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# Investigation of Turkish and Turkmenistanian Students' Approaches towards Environmental Ethics and Their Levels of Naturalistic Intelligence

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## Abstract

The purpose of this study is to compare the attitudes of Turkmenistanian and Turkish university students towards environmental ethics approaches and their naturalistic intelligence (NI) field. In addition, it was investigated whether there is a gender difference in environmental ethics levels in both countries students'. Environmental Ethics Attitude Scale (EEAS) and Multiple Intelligence Areas Inventory were applied to the students. A total of 172 Turkish and 103 Turkmenistanian university students participated. A significant difference between the mean scores of Turkish and Turkmenistanian was observed in all four categories of environmental ethics [Anthropocentric, Ecocentric, Ecofeminism, Teocentric]. The analyses conducted to test gender differences showed that there was not a significant difference between male and female Turkmenistanian students' EAA mean scores. Comparison of NI levels of students from both countries suggested that Turkish students' NI levels were "developed" and Turkmenistanian students' NI levels were "moderately developed". The research findings were considered for both countries students'.

## Introduction

Human beings have long been competing with the nature in their struggle to continue their existence. They are in constant interaction with both living creatures and the abiotic environment. These points validate asking the following question: Do we have a healthy relationship with the environment? If we consider the recent past, the answer is: No. Many resources have been depleted; pollution increased, and -as a result- global warming started causing the emergence of many environmental problems. In fact, the human race is currently busy trying to find solutions to the resulting problems. This is because those problems made human beings realize that they need to protect the environment, strengthened their sense of responsibility towards the nature, and contributed to the development of environmental ethics.

Environmental ethics is a tool that deals with the moral aspects of the relationship between human beings and the environment, and presents the methods necessary to protect it (Des Jardins, 2006). The fact that environmental problems globally affect the whole world highlights the importance of raising individuals who have high awareness and knowledge of their environment and the need to approach those problems in line with ethical values (Kayaer, 2019). This is the only way that those problems can be solved and future problems be avoided (Gürbüzöglü-Yalmanci, 2015). The source of environmental problems is considered to be people's activities which aim for economic development, but, in doing so, ignore environmental ethics (Wilkinson, 2002). As environmental threats that emerged following aspirations for continuous growth and consumption at the end of the 18th and 19th centuries have started to be perceived as problems, many people started to discuss human-environment relationship which resulted in the development of various environmental ethics approaches (EEA) (Des Jardin, 2006). There three main EEAs: (1) the anthropocentric approach, (2) the biocentric approach, and (3) the ecocentric approach.

The anthropocentric approach has developed in line with the views of scientists and philosophers such as Aristo, Descartes, Newton, and Bacon. Descartes (1994) underlined the need for human beings to embrace and rule the environment and laid the foundations of this philosophy. According to this approach, human beings intrinsically value things that they consider to be useful to them (Lundmark, 2007). The environment should be protected because if it is not then people will suffer. Therefore, protection of natural resources is prioritised so that the life quality of people would not deteriorate (Callicott & Frodeman, 2009; Dunlap & Van Liere, 1978). Biocentric approach, on the other hand, advocates the idea that not only humans but also other living creatures are important (Des Jardins, 2006). This approach argues that humans should not be considered to be superior to the environment and that each living creature in the environment is important. As for the ecocentric approach, it has

been formed based on the ideas of scientists such as Leopold and Naess. Ertan (2004) stated that this approach advocates the idea that both living creatures and inanimate objects, thus, the whole environment is important.

In addition to the above approaches, there are other environmental ethics approaches such as animal welfare ethics, deep ecology, soil ethics, teocentric environmental ethics, sustainable development ethics, postmodern environmental ethics, ecofeminism, respect to the nature ethics, earth ethics, and ecological ethics (Mahmutoglu 2009; Rolston, 2003).

While these ethical approaches facilitate the learning of environmental values, the tuition provided via the ideas affected by these approaches enable individuals to develop knowledge, attitudes, and behaviours that make them more aware of the nature (Uygun, 2006). Learning about environmental values help learners develop positive environmental attitudes and this situation results in environmental behaviour (Homer & Kahle, 1988). This process also affects the way learners make decisions about topics relating to the environments (Scott & Oulton, 1998). Naturally positive environmental behaviours develop through environmental ethics and related teaching implementations which can increase students' awareness of and interest in their environment.

Based on the idea that individuals have different ways of thinking and problem solving skills, Howard Gardner developed the Multiple Intelligences Theory (MIT). According to Gardner (2004) there are eight different domains of intelligence that individuals can possess. Those domains of intelligence are; visual-spatial, logical-mathematical, bodily-kinaesthetic, musical-rhythmic, verbal-linguistic, social-intrapersonal, interpersonal, and naturalistic intelligence. Individuals have various talents that are different from the talents others possess and those are referred to as intelligence types (Gardner, 2006, 2007). MIT states that there are eight domains of intelligence; however, individuals may possess different domains of intelligence at high levels and others at low levels (Stanford, 2003). People who have developed Naturalistic Intelligence (NI) are sensitive towards events in the nature; interested in nature trips; curious about ecology, plants, and animals; willing to protect the environment; interested in seasons and climate events; participate in projects relating to the nature; and develop an awareness of the nature (Saban, 2002). Therefore, such individuals are expected to be more successful in developing behaviours towards the environment, environmental values, and environmental ethics.

