and 164 of which were tangible.

Data Collection Tool

In addition to a personal information form consisting of 11 questions developed by the researcher, questionnaires including the Environmental Behavior Scale (EBS) consisting of 20 questions and 6 subscales originally developed by Goldman, Yavetz, and Pe'er (2006) and adapted into Turkish by Timur and Yılmaz in 2013, and the Ecological Intelligence Scale for Adults (EISIFA) consisting of 12 questions and 3 subscales developed by Emel Okur Berberoğlu (2020) were used as data collection tools.

Environmental Behavior Scale (EBS)

The Environmental Behavior Scale (EBS), a 5-point Likert-type scale originally developed by Goldman, Yavetz, and Pe'er (2006) and adapted into Turkish by Timur and Yılmaz in 2013, consists of 20 questions and 6 sub-dimensions (Resource Conservation Activities for One's Economic Benefit, Environmentally Conscious Consumer, Nature Related Leisure Time Activities, Recycling Efforts, Responsible Citizenship, Environmental Activism). The (α) Cronbach's Alpha values calculated for the EBS in the original form were 0.85 for the total EBS, 0.68 for the sub-dimension "Resource Conservation Activities for One's Economic Benefit", 0.66 for the sub-dimension "Environmentally Conscious Consumer", 0.70 for the sub-dimension "Nature Related Leisure Time Activities", 0.63 for the sub-dimension "Recycling Efforts", 0.68 for the sub-dimension "Responsible Citizenship" and 0.57 for the sub-dimension "Environmental Activism". Cronbach's alpha values of the Environmental Behavior Scale (EBS) and its sub-dimensions calculated for the current study are shown in Table 2.

Ecological Intelligence Scale for Adults (EISIFA)

The Ecological Intelligence Scale for Adults (EISIFA), a 5-point Likert-type scale developed by Emel Okur Berberoğlu (2020), consists of 12 questions and 3 sub-dimensions (Holistic Perspective, Social Intelligence, Economy). In the original study, Cronbach's Alpha values for EISIFA (α) were 0.82 for the total EISIFA, 0.64 for the Holistic Perspective sub-dimension, 0.68 for the Social Intelligence sub-dimension and 0.75 for the Economics sub-dimension. The (α) cronbach's alpha

values of the Ecological Intelligence Scale (EISIFA) and its sub-dimensions calculated for the current study are shown in Table 2.

Results

Table 1. Percentage and frequency distributions for study group

		N= 281	
		f	%
Gender	Male	133	47.3
	Female	148	52.7
Age	20 ≤	176	62.6
	21 ≥	105	37.4
Department	Sport	197	70.1
	Social	43	15.3
	Health	41	14.6
Taking lessons about environment	Yes	139	49.5
	No	142	50.5
Attending a course, seminar or talk on about the environment	Yes	156	55.5
	No	125	44.5
Efficient use of leisure time	Yes	181	64.4
	No	100	35.6
Participation in activities using natural resources	Yes	81	28.8
	No	200	71.2

According to Table 1, 148 (52.7%) of the participants of this study, in which 281 university students participated, were male. 176 (62.6%) of the participants were 20 years old or younger and the majority of them were studying at the Faculty of Sports Sciences (70.1%), 142 (50.5%) had not taken a course on the environment before, 156 (55.5%) had attended a course, seminar or talk on the environment before, 181 (64.4%) used their free time efficiently, 200 (71.2%) did not regularly participate in activities where natural resources were used.

Table 2. Arithmetic mean, standard deviation and normality distributions for measurement tools

	N= 281				
	x	Sd	Min.	Max.	α
EISIFA	4.01	0.54	1.42	5.00	0.89
Holistic Perspective	4.14	1.16	1.00	5.00	0.75
Social Intelligence	3.78	1.06	1.00	5.00	0.79
Economy	4.03	1.13	1.67	5.00	0.77
EBS	3.45	0.62	1.35	4.80	0.83
Responsible Citizenship	3.03	0.81	1.00	5.00	0.72
Resource Conservation Activities for the Economic Benefit of the Person	3.59	0.62	1.67	5.00	0.48
Environmentally Conscious Consumer	3.94	0.86	1.00	5.00	0.67
Nature-Related Leisure Activities	3.38	0.79	1.25	5.00	0.63
Recycling Efforts	3.55	0.92	1.00	5.00	0.63
Environmental Activism	2.69	1.14	1.00	5.00	0.71

While it can be said that the participants exhibited a high level of EISIFA (4.01±0.54), the highest mean holistic perspective (4.14±1.16) sub-dimension for EISIFA and the lowest mean social intelligence (3.78±1.06) sub-dimension were found. While it can be said that the participants exhibited an average level of EBS (3.45±0.62), the highest average environmental sensitive consumer (3.94±0.86) sub-dimension for EBS and the lowest average environmental activism (2.69±1.14) sub-dimension were found for EBS. In this study, the internal reliability coefficient for EISIFA was found to be 0.89 and for EBS was 0.83. Additionally, participants' arithmetic mean and standard deviation values for EISIFA and EBS are given. .

