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The Examination of Relationship between the Approaches to Environmental Ethics and Environmental Behaviours of Teacher Candidates by Different Variables

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Abstract

The aim of this study is to determine the environmental behaviour and the approaches to environmental ethics of teacher candidates whether or not they differ in terms of gender, department and place of residence. Moreover, the relationship between the approaches to environmental ethics of teacher candidates and their environmental behaviours was established and interpreted in the study. The research group of the study, in which screening model is used, consists of 881 third year and final year student teachers from the departments of science teaching, primary school teaching and social sciences teaching in five state universities. Out of the teacher candidates, 650 are female and 231 are male students. The data were obtained with Environmental Behaviour Scale and the Approaches to Environmental Ethics Scale. Descriptive statistics, Mann Whitney-U and Kruskal-Wallis H tests, and Spearman Rank-Difference Coefficient of Correlation methods were used for the analysis of the data which determined that there was a low level of relationship between the environmental behaviours and the approaches to environmental ethics of the teacher candidates and that the approaches to environmental ethics and the environmental behaviours differed for some of the variables including gender, department and place of residence.

Introduction

Particularly today, economic growth and rapid consumption lead to serious environmental problems caused by humanity such as global warming, air pollution or pollution and depletion of water resources (IPCC, 2018). There are studies showing that the environmental perspectives, attitudes, value judgments and behaviours of human beings, who are responsible for these results, have a significant effect on these negativities. (Dunlop, 2008; Schultz and Oskamp, 1996). Especially with environmental education, it is aimed that individuals exhibit positive attitudes and behaviours towards the environment (Salequzzman and Stocker, 2001; Bradley, Waliczek and Zajicek, 1999).

Emphasizing the relationship of individuals with their natural environment, environmental education aims to have the motivation of individuals to make decisions by taking responsibility for the environmental information, skills, and attitude and environmental problems. With the existing environmental problems, the importance of raising environmentally literate individuals by overcoming these problems and establishing positive behaviour towards the environment has become remarkable. In this process, ethical approaches that affect different perspectives on the environment are also a dimension that should not be ignored. It is also necessary to consider the compatibility of these approaches with environmental behaviours.

Family, society, and further education process are of great importance in relation to the formation of an individual's ethical approach and behaviour towards the environment. Especially, in addition to the environmental education programs prepared during the education process, teachers are one of the important factors in the management of the process. Therefore, the importance of the environmental perspectives and behaviours of teachers, who are the practitioners of the teaching process, is revealed in creating awareness in the individual with the right ethical approaches and transforming this awareness into behaviour, ensuring the protection and continuity of the environment. Accordingly, the paper attempts to determine the relationship and the level of the relationship, if any, between the environmental behaviour and ethical approaches of the prospective teachers and to find whether the ethical approaches were effective in terms of the behaviour of the group.

Theoretical Framework

Leopold's approach to environmental ethics, which is brought to the agenda especially with his approach to land ethics, is expressed as a systematic assessment that ensures and regulates the transition of people to nature and environment within the framework of certain rules by trying to understand the relationship of humans with the environment (Jardin, 2006; Sandler, 2013; Kılıç, 2008; ECCAP, 2012; Cochrane, 2006; Ertan, 2004; Huying, 2004). Ethical approaches that shape our thoughts and behaviours (Ertan, 2004) also constitute an important framework for the relationship of people with the environment (Gül, 2013). Trying to overcome the conclusion of what the concept of good and bad environmentalism is within the scope of environmental values, environmental ethics is in direct relation with human behaviours that are managed as a system of values developed directly individually (Rai & Sırma, 2011). Moreover, environmental ethics is of great importance in making sense of the ecology and emphasizing the value of an asset (ECCAP, 2012). Defined as a sub-branch of applied ethics, environmental ethics basically deals with the correctness and incorrectness of the behaviours of humans and other living things towards inanimate objects (Benson, 2000).