Analysing related literature on environmental ethics suggest that there is a strong relationship between environmental behaviour and environmental attitudes, those who exhibit environmental behaviour were also found to have high scores for environmental attitudes (i.e. Halkos & Matsiori, 2017). Gribben and Fagan (2016), who correlated anthropocentric attitudes and climate change, highlighted the importance of universities in disseminating the awareness that climate change resulted from anthropocentric approaches. They also noted the importance of ecology-centered attitudes. In their study investigating science and biology teachers' environmental ethics awareness levels, Karakaya and Yılmaz (2017) identified that there were significant differences between science teachers' environmental ethics awareness levels in terms of gender and type of school that they worked in. The study conducted by Quinna, Castéra and Clément (2016) which investigated the meaning Australian teachers attached to anthropocentrism and non-anthropocentrism found that answers indicating a negative attitude were generally related to anthropocentrism. Gola (2017) content analysed which of the environmental ethics approaches (anthropocentric, biocentric, or holistic) were dominant in the coursebooks utilized in the 4th grade in Polish schools. The results showed that the anthropocentric ethical approach was dominant. Gerçek (2016) investigated university students' perceptions of environmental ethics and concluded that the students' perceptions were at a medium level and there was not a significant difference between participants in terms of gender or year of study. While Alagöz and Akman (2016) investigated whether pre-service teachers followed an anthropocentric or ecocentric approach in solving environment related problems, Jackson et al. (2016) studied students' environmental attitudes and behaviours in two public and two international schools in Hong-Kong. The results showed that there was not a significant difference between students' attitudes or behaviours in terms of school type. In another study, Erten (2012) compared Azeri and Turkish university students' environmental awareness levels and it was found that Turkish students' knowledge, attitudes, and behaviours regarding the environment were higher. Chuvieco, Burgui-Burgui, Da Silva, Hussein, and Alkaabi (2018) investigated environmental sustainability habits of university students in Spain, Brazil, and United Arab Emirates, the results, however, did not indicate any significant differences between countries. On the other hand, Berglund, Gericke, Boeve-de Pauw, Olsson, and Chang (2019) compared Taiwanese and Swedish students' sustainability awareness and found significant differences. Swedish students' sustainability awareness is higher than Taiwan students. Furthermore, the number of studies conducted on environmental ethics has increased in recent years in line with increases in environmental problems.

An investigation of studies on multiple intelligence theory suggests that there are many studies conducted by Furnham and colleagues which aimed to predict the intelligence domains of students in different countries (i.e.

America, England, Japan, Iran, East Timor, and Portugal). Students in these studies were asked to predict which domains of intelligence they, their parents', and siblings possessed by answering researchers' questions and the findings were evaluated taking into account the cultural aspects of the countries that the participants were from (Furnham, Hosoe, & Tang, 2001; Furnham, Shahidi & Baluch, 2002; Neto, Furnham, & da Conceição Pinto, 2009). Furnham, Hosoe, and Tang (2001) asked American, English, and Japanese students to estimate their own, parents, and siblings' multiple IQ scores (grouped under verbal, numerical and cultural factors). While American students made higher estimations compared to Japanese, all students reported higher numerical IQ values for their fathers and brothers, and higher verbal IQ values for their mothers and sisters. In a different study, Furnham, Shahidi and Baluch (2002) asked English and Iranian students to estimate multiple intelligence scores of their own, their parents, and siblings. They found that Iranian students had higher levels of tendency to accept gender and race differences. In a similar study, Neto, Furnham, and Conceição Pinto (2009) found that students from East Timor and Portugal reported higher scores for their fathers in all types of intelligences when compared to the scores reported for their mothers. And, Portuguese students were found to have higher levels of sense of self.

There are a limited number of studies in which environment, environmental ethics, and MIT have been studied. Baş (2010) compared the effects of MIT-based and traditional teaching approaches in terms of their impact on students' environmental awareness and attitudes and found that MIT-based activities are more effective in increasing students' environmental awareness and developing positive attitudes. With regards to NI, Baş (2010) stated that school garden visits and activities where students planted trees had positive impacts on developing students' attitudes towards the nature. Similarly, Okur, Yalçın Özdilek and Sezer (2012) compared naturalistic intelligence of women with their environmental attitudes and concluded that naturalistic intelligence is a significant predictor of environmental attitudes. Sangsongfa and Rawang (2016) integrated environmental education and communicative English teaching focusing on MIT and found that the administration of their model increased students' academic achievement. Yenice, Özden and Alpak Tunç (2016) compared pre-service science teachers' environmental attitudes with the domains of multiple intelligence and found logical-mathematical intelligence, bodily-kinaesthetic intelligence, and naturalistic intelligence to be determinants of environmental attitudes. They considered logical-mathematical intelligence in terms of the nature creating an order and expected those who have high levels of logical-mathematical intelligence to have the skills to question and evaluate the nature. Similarly, they considered bodily-kinaesthetic intelligence and naturalistic intelligence as determinants of attitudes towards the nature since the former would require development of psychomotor abilities to protect the nature and the latter would require the development of the ability to empathise with the nature. In the light of the literature, it is understood that the results of studies conducted interculturally and internationally are important for the environment, environmental ethics, and multiple intelligences theory (i.e. Chuvieco, Burgui-Burgui, Da Silva, Hussein, & Alkaabi, 2018; Berglund, Gericke, Boeve-de Pauw, Olsson, & Chang, 2019; Neto, Furnham, & da Conceição Pinto, 2009).