Table 3. Independent sample t-test results between measurement tools and gender variables

	N= 281					
	Gender	n	x	Sd	t	p
EISIFA	Male	133	3.80	0.64	-3.691	0.000*
	Female	148	4.12	0.40		
Holistic Perspective	Male	133	3.90	0.85	-5.092	0.000*
	Female	148	4.36	0.66		
Social Intelligence	Male	133	3.71	0.76	-1.974	0.049*
	Female	148	3.85	0.47		
Economy	Male	133	4.05	0.74	-0.565	0.572
	Female	148	4.05	0.48		
EBS	Male	133	3.36	0.67	-2.687	0.008*
	Female	148	3.55	0.55		
Responsible Citizenship	Male	133	2.96	0.83	-1.204	0.230
	Female	148	3.09	0.79		
Res. Cons. Act. for the Economic Ben. of the Person	Male	133	3.46	0.68	-3.443	0.001*
	Female	148	3.71	0.53		
Environmentally Cons. Consumer	Male	133	3.60	0.98	-5.317	0.000*
	Female	148	4.19	0.66		
Nature-Related Leisure Activities	Male	133	3.36	0.86	-1.484	0.139
	Female	148	3.45	0.71		
Recycling Efforts	Male	133	3.50	0.96	-0.796	0.427
	Female	148	3.56	0.87		
Environmental Activism	Male	133	2.77	1.20	0.856	0.392
	Female	148	2.62	1.08		

*p<0.05

According to the independent sample t-test findings between gender and EISIFA and EBS and their sub-dimensions in Table 3, a significant relationship was found between gender and EISIFA (t=-3.691; p<0.05) and holistic perspective (t=-5.092; p<0.05) and social intelligence sub-dimensions (t=-1.974; p<0.05). Accordingly, it was determined that female participants (4.36±0.66) showed higher holistic perspective averages than male participants (3.90±0.85). It was also determined that female participants (3.85±0.47) showed higher mean social intelligence than male participants (3.71±0.76). For EISIFA (t=-2.687; p<0.05), a significant relationship was found between the participants' gender and the sub-dimensions of resource conservation activities for the economic benefit of the person (t=-3.443; p<0.05) and environmentally conscious consumer (t=-5.317; p<0.05). Although there was no statistically significant difference in the economy sub-dimension for EISIFA, it was found that women reached a higher level of economy than men. For EBS, although there was no statistically significant difference, it was found that women were higher than men in the sub-dimensions of responsible citizen, nature-related leisure time activities and return efforts. For EBS, although there was no statistically significant difference in the sub-dimension of environmental activism, it was determined that men were higher than women.

Table 4 shows the independent sample t-test findings between age grouping and EISIFA and EBS and their sub-dimensions. According to the findings, a significant relationship was found between age and the economy sub-

dimension of EISIFA (t=2.082; p<0.05). Accordingly, it was determined that 20≤ participants (4.09±0.58) showed higher economy averages than 21≥ participants (3.93±0.66). For EBS, a significant relationship was found between EBS (t=-2.531; p<0.05) and responsible citizenship sub-dimension (t=-2.897; p<0.05), nature related leisure activities sub-dimension (t=-3.678; p<0.05), environmental activism sub-dimension (t=-2.345; p<0.05) and age. According to EBS, it was determined that 21≥ participants (3.57±0.65) showed higher averages than 20≤ participants (3.38±0.59). Likewise, for the responsible citizenship sub-dimension, it was determined that 21≥ participants (3.21±0.82) showed higher averages than 20≤ participants (2.92±0.79). For the sub-dimension of nature related leisure activities, it was determined that 21≥ participants (3.60±0.84) showed higher averages than 20≤ participants (3.25±0.73). For the environmental activism sub-dimension, it was determined that 21≥ participants (2.89±1.10) showed higher averages than 20≤ participants (2.56±1.14).

Table 4. Independent sample t-test results between measurement tools and age variables