Environmental ethics aims to make people live in harmony with nature (Homer and Kahle, 1988; Huying, 2004) while trying to determine what the right behaviour should be (Amerbauer, 1998, cited in Kılıç, 2008). Many environmental disasters that emerged in the second half of the 20th century increased the interest in environmental ethics and brought it into a systematic order. There are also different perspectives on environmental ethics which gained a scientific quality in the 1980s (Cochrane, 2006) within the framework of various opinions about whether there is an environmental crisis. With the discovery of iron, the period until the industrial revolution includes the period when the anthropocentric approach was adopted. The non-strict anthropocentric approach focuses primarily on the protection of people and adopts the approach of a balanced use of natural resources to maintain the people's quality of life (Dunlap and Van Liere 1978; Callicott and Frodeman 2009). In the strict anthropocentric approach, however, which basically argues that the entire environment exists to serve human beings, the idea that human being is the owner of nature and has the right to use all its elements prevail. Therefore, the interests and needs of human beings, who are regarded as the master of the environment in a sense, are seen as the priority. In this context, it is stated that the animate or inanimate values of human beings are valuable only if they are for the benefit of the person, who are supporting the approach that ethical principles are meaningful only when they exist for themselves.

Particularly in the 16th and 17th centuries, the idea that nature was put at the disposal of man (Gül, 2013), as scientists such as Bacon, Descartes and Newton stated, became more severe especially with the industrial revolution (Ertan, 2004). During that period, human beings became crueller to nature and adopted unlimited use and exploitation (Ertan, 2004). However, after the industrial revolution, with the increasing demands of people for a comfortable life (NRDC, 2012), the damage to the environment was observed to negatively affect people as well. Thus, in addition to the anthropocentric approach, the ecocentric environmental ethics approach, which includes primarily biocentric, earth ethics, deep ecology and social ecology approaches that emphasize the importance of harmony between the environment and human beings came to the fore. (Anemiya & Macer, 1999; Ertan, 2004; Kılıç, 2008). As for nature protection in the ecocentric approach, all animate and inanimate beings are valued, instead of people's pursuing their own personal interests (Dunlap and Van Liere 1978), and this value is applied to nature itself (Ertan 2004). With a holistic understanding, ecocentrism looks for the problems of animate or inanimate beings within the ecosystem without separating them that compose the nature itself. The metaphor of life is the world, not organisms, because all organisms have evolved from a continuous world (Rowe 1994). In addition to these basic ethical approaches, there are different approaches to environmental ethics such as deep ecology, land ethics, theocentric ethics, sustainable environmental ethics and ecofeminism.

According to the ecofeminist approach called the Futurist approach, women and nature in connection with each other are oppressed due to the patriarchal mentality and, in order to prevent this and to ensure equality for women, the relationship between nature and human should be much healthier (Scarce 1990). In fact, it is stated that, together with different environmental problems, individuals' perspectives, knowledge, and culture are effective in the formation of different ethical approaches towards the environment. Ethical approaches, which are stated to be effective in the thoughts and behaviours of individuals, are expected to be similar in terms of the environment. In addition, it is stated that individuals with an ecocentric approach have a mission to protect the environment and leave the ecosystem clean without destructing it with a sense of responsibility towards future generations (Akalin, 2019).

The value-belief-norm theory, which was created to explain the effect of human behaviours on ecology, states that people will display environmental behaviours when they have the belief that the environment is important to them (Berenguer, 2010). According to these views, it is the attitudes and value judgments formed by

individuals that have a role in the formation and shaping of individuals' behaviours (Fishbein & Ajzen, 2010). With similar interpretations in environmental ethics approaches, it is stated that individuals who have ecocentric approaches to environmental ethics will exhibit behaviours to protect the environment and solve problems related to the environment. In addition, values form the basis of human behaviours according to the value-attitude-behaviour theory based on values-belief-norms (McCarty & Shrum, 1994; Stern, 2000). According to some opinions, the attitude to the environment varies more easily than the environmental values (Sjöblom & Wolff, 2017; Steg, Bolderdijk, Keizer, & Perlaviciute, 2014). In this context, the tendency for environmental values can ensure that individuals have more positive environmental values.