Various socio-economic and cultural structures form a basis for important comparisons. The conversations held with students who took environment and biology courses at the university indicated that there were differences between students' NI levels and environmental ethics perceptions. Moreover, it has been observed that there were opinion differences between Turkmenistanian and Turkish students from time to time, but there were also points that both groups of students agreed on. This situation has drawn the attention of the researchers' attention and analysis of related literature suggested that there were a limited number of studies investigating multiple intelligences theory and environmental ethics, thus, it is considered that this niche in the literature should be filled. In line with this, the present study aims to compare the domain of naturalistic intelligence and environmental ethics perceptions that Turkmenistanian students (those who moved to Turkey for their studies) and Turkish students possess.

Globalization lead to an increased importance given to higher education to broaden students' horizons in an effort to train individuals as world citizens. And, experiencing different values and utilizing various opportunities through international education has been defined as one of the prerequisites of reaching this goal. Student exchanges are one of the most frequently occurring examples of international education (Foreign Economic Relations Board [FERB], 2013). The term "international student" is used to describe students who study part of or their whole study period in a country where they do not have citizenship of ("The Power of International Education", 2021). Such students leave their country of citizenship and travel abroad to realize international exchanges. Most of the international students visiting Turkey for such exchanges come from central Asian countries. Among those countries, Turkmenistan has the first place (Foreign Economic Relations Board [FERB], 2013). Therefore, it is assumed that Turkmenistanian students are among the students with whom Turkish students have the most interaction and sharing in terms of science, education, culture, and art. In this sense, comparing students from these two countries in terms of environmental ethics and naturalistic

intelligence can provide valuable information regarding ethical understanding and how any proposed solution strategy can impact on naturalistic intelligence characteristics. Since students from both countries have spent a considerable amount of time in their home countries, they are considered to have had enough experience to learn about their home cultures and education systems. Therefore, the fact that the compared students are studying in the same Turkish higher education institution does not affect the international nature of the tuition.

### **The Education System in Turkey and Turkmenistan**

The education system of Turkmenistan -which left the Soviet Union and declared its independence- includes pre-school, elementary school, secondary-high school, and higher education. Compulsory education is 12 years and consists of four years of elementary school tuition and eight (six + two) years of secondary-high school tuition. Elementary school tuition (1st, 2nd, 3rd, and 4th years) equips students with basic skills such as literacy and mathematics, and it also includes tuition on nature knowledge (Ashgabat Education Consultancy (AEC), 2013). High school tuition is two years and there are three main areas of studies (Physics-Mathematics, Natural Sciences, and Social Sciences) which include courses such as the Turkmenistnian language, social and natural sciences, foreign languages, sports, and arts (Gelişli & Beisenbaeva, 2017). Undergraduate tuition, on the other hand, is five years long. Vocational courses have been taken out of the basic curriculum and replaced by social sciences and physical education courses that aim to equip learners with basic knowledge on law, ethics, economy, politics, environmental problems, and culture. It has been observed that teenagers prefer to study in undergraduate programs related to underground resources and petrol-natural gas, and energy (AEC, 2013). The education system is based on the basic principles of democracy, national identity awareness, and respect towards other people and nations (UNESCO, 2011).

Similarly, compulsory education in Turkey is 12 years. This compulsory education has three levels each of which is four years long: elementary, secondary, and high school. The system is based on the constructivist approach and coursebooks are prepared accordingly. The curriculum avoids rote learning and prioritizes individual differences. Attention is paid to ensure that the courses are applicable in daily life and students are encouraged to do research. The aims of primary school (elementary + secondary) tuition include the following learning objectives in relation to the environment: exploring the nature and understanding the relationship between humans and the nature, creating an interest and curiosity regarding the events taking place in individuals' immediate environment, and developing positive attitudes towards the environment. The high school biology curriculum includes topics such as the world of living creatures, ecosystem ecology, current environmental problems, community and population ecology (Ministry of National Education [MoNE], 2019). Environment related departments in the Turkish higher education are not generally preferred by students and such programs remain to be at the bottom of the lists. Students rather prefer studying in health related programs (see Council of Higher Education (CoHE) Guide, 2019]

### **Research Questions**

Universities' opinions regarding topics such as cultural interaction, international collaboration, competition, and multicultural education -which emerged as a result of globalization- are affective at the international scale (Küçükcan & Gür, 2009). The fact that environmental problems affected the world at a global scale has had various impacts in individuals' attitudes towards the nature and increased the motivation to search for different solutions and, consequently, various environmental ethics approaches have emerged. Identifying the similarities or differences between countries in terms of environmental ethics approaches is significant since it can present various solution strategies and/or views developed to combat environmental problems. Evaluating solution strategies and ideas during teaching/learning processes can increase awareness of environmental ethics and contribute towards materializing the developed ideas and solution strategies. In relation to that, MIT is significant since it prioritizes individual differences and product yielding capacity in different cultures as explained in Gardner's (1983) definition of intelligence. In particular, identifying NI levels of individuals from different cultures would not only provide information about the education style of that culture but also reveal those individuals' interest in the nature. In addition, identifying intercultural sex differences in terms of environmental ethics approaches can reveal the societal role of gender at the international level. Considering the above mentioned aspects, the following research problems were created within the general theme of investigating the relationship between environmental ethics and naturalistic intelligence. The main research question was: "Is there a significant difference between Turkish and Turkmenistnian students in terms of environmental ethics attitudes and NI levels?"