	N = 281					
	Age	n	x	Sd	t	p
EISIFA	20≤	176	4.03	0,48	0.835	0.404
	21≥	105	3.97	0,63		
Holistic Perspective	20≤	176	4.17	0,72	0.857	0.392
	21≥	105	4.09	0,88		
Social Intelligence	20≤	176	3.77	0,57	-0.487	0.627
	21≥	105	3.81	0,72		
Economy	20≤	176	4.09	0,58	2.082	0.038*
	21≥	105	3.93	0,66		
EBS	20≤	176	3.38	0,59	-2.531	0.012*
	21≥	105	3.57	0,65		
Responsible Citizenship	20≤	176	2.92	0,79	-2.897	0.004*
	21≥	105	3.21	0,82		
Resource Cons. Act. for the Eco. Ben. of the Per.	20≤	176	3.60	0,60	0.264	0.792
	21≥	105	3.58	0,66		
Environmentally Conscious Consumer	20≤	176	3.95	0,85	0.351	0.726
	21≥	105	3.92	0,90		
Nature-Related Leisure Activities	20≤	176	3.25	0,73	-3.678	0.000*
	21≥	105	3.60	0,84		
Recycling Efforts	20≤	176	3.49	0,89	-1.445	0.150
	21≥	105	3.66	0,95		
Environmental Activism	20≤	176	2.56	1,14	-2.345	0.020*
	21≥	105	2.89	1,10		

*p<0.05

Table 5 shows the results of the ANOVA test between the participants' field of education and EISIFA and EBS and their sub-dimensions. When the table is examined, it is seen that there is a significant difference (p<0.05) between EISIFA and its sub-dimension holistic perspective and EBS sub-dimensions responsible citizenship, resource conservation activities for the economic benefit of the person, environmentally conscious consumer, environmental activism and the field of education. The field of study with the highest score for EISIFA was social sciences (4.14±0.20), and the field of study with the highest score for the holistic perspective sub-dimension was social sciences (4.47±0.60) and health sciences (4.47±0.51). Among the sub-dimensions of EBS, the highest score for the responsible citizenship sub-dimension was obtained in sports sciences (3.15±0.81). The highest score for the sub-dimension of resource conservation activities for the economic benefit of the person was obtained in social sciences (3.76±0.57).

Table 5. One way ANOVA test results between EISIFA and EBS for education department variables

N= 281							
	Department	**n**	**x**	**Sd**	**F**	**p**	**LSD**
EISIFA	Sport	197	3.95	0.63	3.27	0.039*	a>b
	Social[a]	43	4.14	0.20			
	Health[b]	41	4.12	0.19			
Holistic Perspective	Sport[a]	197	4.00	0.83	11.26	0.000*	b>a, c>a
	Social[b]	43	4.47	0.60			
	Health[c]	41	4.47	0.51			
Social Intel.	Sport	197	3.78	0.75	0.00	1.000	
	Social	43	3.78	0.00			
	Health	41	3.78	0.00			
Economy	Sport	197	4.03	0.74	0.00	1.000	
	Social	43	4,03	0.00			
	Health	41	4.03	0.00			
EBS	Sport	197	3.47	0.65	0.50	0.603	
	Social	43	3.47	0.52			
	Health	41	3.36	0.54			
Resp. Citiz.	Sport[a]	197	3.15	0.81	8.86	0.000*	a>b
	Social	43	2.84	0.75			
	Health[b]	41	2.62	0.73			
Res. Cons. Act. Eco. Ben. Person	Sport[a]	197	3.53	0.66	3.16	0.044*	a>b
	Social[b]	43	3.76	0.57			
	Health	41	3.69	0.40			
Env. Conscious Consumer	Sport[a]	197	3.78	0.92	13.63	0.000*	b>a, c>a
	Social[b]	43	4.44	0.49			
	Health[c]	41	4.21	0.59			
Nature-Related Leisure Activities	Sport	197	3.39	0.83	0.24	0.786	
	Social	43	3.40	0.67			
	Health	41	3.30	0.70			
Recycling Efforts	Sport	197	3.60	0.89	0.86	0.421	
	Social	43	3.47	1.01			
	Health	41	3.42	0.95			
Env. Activism	Sport[a]	197	2.87	1.15	9.62	0.000*	a>b, a>c
	Social[b]	43	2.36	0.86			
	Health[c]	41	2.14	1.09			

*p<0.05

The field of education with the highest score for the environmental activism sub-dimension is sports sciences (2.87±1.15). According to the post hoc test analysis, in-group differences were found in EISIFA and in the holistic perspective sub-dimension, which is a sub-dimension of EISIFA, in the responsible citizenship sub-dimension, in the resource conservation activities for the economic benefit of the person sub-dimension, in the environmentally conscious consumer sub-dimension and

in the environmental activism sub-dimension, which are sub-dimensions of EBS, according to the field of study variable. These within-group differences are in favor of sport sciences for EISIFA, within-group differences for the holistic perspective sub-dimension, which is a sub-dimension of EISIFA, in favor of social sciences in the group between sport sciences and social sciences, in favor of health sciences in the group between health sciences and sport sciences, in favor of sport sciences for the responsible citizenship sub-dimension of EBS, and in favor of sport sciences for the resource conservation activities for the economic benefit of the person sub-dimension, For the sub-dimension of environmentally conscious consumer, in-group differences between sport sciences and social sciences were in favor of social sciences and for the group between health sciences and sport sciences were in favor of health sciences; for the sub-dimension of environmental activism, in-group differences between sport sciences and social sciences were in favor of sport sciences and for the group between health sciences and sport sciences were in favor of sport sciences.