In studies conducted in a number of different countries, an inverse relationship was found between environmental perception, which is described as egoistic, anthropocentric or human-centered, and environmental behaviours (Crumpei, Boncu, Crumpei, 2014). There are also studies showing that individuals with the ecocentric approach tend to display environmentally friendly behaviours. For example, in their study on the relationship of environmental attitude, motivation and value for the conservation of marine biodiversity, Halkos and Matsiori (2017) determined that those who display environmentally friendly behaviour have higher environmental attitude scores. However, some studies have found that individuals with environmentalist approach do not show this in their behaviour when their thoughts and feelings are not in harmony. In the research by Misfud (2011) with students who were about to complete the secondary education, it was found that they had a strong positive attitude towards the environment but took little positive action towards the environment. Similarly, in their study with 7th grade students, Rebolj and Devetak (2013) observed that while most of the students were concerned about environmental issues such as drought and thirst, they were not very willing to participate in environmental projects. Liu, Liang, Fang, and Tsai (2015) found in their study that teachers' knowledge and attitudes towards the environment were at a good level; however, they were at a low level in terms of action. It is stated that the results were mostly due to the education provided in a traditional way, especially in science programs. Therefore, environmental education and its importance, which is one of the important pillars in the development of positive attitudes and behaviours towards the environment, are highlighted.

The aim of environmental education is to enable individuals to acquire sufficient environmental knowledge, as well as positive attitude towards the environment, ethical approach, and value and to reflect these tendencies on behaviour in a positive way (Poortinga, Steg and Vlenk, 2004; Mackenzie and Edwards 2013). The purpose of environmental education is to enable individuals to produce solutions by increasing their sensitivity to both local and global environmental problems (Cole, 2007). It is stated that particularly applied environmental education, together with the basic knowledge gained through environmental education, will make an important contribution to the shaping of ecological values (Kempton, Boster, & Hartley, 1995; Kollmuss & Agyeman, 2002). Energy efficiency, which came to the fore upon the Tbilisi Declaration, is still valid today. Individuals sensitive to energy efficiency are sensitive to environmental knowledge, attitudes, emotions, values, awareness and behaviours and environmental problems (UNESCO, 1978). Studies have concluded that individuals who are aware of the environmental and harmful situations for the environment have higher bio-spheric values (Corner, Roberts, Chiari, Voller, Mayrhuber, Mandl & Monson, 2015; Howell, 2013; McMillan, Wright, & Beazley, 2004). Moreover, it is stated that values affect knowledge as well as cultural and socioeconomic factors. As for environmental education, both the content of the program created and the knowledge of educators, i.e. teachers, as well as their attitudes towards the environment, environmental values and behaviours, should be taken into account.

When the studies in literature examined, it was seen that, in general, case studies were conducted with different groups only in the context of environmental ethics (Bozdemir & Faiz, 2018; Cappellaro, 2016; Çobanoğlu, Karakaya, & Türer, 2012; Erten, 2007; Karakaya, 2009; Erten & Aydoğdu, 2011; Kortenkamp & Moore, 2001; Thompson & Barton, 1994; Thompson, 1998; Özdemir, 2014;) or only in the context of environmental behaviour (Özgen (2012) and Öcal (2013) Silkü (2011) Pe'er, Goldman and Yavetz (2007); Hsu (2004)). In addition, there are studies on whether environmental ethics or environmental behaviour change according to variables such as gender [(Şama, 2003; Çabuk & Karacaoğlu, 2003; Deniz & Genç, 2007; Manzaral, Barreiro, & Carrasquer, 2007; Erten, 2008; Kahyaoğlu, Daban, & Yangın, 2008; Karakaya, 2009; Şenyurt, Temel, & Özkahraman, 2011; Wongchantra & Nuangchalerm, 2011; Çobanoğlu, Karakaya, & Türer, 2012; Kiper, Korkut, & Üstün Topal, 2017; Karakaya & Yılmaz, 2017; Akyol (2014) Genç & Genç (2013); De Lavega (2004)] department [(Şama, 2003; Çabuk & Karacaoğlu, 2003; Kahyaoğlu, Daban, & Yangın, 2008; Karakaya, 2009; Saka, Sürmeli, & Öztuna, 2009; Şenyurt, Temel, & Özkahraman, 2011; Can, 2012; Kiper, Korkut, & Üstün Topal, 2017)], and class level (Çabuk & Karacaoğlu, 2003; Manzaral, Barreiro, & Carrasquer, 2007; Can, 2012; Sungur, 2017).