The sub research questions were:

- (1) Is there any relationship between environmental ethics and NI?
- (2) Is there a significant difference between Turkish and Turkmenistanian students' perceived levels of environmental ethics?
- (3) Is there a significant difference between Turkish and Turkmenistanian students' NI levels?
- (4) Is there a significant difference between Turkish and Turkmenistanian students' environmental ethics levels in terms of the gender variable?

## Method

Turkish and Turkmenistanian university students' environmental ethical attitudes were compared in terms of their naturalistic intelligence in the present. Survey model, a quantitative research method, was utilized in the study. The dependent variables that were compared in the study were the two groups of university students. The independent variables that were examined, on the other hand, were environmental ethics attitudes and naturalistic intelligence levels as well as gender.

## Sampling

The study sample in this study consisted of Turkish and Turkmenistanian students who studied at Kafkas University in Turkey. 275 students (172 Turkish and 103 Turkmenistanian) participated in the study. The data were collected using the Environmental Ethical Attitude Scale and Multiple Intelligence Domains Inventory. Students were informed about the study and the data was collected from students who volunteered to participate. Students have come across environment related courses and topics at certain periods of their tuition. In this sense, it was considered that they would have developed a certain level of environmental ethical attitudes and naturalistic intelligence up to that point in their education. Therefore, variables such as year of study and study program were ignored. Demographic characteristics of the participants are detailed in Table 1.

Table 1. Demographic characteristics of the participants

Group	Gender	N	Total
Turkish	Female	105	172
	Male	67	
Turkmenistanian	Female	58	103
	Male	45	

## Instruments

### *Environmental Ethical Attitude Scale*

The Environmental Ethical Attitude Scale (EEAS) developed by Gürbüzöğlü-Yalmançı (2015) was utilized to measure environmental ethical attitudes (EEA) of Turkish and Turkmenistanian students. Kaiser Meyer Olkin (KMO) value of the scale is 0.837 and the chi-square value obtained from Bartlett's Sphericity test is significant ( $\chi^2=11920.99$ ;  $p<.05$ ). Answers to the questions in the scale are evaluated on a 5-point Likert scale. There are a total of 33 questions under four scales [Anthropocentric (first factor), Ecocentric (second factor), Ecofeminist (third factor), and Teocentric (fourth factor) environmental ethics]. Total variance explained by those factors is 47,57 %. Factor loadings of the items under the first factor range between .958 and .828, between .579 and .333 for the items under the second factor, between .866 and .482 for the items under the third factor, and between .805 and .724 for the items under the fourth factor. The threshold limit for factor loadings is generally accepted to be .30 and above (Hair Junior, etc., 1998; Merenda, 1997; Tabachnick, & Fidell, 1996). Cronbach's Alpha reliability coefficient for the first factor is calculated as .80, .72 for the second, .82 for the third, and .87 for the fourth factor. The Confirmatory Factor Analysis (CFA) supported and confirmed the four-factor solution achieved ( $\chi^2/df=2.42$ , RMSEA=.059, GFI=.84, CFI=.95, NFI=.92, NNFI=.94 ve AGFI=.82).

### *CFA Results for the Environmental Ethical Attitude Scale*

CFA, which was conducted to confirm the construct validity of EEAS in its administration with Turkish and Turkmenistanian students, suggested that the first question under the Anthropocentric ethic approach had a low "t" value and its predictive power was low, thus, this item was deleted in EEAS's administration in the present

study. The remaining 32 items were analysed to measure fit indices and the results suggested that the model had a good fit ( $\chi^2=763.71$ ,  $df= 458$ ,  $p = 0.00$ ,  $\chi^2/df= 1.66$ ,  $RMSA=.049$ ,  $NFI=.94$ ,  $NNFI=.97$ ,  $CFI=.97$ ,  $IFI=.97$ ; Schermelleh-Engel, Moosbrugger & Müller, 2003; Ullman, 2001) and, thus, the scale was used to measure participants' environmental ethics attitudes.

Example statements for each factor included: "The nature exists for human beings" for the Anthropocentric approach, "Each living creature in the nature has the same value" for the Ecocentric approach, "Gender discrimination should be avoided when solving environmental problems" for the Ecofeminist approach, and "All the creatures that god created should be loved" for the Teocentric approach.

### *Multiple Intelligence Domains Inventory*

Multiple Intelligence Domains for Educators Inventory was used to determine Turkish and Turkmenistationian students' naturalistic intelligence (NI) levels. The inventory was first developed by Armstrong (1994). The present study utilized the version of the inventory revised by Saban (2002). Each item in the inventory included the following anchors; "not appropriate at all", "not appropriate", "partially appropriate", "appropriate", "totally appropriate". Cronbach's alpha reliability coefficient in the original inventory was .83 and the coefficient in the present study was .80. This indicated that the inventory had a good level of internal consistency. Answers to the items in the inventory are collected on a five-point Likert scale. There are 10 items for each intelligence domain. In line with the aim of the study, only the items prepared to measure the NI domain were used. Participant scores were evaluated based on the following; scores between 32 and 40 were considered as "very developed", 24-31 as "developed", 16-23 as "moderately developed", 8-15 as "somewhat developed", and 0-7 as "underdeveloped".