Table 6. The t-test results comparing taking lessons about environment regarding EISIFA and EBS and sub-dimension

N= 281						
	Lesson	**n**	**x**	**Sd**	**t**	**p**
EISIFA	Yes	139	4.04	0.54	1.182	0.238
	No	142	3.97	0.54		
Holistic Perspective	Yes	139	4.11	0.79	-0.650	0.517
	No	142	4.17	0.78		
Social Intelligence	Yes	139	3.90	0.64	3.194	0.002*
	No	142	3.67	0.59		
Economy	Yes	139	4.06	0.62	0.769	0.442
	No	142	4.00	0.61		
EBS	Yes	139	3.58	0.60	3.418	0.001*
	No	142	3.33	0.61		
Responsible Citizenship	Yes	139	3.25	0.76	4.624	0.000*
	No	142	2.81	0.81		
Res. Cons. Act. Eco. Ben. Person	Yes	139	3.53	0.61	-1.575	0.116
	No	142	3.65	0.63		
Environmentally Conscious Consumer	Yes	139	3.94	0.78	0.057	0.955
	No	142	3.94	0.94		
Nature-Related Leisure Activities	Yes	139	3.52	0.83	2.900	0.004*
	No	142	3.25	0.73		
Recycling Efforts	Yes	139	3.68	0.86	2.324	0.021*
	No	142	3.43	0.96		
Environmental Activism	Yes	139	3.00	1.13	4.785	0.000*
	No	142	2.38	1.05		

*p<0.05

Table 6 shows the results of the independent sample t-test between taking an environmental course and EISIFA and EBS and their sub-dimensions. According to the table, there is a significant relationship between the social intelligence sub-dimension of EISIFA (t=3.194; p<0.05) and taking a course on the environment. Accordingly, the mean of the social intelligence sub-dimension (3.90±0.64) of the participants who stated that they had taken a course on the environment was higher. Again, according to the table, there is a significant relationship between EBS and its sub-dimensions of responsible citizenship sub-dimension, nature related leisure activities sub-dimension, recycling efforts sub-dimension and environmental activism sub-dimensions and taking a course on the environment. Accordingly, it was found that the mean scores of the participants who stated that they had taken a course on the environment were higher in EBS (3.58±0.60), responsible citizenship sub-dimension (3.25±0.76), nature related leisure activities sub-dimension (3.52±0.83), recycling efforts sub-dimension (3.68±0.86) and environmental activism sub-dimension (3.00±1.13).

Table 7. The t-test results comparing attending a course, seminar or talk on about the environment regarding EISIFA and EBS and sub-dimension

N= 281						
	Attending	**n**	**x**	**Sd**	**t**	**p**
EISIFA	Yes	156	4.03	0.57	0.941	0.348
	No	125	3,97	0.50		
Holistic Perspective	Yes	156	4.14	0.81	-0.017	0.986
	No	125	4.14	0.75		
Social Intelligence	Yes	156	3.85	0.66	2.091	0.037
	No	125	3.70	0.57		
Economy	Yes	156	4.05	0.61	0.716	0.475
	No	125	4.03	0.62		
EBS	Yes	156	3.56	0.59	3.127	0.002*
	No	125	3.33	0.63		
Responsible Citizenship	Yes	156	3.18	0.76	3.671	0.000*
	No	125	2.83	0.83		
Res. Cons. Act. Eco. Ben. Person	Yes	156	3.56	0.57	-0.897	0.371
	No	125	3.63	0.68		
Environmentally Conscious Consumer	Yes	156	4.00	0.77	1.249	0.213
	No	125	3.87	0.97		
Nature-Related Leisure Activities	Yes	156	3.49	0.81	2.599	0.010*
	No	125	3.24	0.74		
Recycling Efforts	Yes	156	3.64	0.83	1.832	0.068
	No	125	3.44	1.09		
Environmental Activism	Yes	156	2.93	1.10	4.204	0.000*
	No	125	2.38	1.10		

*p<0.05

Table 7 presents the results of the independent sample t-test between EISIFA and EBS and their sub-dimensions and the status of attending a course, seminar or speech on the environment. According to the table, there is no significant relationship between EISIFA and participation in an environmental course, seminar or speech. On the other hand, a significant relationship was found between the participation in an environmental course, seminar or speech and EBS (t=3.127; p<0.05) and its sub-dimensions of responsible citizenship (t=3.671; p<0.05), nature

related leisure activities (t=2.599; p<0.05) and environmental activism (t=4.204; p<0.05). Accordingly, it was determined that the participants who attended a course, seminar or speech on the environment had higher mean scores in the EBS (3.56±0.59), responsible citizenship sub-dimension (3.18±0.76), nature related leisure activities sub-dimension (3.49±0.81) and environmental activism sub-dimension (2.93±1.10).