In this study, besides determining the environmental ethics and environmental behaviour levels of the teacher candidates in the context of both environmental ethics and environmental behaviour, ethical and behavioural changes were examined according to gender, department and place of residence. Therefore, the difference of these variables in both the ethical point of view and the behavioural dimension was tried to be discussed from both angles. In addition, there are very few studies on the relationship between environmental education and environmental behaviour (Gheith, 2013; Liu, Liang, Fang and Tsai (2015; Kaida & Kaida, 2016; Misfud (2011) Rebolj and Devetak (2013; Thapa, 2010)), and the harmony of ethical approach with behaviour was intended to be determined. In line with the data obtained, it is aimed to contribute to the processes of developing environmental ethics and environmental behaviour in different programs by contributing to the environmental education programs provided in the educational processes of the teacher candidates. Accordingly, the questions of the study are as follows:

- What are the approaches to environmental ethics (anthropocentric and ecocentric) and the environmental behaviour levels of the teacher candidates?
- Do the teacher candidates' approaches to environmental ethics (anthropocentric and ecocentric) and their environmental behaviours differ according to gender, department and place of residence?
- Is there a relationship between the teacher candidates' approaches to environmental ethics (anthropocentric and ecocentric) and their environmental behaviours?

Method

This research was designed by combining two methodologies including cross-sectional research and correlation study under the quantitative research type. In cross-sectional researches, research data are collected from a predetermined population over a specified period of time. The descriptive analyses including the mean and standard deviation were calculated to reveal the level of environmental behaviour, anthropocentric and ecocentric attitudes of teacher candidates of science, primary school and social sciences. Relational studies aim to examine the relationships between the variables of the study (Fraenkel & Wallen, 2006). Within the scope of the research problem, a relational screening model, which aims to describe the current situation (Çepni, 2010; Karasar, 2000), was applied in order to determine the relationship between the approaches to environmental ethics and the environmental behaviours of teacher candidates.

Study Group

The research group consists of 881 third year and final year student teachers from the departments of science teaching, primary school teaching and social sciences teaching in five state universities. Of the teacher candidates, 650 are female and 231 are male students. Of the teacher candidates participating in the study, 357 were science teacher candidates, 273 were primary school teacher candidates, and 251 were social sciences teaching graduates. The research data were collected in approximately 6 months. The data were presented to the teacher candidates in print, and a half-hour period was given to them for the application.

Data Collection Tools

Approaches to Environmental Ethics Scale: In the study, Approaches to Environmental Ethics Scale (Saka & Sürmeli, 2013) was used to determine the approaches to environmental ethics of teacher candidates. The scale consists of 25 items and includes the 5-point Likert scale ranging from 'Strongly disagree' to 'Strongly agree'. The scale consists of three subscales, namely anthropocentric, biocentric and ecocentric subscales each of which was evaluated according to separate scores, rather than the whole scale. There are 8 items in the anthropocentric scale, 11 items in the biocentric scale, and 6 items in the ecocentric scale. In the study, anthropocentric and ecocentric dimensions of the scale were used. The results of confirmatory factor analysis during the development of the scale were RMSEA, 0.005; GFI, 0.86; AGFI, 0.83; NNFI and CFI were calculated as 0.96 (Saka and Sürmeli, 2013). The Cronbach α reliability coefficient of the scale was calculated as .73 for the total scale, .76 for the anthropocentric and .86 for the ecocentric (Saka & Sürmeli, 2013). The results of the Cronbach α reliability calculation repeated in this study was .80; .84; and .86 respectively. The evaluation of the scale is assessed according to separate scores gained from each sub-scale. The whole scale was used in the application phase of the research, but the biocentric approach was not taken into consideration in the evaluation. The research aims to find the relationship between change in variables and behaviours according to the most