### **Data Analysis and Procedures**

The data in this study consisted of the answers Turkish and Turkmenistationian students gave to the questions within the "Environmental Ethical Attitude Scale (EEAS)" and "Multiple Intelligence Domains Inventory". Prior to data collection, the questions within the scales were checked in terms of being comprehensible for students. Comprehensibility is one of the factors that increase reliability of the scale items. There are Turkmenistationian students who pursue their education in Turkey and their Turkish levels are determined by the Turkish Teaching Application and Research Centre (TTARC) within the university and Turkish language courses are provided to those who need language support. Therefore, when they start their tuition, both Turkish and Turkmenistationian students understand Turkish. Nevertheless, a pilot study was administered to 10 students from each group in order to ensure that both Turkish and Turkmenistationian students understood the questions. The results of the pilot administration suggested that there were no questions which were incomprehensible for either group of students. The construct validity of the EEAS scale was established via CFA. Following this step, ANOVA was conducted to test whether there were NI level and environmental ethics attitude differences between Turkish and Turkmenistationian students who were brought up in a different culture and education system. MANOVA was conducted to test whether there were gender related differences.

## **Results and Discussion**

### **Relationship between NI and EEA**

According to Table 2, the highest level of relationship was observed between NI and ecocentric and teocentric versions of EEA. The relationship between NI and ecofeminist ethic was moderate and a low and negative relationship was observed between NI and anthropocentric ethic. Individuals with high levels of NI give importance to understanding global environmental problems (Mauladin, 2013). Similarly, the underlying rationale for environmental ethics is to develop a holistic solution to environmental problems through an ecocentric perspective.

Table 2. Correlation results between NI and EEA

	Anthropocentric ethic	Ecocentric ethic	Ecofeminist ethic	Teocentric ethic
NI	-.15*	.49**	.27**	.41**

\*\*Correlation is significant at the 0.01 level (2-tailed)

**EEA Differences between Turkish and Turkmenistanian Students**

ANOVA and descriptive statistics were utilized in order to confirm whether there was a difference between Turkish and Turkmenistanian students' EEAs (Table 3).

Table 3. ANOVA results for comparison of Turkish and Turkmenistanian students' EEAs

Ethical approach	Group	N	Mean	sd	df	Chi-square	F	p
Anthropocentric ethic	Turkish	172	6.11	2.49	1	0.40	188.69	.00
	Turkmenistanian	103	9.92	1.67	273			
Ecocentric ethic	Turkish	172	71.34	8.94	1	0.32	130.54	.00
	Turkmenistanian	103	57.90	10.22	273			
Ecofeminist ethic	Turkish	172	32.69	4.04	1	0.23	83.30	.00
	Turkmenistanian	103	27.90	4.46	273			
Teocentric ethic	Turkish	172	15.56	3.18	1	0.22	79.14	.00
	Turkmenistanian	103	12.11	2.98	273			

Mean scores for environmental ethical attitudes of 172 Turkish and 103 Turkmenistanian students are given in Table 3. ANOVA results showed that there was a significant difference between Turkish and Turkmenistanian students' scores for all four types of ethic approaches [F (1.273) (Anthropocentric)=188.69,  $p < .05$ ; F (1.273)(Ecocentric)=130.54,  $p < .05$ ; F (1.273)(Ecofeminist)=83.30,  $p < .05$ ; F (1.273)(Teocentric)=79.14,  $p < .05$ ]. Analysis of eta squared values suggested that the effect size of these significant differences were high. According to Green and Salkind, (2004), for eta square values, (.01) means small, (.06) medium, (.14) extensive effect level. Accordingly, it can be said that ethical approaches have a large effect size on Turkish and Turkmenistan students. Table 3 indicates that Turkish students had higher scores than Turkmenistanian students for the "Ecocentric ethic approach" (M=71.34), "Ecofeminist ethic approach" (M=32.69), and "Teocentric ethic approach" (M=15.56). Turkmenistanian students, on the other hand, had higher scores than the Turkish ones for the "Anthropocentric ethic approach" (M=9.92).

**NI Levels of Turkish and Turkmenistanian Students**

ANOVA and descriptive statistics analyses were conducted in order to test whether there was a significant difference between Turkish and Turkmenistanian students' naturalistic intelligence (NI) levels (Table 4).

Table 4. ANOVA results of the difference between Turkish and Turkmenistanian students' NI levels and descriptives statistics

Group	N	Mean	sd	df	Eta squared( $\eta^2$ )	F	p
Turkish	172	27.90	7.10	1	0.10	33.02	.00
Turkmenistanian	103	22.89	6.81	273			

The analysis of statistics included in Table 4 indicates that there was a significant difference between NI levels of Turkish and Turkmenistanian students (F (1.273) =33.02,  $p < .05$ ). The eta squared value suggests that the effect size was high ( $\eta^2 = 0.10$ ). Additionally, the analysis of the mean scores for both groups of students show that the mean score for Turkish students (M=27.90) was higher than the mean score for Turkmenistanian students (M=22.89). In line with the development levels of the Multiple Intelligence Domains Inventory, Turkish students' mean NI score was considered to be at the "developed" level (24-31) and Turkmenistanian students' mean score was considered to be at the "moderately developed" level (16-23).

**Investigation of Differences between Turkish and Turkmenistanian Students' Environmental Ethical Approach (EEA) in terms of the Gender Variable**

MANOVA was conducted in order to test whether EEA related gender differences existed between the students' of both countries. EEA scores were treated as the dependent variable and gender as the independent. Normality of distribution and MANOVA assumptions were checked prior to the analysis. Checks including the normality of the data set, Mahalanobis distance of the extreme values, matrix and variance-covariance homogeneity of the data set, and equality of variance suggested that MANOVA can be utilized. The results of MANOVA are presented in Table 5.