Table 8. The t-test results comparing efficient use of leisure time regarding EISIFA and EBS and sub-dimension

N= 281						
	Efficient use	**n**	**x**	**Sd**	**t**	**p**
EISIFA	Yes	181	4.05	0.53	1.984	0.048*
	No	100	3.92	0.55		
Holistic Perspective	Yes	181	4.21	0.78	2.049	0.041*
	No	100	4.01	0.78		
Social Intelligence	Yes	181	3.84	0.63	1.983	0.048*
	No	100	3.68	0.61		
Economy	Yes	181	4.05	0.62	0.865	0.388
	No	100	3.98	0.61		
EBS	Yes	181	3.53	0.61	2.790	0.006*
	No	100	3.32	0.60		
Responsible Citizenship	Yes	181	3.14	0.77	3.173	0.002*
	No	100	2.82	0.85		
Res. Cons. Act. Eco. Ben. Person	Yes	181	3.59	0.62	0.159	0.873
	No	100	3.58	0.63		
Environmentally Conscious Con.	Yes	181	3.97	0.89	0.729	0.466
	No	100	3.89	0.81		
Nature-Related Leisure Activities	Yes	181	3.45	0.81	1.958	0.051
	No	100	3.26	0.74		
Recycling Efforts	Yes	181	3.66	0.89	2.650	0.009*
	No	100	3.36	0.95		
Environmental Activism	Yes	181	2.85	1.13	3.226	0.001*
	No	100	2.40	1.10		

*p<0.05

Table 8 shows the results of the independent sample t-test between productive use of leisure time and EISIFA and EBS and their sub-dimensions. A significant relationship was found between productive use of leisure time and EISIFA (t=1.984; p<0.05) and its sub-dimensions of holistic perspective (t=2.049; p<0.05) and social intelligence (t=1.983; p<0.05). Accordingly, the participants who stated that they use their leisure time efficiently had higher mean scores in EISIFA (4.05±0.53) and its sub-dimensions of holistic perspective (4.21±0.78) and social intelligence (3.84±0.63). On the other hand, a significant relationship was found between efficient use of leisure time and EBS (t=2.790; p<0.05) and its sub-dimensions of responsible citizenship (t=3.173; p<0.05), recycling efforts (t=2.650; p<0.05) and environmental activsm (t=3.226; p<0.05). Accordingly, the participants who stated that they used their leisure time efficiently had higher mean scores in EBS (3.53±0.60) and its sub-dimensions of responsible citizenship (3.14±0.77), recycling efforts (3.66±0.89) and environmental activism (2.85±1.13).

Table 9. The t-test results comparing participation in activities using natural resources regarding EISIFA and EBS and sub-dimension

N= 281						
	Participation in activities	n	x	Sd	t	p
EISIFA	Yes	81	4.12	0.54	2.348	0.020*
	No	200	3.96	0.54		
Holistic Perspective	Yes	81	4.21	0.76	1.002	0.317
	No	200	4.11	0.79		
Social Intelligence	Yes	81	4.00	0.68	3.679	0.000*
	No	200	3.70	0.59		
Economy	Yes	81	4.13	0.65	1.708	0.089
	No	200	3.99	0.60		
EBS	Yes	81	3.66	0.65	3.641	0.000*
	No	200	3.37	0.59		
Responsible Citizenship	Yes	81	3.33	0.76	4.139	0.000*
	No	200	2.90	0.80		
Res. Cons. Act. Eco. Ben. Person	Yes	81	3.61	0.62	0.386	0.700
	No	200	3.58	0.62		
Environmentally Conscious Consumer	Yes	81	3.99	0.88	0.633	0.527
	No	200	3.92	0.86		
Nature-Related Leisure Activities	Yes	81	3.61	0.89	3.184	0.002*
	No	200	3.28	0.73		
Recycling Efforts	Yes	81	3.79	0.77	2.719	0.007*
	No	200	3.46	0.96		
Environmental Activism	Yes	81	3.33	1.08	6.506	0.000*
	No	200	2.42	1.05		

*p<0.05

Table 9 presents the results of the independent sample t-test between participation in leisure time activities using natural resources and EISIFA, EBS and their sub-dimensions. A significant relationship was found between EISIFA (t=2.348; p<0.05) and its sub-dimension social intelligence (t=3.679; p<0.05) and participation in leisure time activities using natural resources. Accordingly, the average scores obtained from EISIFA (4.12±0.54) and social intelligence (4.00±0.68) sub-dimension of the participants who stated that they participated in activities where natural resources were used were higher. On the other hand, a significant relationship was found between EBS (t=3.641;p<0.05) and its sub-dimensions of responsible citizenship (t=4.139; p<0.05), nature related leisure activities (t=3.184; p<0.05), recycling efforts (t=2.719; p<0.05) and environmental activism (t=6.506; p<0.05) and participation in leisure activities using natural resources. Accordingly, the mean scores obtained from EBS (3.66±0.65) and its sub-dimensions of responsible citizenship (3.33±0.76), nature related leisure activities (3.67±0.89), recycling efforts (3.79±0.77) and environmental activism (3.33±1.08) were higher for the participants who stated that they participated in leisure time activities using natural resources.