environmentally friendly ethical approach (ecocentric) and the most non-environmental ethical approach (anthropocentric). Therefore, the results of the biocentric ethical approach were not included in this study.

Environmental Behaviour Scale: It was obtained as a result of adaptation to Turkish from the "High School Environmental Survey" scale published by Karatekin (2011) in Wisconsin Center for Environmental Education in order to measure the environmental behaviours of the teacher candidates. During the adaptation study, 7 items were added by the researcher to improve the content validity, and a 19-item scale was obtained according to the data obtained from the reliability and validity analyses conducted as a result of pilot schemes. The scale includes the 5-point Likert scale which has the following options as answers: "Always", "Generally", "Sometimes", "Rarely" and "Never". The scale has 3 sub-dimensions: Physical Protection Behaviour with 7 items, Individual and Social Persuasion with 5 items, and Political and Legal Behaviours with 6 items. As a result of the reliability analysis conducted by Karatekin (2011), the Cronbach α reliability coefficient of the whole scale was .85, and the sub-dimensions of Physical Protection Behaviour, Individual and Social Persuasion and Political and Legal Behaviours were respectively .73; .81 and .71. As a result of the reliability analysis carried out within the scope of this study, the Cronbach α value for the whole scale was determined as .89, and the sub-dimensions were determined as .68; .80 and .88 respectively.

Data Analysis

In the study, SPSS 14 package program was used to process, analyse and interpret the raw data obtained from the Personal Information Form, Approaches to Environmental Ethics Scale and Environmental Behaviour Scale. In the statistical analysis, the percentage and frequency values that describe the general structure of the group were primarily included in line with the answers given by the sample group to the questions stated in the Personal Information Form. In addition, the mean (X), standard deviation (sd) and standard error (SE_x) values of the scores the group received from the relevant measurement tools were calculated. The results of the skewness and kurtosis analysis conducted to determine whether the scores obtained from the tests show normal distribution are given in Table 1.

Table 1. Skewness and kurtosis analysis results for environmental behaviour scale and environmental ethics scale

| Variables | Skewness | Skewness standard error | Kurtosis | Kurtosis standard error | Mean | sd |
|---|----------|-------------------------|----------|-------------------------|-------|--------|
| Anthropocentric | ,454 | ,082 | -,316 | ,165 | 19,12 | 6,579 |
| Ecocentric | -,967 | ,082 | 1,144 | ,165 | 25,20 | 3,924 |
| Physical Protection Behaviour Subdimension | ,233 | ,082 | 1,568 | ,165 | 23,66 | 4,857 |
| Individual and Social Persuasion Subdimension | -,255 | ,082 | -,177 | ,165 | 20,91 | 4,676 |
| Political and Legal Behaviours Subdimension | ,805 | ,082 | -,255 | ,165 | 12,82 | 5,844 |
| Environmental Behaviour | ,231 | ,082 | -,239 | ,165 | 57,41 | 12,897 |

In the Kolmogorov Simirnov analysis, it was determined that normality could not be achieved in either of the measurement tools ($p < .01$). Since the Kolmogorov-Simirnov test is very precise in determining the normal distribution (Pett, 1997), the skewness and kurtosis values were also used. In the analyses, it was observed that the values obtained when the Skewness and Kurtosis coefficients were divided by the Skewness and Kurtosis standard error respectively were not between ± 1.96 (Liu, Marchewka, Lu, Yu, 2005; Pett, 1997); therefore, it was accepted that the distribution did not provide normality. For this reason, Mann Whitney U-Test (Mann-Whitney U-Test for Independent Samples) and Kruskal Wallis H-Test (Kruskal Wallis H-Tests for independent samples) tests were applied for non-parametric unrelated measurements. In addition, Spearmen Rank Differences Test was applied to determine the relationship between the approaches to environmental ethics and environmental behaviour and the sub-dimensions.