Table 5. MANOVA results of the difference between Turkish and Turkmenistanian students' EAA scores in terms of the gender variable

Group	Ethical approach	Gender	N	Mean (X)	p	Partial eta squared	F	Wilks' Lambda
Turkish students	Anthropocentric ethic approach	Female	105	6.52	.006	.043	4.70	.90
		Male	67	5.46				
	Ecocentric ethic approach	Female	105	71.57	.684	.001		
		Male	67	71				
	Ecofeminist ethic approach	Female	105	33.21	.017	.033		
		Male	67	31.67				
	Teocentric ethic approach	Female	105	15.91	.071	.019		
		Male	67	15.01				
Turkmenistanian students	Anthropocentric ethic approach	Female	58	9.91	.954	.000	1.48	.94
		Male	45	9.93				
	Ecocentric ethic approach	Female	58	59.93	.022	.051		
		Male	45	55.28				
	Ecofeminist ethic approach	Female	58	28.31	.296	.011		
		Male	45	27.37				
	Teocentric ethic approach	Female	58	12.24	.632	.002		
		Male	45	11.95				

The results showed that there was a significant difference between male and female Turkish students' EAA mean scores [ $F(4,167)=4.70$   $p=.00$ ; Wilks' Lambda=.90; partial eta squared=.10]. Bonferroni alpha correction at the value of .013 was utilized when separately analysing each category of ethic approaches, the only significant difference between male and female Turkish students was observed in the anthropocentric ethic approach category ( $F(1,172)=7.66$ ;  $p=.006$ ; partial eta squared=.043). Similarly, the analysis of mean scores of female and male Turkish students revealed that the former group had higher levels of anthropocentric ethic approach ( $M(\text{Female})=6.52$ ;  $M(\text{male})=5.46$ ).

The analysis of male and female Turkmenistanian students' mean EAA scores, on the other hand, showed that there was not a significant difference between the two ( $F(4,98)=1.48$   $p=.21$ ; Wilks' Lambda=.94; partial eta squared=.05). Separate EAA score analyses (based on the .013 alpha correction value) for both groups of Turkmenistanian students within each sub-category of environmental ethic approaches also revealed that there were no significant differences between male and female students ( $p>.013$ ).

## Discussion and Conclusion

In line with the framework investigating the relationship between environmental ethics attitudes (EEA) and naturalistic intelligence (NI), the present study found a high level of relationship between NI and ecocentric and teocentric ethic. In this sense, it can be argued that; participants' NI characteristics have ecocentric and religious roots.

Environmental problems require us to ask questions such as what we value as human beings, what kind of creatures we are, what our place in the nature is, and in what kind of a world we can develop our species (Des Jardins, 2006, p.35). Such questions can also reveal characteristics of individuals who possess naturalistic intelligence. Individuals who have ecocentric ethic attitudes leave their personal benefits aside and act to protect the nature (Dunlap & Van Liere, 1978), and individuals who have teocentric ethic attitudes feel that they need to respect all species in the nature because of the view that they are entrusted to human beings by god (Des Jardins, 2006). There are parallels with such characteristics and the characteristics that individuals with naturalistic intelligence possess; such individuals have developed environmental awareness and want to protect the nature (see for example; Saban, 2005). In this sense, a high level of relationship can be observed between NI and ecocentric and teocentric ethic approaches. As such, the development of NI would positively contribute towards developing ecocentric and teocentric ethic attitudes. Sensitive behaviours towards the environment which is a characteristic of NI have parallels to ecocentric ethic approach. In addition, being sensitive towards plant types, taking care of plants, protecting pets, and having an interest in exploring natural events and species in the nature have parallels with the teocentric approach. In line with the teocentric environmental ethics approach, Des Jardins (2006) stated that human beings –based on their sense of responsibility to the god- respect the creatures created by the god and act responsibly towards the nature that is entrusted to them. The prominent idea in the

ecofeminist environmental ethics approach is that there should be a healthy relationship between human beings and the nature and this relationship can prevent the inequalities between men and women as well as contribute towards achieving equal opportunities. Attention, in particular, is paid to the idea that women are treated unfairly because of the patriarchal way of thinking and this idea forms the basis to destroying the nature (Scarce, 1990; Tamkoç, 1996). Considering the characteristics of NI, it can be observed that a limited number of characteristics of ecofeminism are present in NI. This has reflected itself in ecofeminist ethics in the form of the nature and biotopes where wild life animals live being destroyed in the patriarchal order (Des Jardins, 2006). These ideas include NI characteristics and, at the same time, are in parallel with the ecocentric approach. Evaluation of the societies with which the study is conducted suggests that the ecofeminist approach has not found its place in the society yet. Anthropocentric environmental ethics approach, on the other hand, prioritizes human beings' interests and supports the idea that human beings can dominate the nature as they wish (Dunlap et al., 2000), which is not an observed characteristic of NI. Therefore, it is expected that the relationship between NI and anthropocentric ethics approach would be low and/or negative.

The present study investigated environmental ethic approaches (EEA) and naturalistic intelligence (NI) levels of students from two countries (Turkey and Turkmenistan). The types of environmental ethics investigated in the study included; anthropocentric, ecocentric, ecofeminist, and teocentric ethic approaches. A significant difference between the mean scores of Turkish and Turkmenistanian was observed in all four categories of environmental ethics. It was found that Turkish students' mean scores for the ecocentric, ecofeminist, and teocentric ethical approach categories were higher than Turkmenistanian students' mean scores (See Table 3). Similarly, related research indicated that Turkish students' environmental ethical attitudes and ethical approach levels were high (Karakaya, Avgin & Yılmaz, 2018; Erten & Aydoğdu, 2011). In this sense, the present study can be considered as a guide in terms of investigating various environmental ethic approaches of students from different cultural backgrounds and countries.