Table 10. Results of correlation analysis between EISIFA and EBS and sub-dimension

EISIFA	1										
Holistic Perspective	0.792**	1									
Social Intelligence	0.810**	0.456**	1								
Economy	0.711**	0.366**	0.475**	1							
EBS	0.472**	0.460**	0.408**	0.223**	1						
Responsible Citizenship	0.323**	0.275**	0.354**	0.137*	0.846**	1					
Res. Cons. Act. Eco. Ben.	0.252**	0.216**	0.218**	0.152*	0.444**	0.330**	1				
Environmentally Conscious Con.	0.491**	0.500**	0.333**	0.268**	0.744**	0.454**	0.414**	1			
Nature-Related Leisure	0.353**	0.366**	0.303**	0.097	0.795**	0.613**	0.334**	0.478**	1		
Recycling Efforts	0.392**	0.406**	0.310**	0.257**	0.783**	0.591**	0.358**	0.558**	0.490**	1	
Environmental Activism	0.163**	0.141*	0.235**	0.034	0.697**	0.719**	0.240**	0.276**	0.546**	0.468**	1

** Weak (0.20–0.39), moderate (0.40–0.69), or strong (0.70–0.89) relationship based on Alpar (2014) qualification regarding correlation coefficient (Table A1)

According to Table 10, as a result of Pearson correlation analysis, it was found that there was a moderate positive relationship (r=0.472) between EISIFA and EBS. When the relationship between EISIFA and its sub-dimensions is analyzed, it is found that there are strong positive relationships between EISIFA and holistic perspective sub-dimension (r=0.792), strong positive relationships between social intelligence sub-dimension (r=0.810), and strong positive relationships between economy sub-dimension (r=0.711). A moderate (r=0.491) positive relationship was found between EISIFA and the environmentally conscious consumer sub-dimension of EBS. Low positive relationships were found between EISIFA and other sub-dimensions of EBS. When the relationship between EIS and the sub-dimensions of EBS is examined, it is found that there is a strong positive relationship between EBS and responsible citizenship sub-dimension (r=0.846), a moderate positive relationship between resource conservation activities for economic benefit of the person sub-dimension (r=0.444), a strong positive relationship between environmentally conscious consumer sub-dimension (r=0. 744), strong positive relationship between nature related leisure activities sub-dimension (r=0.795), strong positive relationship between recycling efforts sub-dimension (r=0.783), and moderate positive relationship between environmental activism sub-dimension (r=0.697). In addition, a strong positive relationship (r=0.719) was found between the responsible citizenship sub-dimension and environmental activism sub-dimensions.

Table 11. Simple Lineer Regression analysis results between EISIFA and EBS

	R	R^2	F	p	B	t	p
EISIFA	0.472	0.223	79.996	0.000*	0.538	8.944	0.000*

Dependent value: Environment Behavior Scale (EBS)

In Table 11, simple linear regression analysis was conducted to predict EBS according to EISIFA. EISIFA level is a significant predictor of EBS (F=79.996; p<0.001). EISIFA level predicts approximately 22 percent of the variance of EBS. When students' EISIFA level increases by one unit, their EBS level will increase by 0.538 units. The equation predicting EBS is: EBS= 1.298+0.538*EISIFA.

Table 12. Lineer Regression analysis results between EISIFA and sub-dimension of EBS

	B	Std. Error	β	t	p
Responsible Citizenship	0.073	0.057	0.110	1.281	0.201
Res. Cons. Act. Eco. Ben. Person	0.017	0.050	0.020	0.344	0.731
Environmentally Conscious Con.	0.209	0.042	0.333	4.948	0.000*
Nature-Related Leisure Activities	0.093	0.048	0.135	1.931	0.055
Recycling Efforts	0.082	0.042	0.139	1.974	0.049
Environmental Activism	-0.072	0.037	-0.151	-1.985	0.048

$R=0.530$, $R^2=0.281$, $p<0.001$, $F=79.996$

Dependent Variable: An Ecological Intelligence Scale Intended for Adults (EISIFA)

According to Table 12, according to the findings of the regression analysis examining the effects of EISIFA on EBS sub-dimensions of responsible citizenship, resource conservation activities for the economic benefit of the person, environmentally conscious consumer, nature related leisure activities, recycling efforts, environmental activism, a statistically significant relationship (β=0.333; t=4.948; p<0.001) was found between EISIFA and environmentally conscious consumer sub-dimension.