Results

In this section, firstly the analysis results regarding the environmental ethics and environmental behaviour levels of the teacher candidates constituting the research group are presented. Along with these levels, there are results

regarding whether there is a difference in the environmental ethics and environmental behaviours based on the variables of gender, department of education and place of residence. Finally, the results of the relationship between the teacher candidates' approaches to environmental ethics and environmental behaviours are provided. While the results of the approach to environmental ethics levels of the teacher candidates are presented in Table 2, Table 4 shows the environmental behaviour levels.

Table 2. Descriptive statistics results for teacher candidates' levels of approach to environmental ethics

| | N | Minimum | Maximum | Mean | S.D. |
|-----------------|-----|---------|---------|-------|------|
| Anthropocentric | 881 | 8.00 | 38.00 | 19.12 | 6.57 |
| Ecocentric | 881 | 9.00 | 30.00 | 25.20 | 3.92 |

As a result of the analysis, it was determined that the anthropocentric approach of the teacher candidates was at the level of I disagree ($\bar{x} = 19.12$), while the ecocentric environmental ethics approach ($\bar{x} = 25.20$) was at the level of I agree.

Table 3. Descriptive statistics results for teacher candidates' environmental behaviour levels

| | N | Minimum | Maximum | Mean | S.D. |
|----------------------------------|-----|---------|---------|-------|-------|
| Physical Protection Behaviour | 881 | 10.00 | 35.00 | 23.66 | 4.85 |
| Individual and Social Persuasion | 881 | 6.00 | 30.00 | 20.91 | 4.67 |
| Political and Legal Behaviours | 881 | 6.00 | 30.00 | 12.82 | 5.84 |
| Environmental Behaviour | 881 | 24.00 | 95.00 | 57.41 | 12.89 |

When Table 3 was examined, it was seen that the environmental behaviours of the teacher candidates ($\bar{x} = 57.41$) were generally at the level of I agree. However, while the physical protection behaviour ($\bar{x} = 23.66$) and the individual and social persuasion behaviours ($\bar{x} = 20.91$) were at the level of sometimes, the political and legal behaviours ($\bar{x} = 12.82$) were found to be at the level of rarely in the analysis results. Table 4 and Table 5 presented the variability of the approaches to environmental ethics and the environmental behaviours of the teacher candidates according to the variable of gender.

Table 4. Mann-Whitney U test comparison results for teacher candidates' levels of approach to environmental ethics by gender variable

| | Gender | n | Mean rank | Total rank | U | p |
|-----------------|--------|-----|-----------|------------|-----------|------|
| Anthropocentric | Male | 231 | 467,67 | 108032,50 | 68913,500 | .063 |
| | Female | 650 | 431,52 | 280488,50 | | |
| Ecocentric | Male | 231 | 372,96 | 86153,00 | 59357,000 | .000 |
| | Female | 650 | 465,18 | 302368,00 | | |

Table 4 presented the results showing whether the scores of the teacher candidates from the environmental ethics scale differed according to the gender variable. According to the results, it was determined that the gender variable did not make a difference in the approaches to anthropocentric environmental ethics of the teacher candidates ($p > .05$). In addition, a significant difference, which seemed to be in favour of women, was observed in the approaches to ecocentric environmental ethics ($p < .05$).