From a socio-economic perspective, most of the land in Turkmenistan consists of deserts and there is limited amount of land which is arable. On the other hand, the country has rich sources of petroleum and natural gases and it declared its independence in a relatively recent time, 1991 (Turkish Cooperation and Coordination Agency [TCCA], 1995). In this sense, it is possible to consider that Turkmenistan will adopt pragmatic values in order to join the list as a developed or developing nation and this situation may reflect itself on the education system and affect students. In fact, a university that focuses its tuition on petroleum and natural gases was opened in the country considering its economic benefits (Clement & Kataeva, 2018). Considering those points, it is possible that the "Anthropocentric ethic approach" will be adopted at a higher level in a country which advocated a pragmatic philosophy and needs to develop and grow. When they were part of the Soviet Russia, Turkmenistan citizens were banned from practicing their religion and propagandas aiming to distance people from religion were made (Özbay, 2019). Having been refused to receive religious education for over 70 years might have affected Turkmenistan citizens' approach to religious ethics. The current education system in Turkmenistan does not have any course content regarding the concept of religion. It is possible that this was the reason why Turkmenistanian students' "Teocentric ethic approach" scores were lower than the mean scores of the Turkish students. While the primary school education curriculum in Turkmenistan focuses on "world environment, language development, mathematics, manual skills, fine arts, physical training, singing and music, and fiction", the secondary-high school curriculum focuses on "the principles of scientific knowledge, development of creative abilities, cultural attainment, and physical training" (International Bureau of Education (IBE-UNESCO), 2011). It is understood that the topic of environment receives little attention in the Turkmenistanian education system and this might have resulted in Turkmenistanian students' lower levels of adoption of the "Ecocentric ethic approach".

Environmental problems such as arid lands which result from human activities are the concern of almost all central Asian countries. In this sense, it has a regional essence. The fact that Turkmenistan has set the goal of increasing agricultural production to a level that would be enough for the population of Turkmenistan (Ökmen, 2001) is an indicator of anthropocentric ethic at the level of the government.

Industrial activities near the Caspian Sea where oil fields are located have caused considerable pollution especially in the sea. The waste that was produced was sent to the sea without any treatment. Consequently, many species in the sea were harmed (Ökmen, 2001). Such situations are in line with the anthropocentric ethic approach that reflects human beings' enthusiasm to reign over the nature.

"Religious Culture and Moral Knowledge" course is compulsory in the Turkish education system and is offered from the 4th grade until the end of the 12th grade. Although students are predominantly taught about Islam, information on other religions is included in the curriculum. Both the fact that 90% of the Turkish population

chose Islam and that religion education is provisioned in the Turkish education system may be the reason for why Turkish students' "Teocentric ethic approach" scores were higher than the Turkmenistanian students. Students in Turkey are first introduced to the topic of environment in primary schools as part of Science and Biology courses starting as early as the 3rd grade. The content of these courses include not only general information on the environment but also information and activities on energy transformation, sustainability, environment protection, recycling, biodiversity, environmental problems and finding solutions to those problems (MoNE, 2019). It is possible the reason for why Turkish students' "Ecocentric ethic approach" scores were higher than Turkmenistanian students' scores is the fact that environment related topics are covered extensively in the above mentioned courses. The study conducted with Turkish and Azeri pre-service teachers by Erten and Aydođdu (2011) found that the former possessed higher levels of "Ecocentric ethic approach" than the latter. The findings of the present study are in line with Erten and Aydođdu's (2011) findings.

Furthermore, Turkey is playing an active role in international collaborations to find solutions to environmental problems related to most socio-economic issues. Turkey is one of the most successful countries in implementing the Montreal Protocol created in 1991 ("Republic of Turkey Ministry of Foreign Affairs", 2021). In this sense, it can be argued that Turkey has made progress in solving environmental problems and the government prioritizes the ecocentric approach. Becoming aware of environmental problems in Turkey has a history that goes back to the Ottoman Empire era. For example, various precautions were taken to protect water sources in particular during the Ottoman era. Similarly, it can be observed that various practices are employed in different ministries with regards to protecting the environment and non-human species. The above are indicators that a move towards abandoning anthropocentric ethics approach has been initiated. This sensitivity, which can be observed in the political area, has been helpful in developing, extending, and practicing ecocentric ethic attitudes (Ertan, 2004).

The analyses conducted to test gender differences between students from Turkey and Turkmenistan showed that there was not a significant difference between male and female Turkmenistanian students' EAA mean scores. On the other hand, it was found that the anthropocentric ethical approach mean scores of female Turkish students were higher than male Turkish students. The gender differences between the students of both countries are considered to have resulted from the social structure and education system of the countries. This is because education affects the society and the society affects education. Similarly, Erten (2008) attributed the environmental ethic approach differences between teachers in Turkey and teachers in Germany to cultural differences.