Discussion and Conclusion

As a result of the research examining the environmental behavior and ecological literacy of university students, it can be said that the environmental behavior level of university students is at a medium level. The ecological intelligence levels of university students were found to be at high levels. It was determined that EBS and EISIFA measurement tools showed significant relationships and differences with each other and with various variables. According to the findings of the study, it was observed

that EISIFA levels were high and EBS levels were average. It was concluded that the highest EISIFA score was holistic perspective sub-dimension and the highest EBS score was environmentally conscious consumer sub-dimension. In addition, a significant relationship was found between EISIFA and the environmentally conscious consumer sub-dimension, which is a sub-dimension of EBS. Accordingly, the first sub-problem of the research has been answered.

In other studies in the literature, Kyttä et al. (2018) stated that children who have the freedom to actively use urban space will have more positive environmental behaviors. Aydın and Kaya (2011) conducted a study on 394 students in a secondary school in Karabük and found that students' environmental behavior levels were medium-low. In the study conducted by Semenderoğlu and Arslan (2022), it was determined that the environmental behavior levels of 144 geography department students were at a medium level with an average of 3.44±0.75. Ürey and Şahin (2010) found that the environmental behavior scores of academic staff were high. Therefore, it is possible to say that the current research findings are supported by the literature.

According to the second sub-problem sought to be answered in the study: It was determined that EISIFA and EBS levels were in favor of females in gender variable. Accordingly, it was found that female students showed a higher average than male students in EISIFA and its sub-dimensions holistic perspective and social intelligence sub-dimensions, which showed a statistically significant relationship. Çabuk and Karacaoğlu (2003) determined that female students exhibited more sensitive behavior towards the environment than male students. Özdemir, Yıldız, Ocaktan, and Sarışen (2004) found that female students had higher mean environmental sensitivity scores than male students. Deniş and Genç (2007) found that female university students had higher attitudes towards the environment than male university students. Kahyaoğl et al., (2008) found that female pre-service teachers had higher attitude scores towards the environment than male pre-service teachers. Çimen and Yılmaz (2011) found that female students were more sensitive to environmental problems, were more interested in environmental news, and had more environmental responsibilities. Kahyaoğlu (2013) found that male students have higher consumer/economic behaviors towards protecting the environment. In the study conducted by Özgün and Özgün (2019), it was found that there was no significant difference between pre-service teachers' being related to nature and the gender variable. It is possible to come across studies in the literature where it is stated that environmental behavior levels do not create a statistically significant difference according to gender (Ürey and Şahin, 2010; Aydın and Kaya, 2011; Koç and Karatekin, 2013; Gıcır et al., 2020; Sarısülük, 2018; Erbasan, 2018; Semenderoğlu and Arslan, 2022). From this point of view, in parallel with the current finding, it is seen that studies stating that gender changes environmental behavior and on the other hand does not differentiate it have taken place in the literature.

As a result of the research, it was observed that there was a statistically significant difference between the environmental behaviors and ecological intelligence levels of university students and the field of study. When the fields of study of the students were examined, it was determined that the field of study with the highest score for EISIFA, resource conservation activities for the economic benefit of the pearson sub-dimension and environmentally conscious consumer sub-dimension was social sciences (4.14±0.20). In another study conducted by Çimen and Yılmaz (2011), it was determined that the education department with the highest ecological intelligence levels was biology. Putra et al. (2019) concluded that biology students have high levels of ecological intelligence. These results constitute the answers to the third sub-problem sought in the study.
In the study, statistically significant relationships were found between the economy sub-dimension for EISIFA and EBS, responsible citizenship resource conservation activities for the economic benefit of the person, nature related leisure activities, environmental activism sub-dimensions for EBS and age variable. Accordingly, it was concluded that the younger the age of the participants, the more economic behaviors they exhibited, but on the contrary, the older they were, the more positive their behaviors towards the environment were. In the study conducted by Çabuk and Karacaoğlu (2003), it was concluded that as the age of the students increases, they are more sensitive to the environment and thus show more positive environmental behavior. Ürey and Şahin (2010) found that there was no statistically significant difference in the environmental behavior scores of academic staff according to age variable. Semenderoğlu and Arslan (2022) concluded that the environmental behaviors of students aged 25 and over were higher. In the study conducted by Gıcır, Oruç and Özatlı (2020), it was concluded that although Generation Z took environmental education courses in primary education, their environmental behavior scores were low and this situation may be due to the insufficiency of applied trainings.