Table 5. The comparison results of the Kruskal Wallis test for the levels of teacher candidates' approach to environmental ethics according to the department variable

| | Teaching Department | n | Mean Rank | sd | χ^2 | p |
|-----------------|---------------------|-----|-----------|----|----------|------|
| Anthropocentric | Science | 357 | 431,82 | 2 | 3,292 | ,193 |
| | Primary School | 273 | 430,39 | | | |
| | Social Sciences | 251 | 465,60 | | | |
| Ecocentric | Science | 357 | 471,21 | 2 | 9,099 | ,011 |
| | Primary School | 273 | 428,29 | | | |
| | Social Sciences | 251 | 411,85 | | | |

Based on the analyses conducted on whether there was a difference in the approaches to environmental ethics of the teacher candidates according to the departments they studied, only a difference in the approach to ecocentric environmental ethics (χ^2 (sd = 2, n = 881) = 9,099; $p < .05$) was found. Considering the mean rank of teacher candidates' ecocentric scores among science, social sciences and primary school teacher candidates, it was observed that this difference was in favour of prospective science teachers in both groups.

Table 6 and Table 7 showed the variability of the approaches to environmental ethics and the environmental behaviours of the teacher candidates according to the variables of place of residence. When Table 6 was examined, it was seen that there was no difference in any of the approaches to environmental ethics of the teacher candidates according to the variable of place of residence.

Table 6. The comparison results of the Kruskal Wallis test for the levels of environmental ethics by the variable of place of residence of the teacher candidates

| | Place of Residence | n | Mean Rank | sd | χ^2 | p |
|-----------------|--------------------|-----|-----------|----|----------|------|
| Anthropocentric | Village | 106 | 475,42 | 4 | 8,993 | ,061 |
| | Town | 45 | 456,01 | | | |
| | County | 122 | 429,48 | | | |
| | City | 210 | 472,17 | | | |
| | Metropolis | 398 | 417,22 | | | |
| Ecocentric | Village | 106 | 461,41 | 4 | 1,989 | ,738 |
| | Town | 45 | 433,36 | | | |
| | County | 122 | 456,23 | | | |
| | City | 210 | 425,25 | | | |
| | Metropolis | 398 | 440,07 | | | |

Table 7. Mann-Whitney U test comparison results for the teacher candidates' environmental behaviour levels by gender variable

| | Gender | n | Mean rank | Total rank | U | p |
|----------------------------------|--------|-----|-----------|------------|-----------|------|
| Physical Protection Behaviour | Male | 231 | 400,87 | 92602,00 | 65806,000 | ,006 |
| | Female | 650 | 454,60 | 295038,00 | | |
| Individual and Social Persuasion | Male | 231 | 399,97 | 92392,50 | 65596,500 | ,004 |
| | Female | 650 | 455,58 | 296128,50 | | |
| Political and Legal Behaviours | Male | 231 | 478,80 | 110603,50 | 66342,500 | ,008 |
| | Female | 650 | 427,57 | 277917,50 | | |
| Environmental Behaviour | Male | 231 | 431,06 | 99574,00 | 72778,000 | ,511 |
| | Female | 650 | 443,86 | 288066,00 | | |

Table 8 presented the analyses carried out to determine whether gender caused a difference in environmental behaviour and environmental behaviour sub-dimensions. According to the analysis results, while the environmental behaviour of the teacher candidates did not differ according to gender ($p > .05$), it was observed that there was a significant difference in all three sub-dimensions ($p < .05$) which was found to be in favour of females for physical protection behaviour and individual and social persuasion behaviours, and in favour of males for political and legal behaviour. Table 8 and Table 9 showed the variability of the approaches to environmental ethics and the environmental behaviours of the prospective teachers according to the department variable.