Erten's (2008) study conducted with teachers from Turkey and Germany did not find a significant difference between male and female teachers from Germany in terms of ecocentric approach, anthropocentric approach, and antipathetic attitudes towards the environment approaches". On the other hand, there was a significant difference between male and female teachers from Turkey. The present study suggests that female Turkish students have higher levels of pragmatism compared to male Turkish students. However, the fact that the mean scores of female Turkish students in the ecofeminist and ecocentric ethic approach categories were higher than their male counterparts (Table 3) creates a contradiction. It is believed that the source of this outcome can be the modern approaches practiced in the education system and the continuation of the pragmatic and patriarchal way of thinking in the society. Aktaş (2013) underlines traditional views in a "patriarchal" society continue during the process of modernization and those values put pressure on females. Casey and Scott (2006) stated that women and girls adopt a "more affectionate, nourishing, and protecting" role as a result of traditional approaches.

Although there were not significant differences between EAA scores of male and female Turkish students, Turkmenistanian students had lower mean scores than Turkish students in all ethic approaches except the anthropocentric ethic approach (Table 2). This indicates that the Turkmenistanian society is a society that adopts traditional and pragmatic values.

Analysis of Table 5 shows that female Turkish and Turkmenistanian students' mean scores in ethic approaches are generally higher than males. Wongchantra, Boujai, Sata, and Nuangchalerm (2008) utilized the ethics infusion method in order to teach undergraduate students about the environment and environmental ethics. Following the implementation of the method, the results suggested that female participants' knowledge of the environment and environmental ethic levels were higher than their male counterparts. On the other hand, in the study conducted with Australian participants investigating female and male participants' environmental concerns and behaviour within the framework of ecocentric and anthropocentric ethics, Casey and Scott (2006) found that female students' ecocentric environmental ethic scores were higher than the males, and anthropocentric ethic approach scores of the male participants was higher than the females. In their study,

Sungur (2017) found that the gender variable does not cause significant differences in terms of environmental ethics.

Comparison of NI levels of students from both countries suggested that Turkish students' NI levels were "developed" and Turkmenistanian students' NI levels were "moderately developed". The inclusion of the constructivist approach into the Turkish education system allowed students' development of various intelligence domains including the naturalistic intelligence. Multiple intelligences theory is one of the factors that formed the basis of the constructivist approach (Burma, 2003 as cited in Arslan, Orhan, and Kırbas, 2010). The present study compared both environmental ethic approaches and NI levels of students from two countries. The analysis of related literature indicated that there is only a limited number of studies which investigated intelligence or naturalistic intelligence domains and environmental ethic approaches. Future studies can be conducted to investigate the effects of multiple intelligence domains on environmental ethic approaches.

This finding was, in fact, also supported in the results calculated in Table 3. Turkish students' mean "Ecocentric ethic approach" score was high. According to Erten and Aydođdu (2011) those who possess ecocentric ethic approach protect the environment without thinking about their personal interests, they consider all living creatures as a part of the nature and advocate that the nature should be protected as a whole. Similarly, individuals whose NI is developed possess characteristics such as being sensitive of bio-diversity, establishing contact with living creatures, protecting them, being sensitive of the nature, feeling the nature, and recognizing and categorizing living creatures (Lazear, 2000). Therefore, it can be argued that those who possess ecocentric ethic approach also have a developed NI. In their study, Okur, Yalçın-Özdilek and Sezer (2012) found that an individual's attitude towards the environment is a significant predictor of their NI levels. This was also confirmed in another study conducted by Yenice, Özden and Alpak Tunç (2016). It is a known fact that cultural constructs affect intelligence domains. As such, Gardner (2004) underlined that intelligence domains develop in different ways in different cultures. In line with this, the positive effect of the constructivist approach that has been in practice in Turkey since 2004 (which prioritizes individual differences and avoids rote learning) should be emphasized.

Turkmenistanian students had moderately developed NI. It is possible that multiple intelligences theory and the qualities that are expected to develop for the NI are not well integrated into the environment related courses. Therefore, it is possible to argue that those students did not have enough opportunities to develop an environmental ethic approach or their NI. In addition, for many years Turkmenistan followed monoculture in agriculture that is to say; only cotton was harvested for many years, and –as a result- the land became arid. Therefore, unavoidably, the environment was harmed. This situation which indicates that agriculture technique and culture did not develop (Ökmen, 2001) is, at the same time, an indicator that individuals did not sufficiently develop naturalistic intelligence.

Awareness and understanding of environmental ethic approaches are crucial for protecting the nature and prevent environmental disruptions. Among environmental ethic approaches, the ecocentric approach is considered to have more long-lasting effects in the solution of environmental problems. According to Erten and Aydođdu (2011), "individuals -who believe that the nature should be protected for the sake of the nature- can be expected to demonstrate behaviours that are beneficial to the environment" (p. 165/6). In this sense, if we are to find solutions to environmental problems, it is important to ensure that environmental ethics related courses are included in the curriculums of every country and ecocentric-oriented teaching activities are practiced.

## Suggestions

In the curriculum of both countries, there may be educational activities that contribute to increasing the environmental-centered ethical understanding together with activities that support the fields of naturalist intelligence.

It is recommended to inform students at schools and universities about the eco-centered ethical approach, which is effective in minimizing environmental problems. This knowledge should not only remain at the theoretical level, but should also be seen in behavior.

It is important that environment-centered ethics take place in programs as a discipline given with student-centered approaches.

It is recommended to investigate the effects of multiple intelligences theory on ethical approaches to the environment as a basis for future studies.

## Scientific Ethics Declaration

The authors declare that the scientific ethical and legal responsibility of this article published in JESEH journal belongs to the authors.

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