It is possible to talk about the necessity of raising students in an environmentally sensitive manner within social activities such as environmental culture as well as courses such as science and technology and biology in order to cover ecology issues in various education and training plans. The most important task in raising "ecological literacy" belongs to schools. It is mentioned that education and training programs should be created in such a way that students gain sensitivity to ecological problems globally, starting from their immediate environment (Baş, 2011). Bahruddin, Rohmat, and Setiawan (2017) found that school policies have a high impact on raising environmentally sensitive individuals with high levels of ecological intelligence. Another study by Pratiwi et al. (2020) aimed to examine the relationship between the establishment of the Green Campus program at Kuningan University (Indonesia) and the ecological intelligence levels of university students. According to the results of the study, it was determined that the ecological intelligence levels of the university students participating in the study were at an average level, similar to the current study. Among the reasons for this situation, it can be

interpreted as the lack of a learning process that is not yet fully equipped to develop students' ecological intelligence. Sarısülük (2018) concluded that there is a significant difference in the environmental behaviors of students studying in different school types. The school environment, teachers' behaviors and other students' behaviors were effective in the emergence of this difference. In addition, the fact that the course hours for environmental issues are different in vocational and Anatolian high schools and that there is no geography course after the 10th grade in vocational high schools suggest that this result is effective on this result.

Of the university students participating in the study, 139 (49.5%) stated that they had not taken a course on the environment before. 124 (62.9%) of 197 (70.1%) students in the field of sports sciences, 7 (16.3%) of 43 (15.3%) students in the field of social sciences, and 8 (19.5%) of 41 (14.6%) students in the field of health sciences stated that they had taken a course on the environment. According to the results of the study, the students who stated that they had taken a course related to the environment before scored higher on EBS (3.58±0.60) and EBS sub-dimensions responsible citizenship (3.25±0.76), nature related leisure activities (3.52±0.83), recycling efforts (3.68±0. 86), environmental activism (3.00±1.13) and EISIFA's sub-dimension of social intelligence (3.90±0.64) were higher than the students who stated that they had not taken an environmental course before. According to the study conducted by Köse et al., (2011), it was concluded that individuals who receive adequate education on the environment are expected to produce creative ideas and reduce environmental problems by being sensitive to the environment. Therefore, similar to the current study, students who take environmental courses are expected to have positive environmental behaviors. Özgün (2018) found that university students' taking environmental courses at university was a positive variable on their ecology knowledge. Contrary to the findings of the current study, Özgün and Özgün (2019) concluded that the variable of taking environmental courses at university did not make a significant difference in terms of environmental behaviors.

A significant relationship was found between taking environmental courses, efficient use of leisure time and participation in leisure time activities where natural resources are used and recycling efforts sub-dimension. In another study, no statistically significant difference was found between taking an environmental course and not taking an environmental course (Gürbüzoğlu et al., 2011). According to the results of the study conducted by Erten (2005), it was stated that the information learned in environmental courses should definitely be given to all students because it will affirm environmental behavior. Koç and Karatekin (2013) concluded that taking environmental courses did not have a positive effect on the environmental behaviors of prospective geography teachers.

According to the results of the study, it was determined that there was a moderate positive relationship (r=0.472) between EISIFA and EBS. EISIFA level is a significant predictor of EBS (F=79.996; p<0.001). EISIFA level predicts 22 percent of the variance of EBS. There were strong positive correlations between EISIFA and holistic perspective sub-dimension (r=0.792), strong positive correlations between social intelligence sub-dimension (r=0.810), and strong positive correlations between economy sub-dimension (r=0.711). There were moderate positive correlations between EISIFA and environmentally conscious consumer sub-dimension of EBS (r=0.491) and low positive correlations in other sub-dimensions of EBS. When the relationship with the sub-dimensions of EBS is examined, it is found that there are strong positive correlations between EBS and responsible citizenship sub-dimension (r=0.846), moderate positive correlations between resource conservation activities for economic benefit of the person sub-dimension (r=0.444), strong positive correlations between environmentally conscious consumer sub-dimension (r=0. 744), strong positive relationship between nature related leisure activities sub-dimension (r=0.795), strong positive relationship between recycling efforts sub-dimension (r=0.783), and moderate positive relationship between environmental activism sub-dimension (r=0.697). In addition, a strong positive relationship (r=0.719) was found between the responsible citizenship sub-dimension and environmental activism sub-dimensions.

As a result of the research, it can be said that university students' environmental behavior is at a medium level and their ecological intelligence is at a high level. It was determined that variables such as gender, age, marital status, income level, field of education, and taking an environmental course before significantly differentiated environmental behavior and ecological intelligence, and that there was a statistically significant relationship between environmental behavior and ecological intelligence and that environmental behavior significantly predicted ecological intelligence. Future research can be examined in terms of investigating environmental behavior and ecological intelligence on different sample groups, different geographies and cultures. At the same time, environmental behavior and ecological intelligence research can be spread to a wide base by expanding the sample group, various programs can be prepared by evaluating the findings obtained in line with the understanding of environmental protection and sustainability, plans and activity applications can be organized to increase the environmental behavior and ecological intelligence levels of different age groups.

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