Table 8. The comparison results of the Kruskal Wallis test for the environmental behaviour levels of the teacher candidates by department variable

| | Teaching Department | n | Mean Rank | sd | χ^2 | p | Significant Difference |
|----------------------------------|---------------------|-----|-----------|----|----------|------|---|
| Physical Protection Behaviour | Science | 357 | 466,76 | 2 | 10,166 | .006 | Science>Social Sciences Primary> Social sciences |
| | Primary School | 273 | 443,15 | | | | |
| | Social Sciences | 251 | 400,28 | | | | |
| Individual and Social Persuasion | Science | 357 | 463,09 | 2 | 6,726 | .035 | Science> Social sciences |
| | Primary School | 273 | 441,66 | | | | |
| | Social Sciences | 251 | 408,86 | | | | |
| Political and Legal Behaviours | Science | 357 | 433,17 | 2 | ,590 | .744 | - |
| | Primary School | 273 | 447,82 | | | | |
| | Social Sciences | 251 | 444,72 | | | | |
| Environmental Behaviour | Science | 357 | 455,14 | 2 | 5,096 | .078 | - |
| | Primary School | 273 | 449,31 | | | | |
| | Social Sciences | 251 | 410,14 | | | | |

As a result of the analyses carried out on whether there was a difference in the environmental behaviours and sub-dimensions of the teacher candidates according to their departments, only physical protection behaviour (χ^2 (sd = 2, n = 881) = 10.166; $p < .05$) and individual and social persuasion dimension difference (χ^2 (sd = 2, n = 881) = 6.726; $p < .05$) was determined. It was observed that the difference was in favour of the Science teacher candidates among the Science and Social sciences under the sub-dimension of Physical Protection Behaviour and of Primary School teaching among Primary School Teaching and Social sciences teacher candidates. Considering the mean rank between the Science and Social sciences teacher candidates, it was seen that the difference was in favour of the prospective science teachers under the individual and social persuasion sub-dimension.

Table 9. The comparison results of the Kruskal Wallis test for the environmental behaviour levels of the teacher candidates by place of residence

| | Place of residence | n | Mean Rank | Sd | χ^2 | p |
|----------------------------------|--------------------|-----|-----------|----|----------|------|
| Physical Protection Behaviour | Village | 106 | 414,10 | 4 | 1,716 | ,788 |
| | Town | 45 | 421,51 | | | |
| | County | 122 | 447,34 | | | |
| | City | 210 | 447,32 | | | |
| | Metropolis | 398 | 443,99 | | | |
| Individual and Social Persuasion | Village | 106 | 433,67 | 4 | ,743 | ,946 |
| | Town | 45 | 443,27 | | | |
| | County | 122 | 432,53 | | | |
| | City | 210 | 453,23 | | | |
| | Metropolis | 398 | 438,84 | | | |
| Political and Legal Behaviours | Village | 106 | 420,85 | 4 | 2,490 | ,215 |
| | Town | 45 | 433,42 | | | |
| | County | 122 | 402,59 | | | |
| | City | 210 | 466,81 | | | |
| | Metropolis | 398 | 445,38 | | | |
| Environmental Behaviour | Village | | 414,76 | 4 | 5,791 | ,646 |
| | Town | | 436,94 | | | |
| | County | | 427,66 | | | |
| | City | | 458,60 | | | |
| | Metropolis | | 442,15 | | | |

Table 9 demonstrated that there was no difference in any environmental behaviour of the teacher candidates according to the variable of place of residence. Below are the results of the analysis conducted to determine whether there was a relationship between the approaches to environmental ethics of the teacher candidates and their environmental behaviour levels, and, if any, the level of this relationship.

Table 10. Spearman rank differences correlation results for the teacher candidates' approaches to environmental ethics, environmental behaviours and environmental education self-efficacy

| | 1 | 2 | 3 | 4 | 5 | 6 |
|----------------------------------|---|-------|--------|--------|--------|--------|
| Anthropocentric | 1 | -,034 | ,110** | ,076* | ,307** | ,208** |
| Ecocentric | | 1 | ,313** | ,333** | ,102** | ,285** |
| Physical Protection Behaviour | | | 1 | ,668** | ,525** | ,857** |
| Individual and Social Persuasion | | | | 1 | ,485** | ,834** |
| Political and Legal Behaviours | | | | | 1 | ,827** |
| Environmental Behaviour | | | | | | 1 |

* Significance at $p < .05$ level

** Significance at $p < .01$ level

Table 10 showed that anthropocentric approach had a positive relationship with low significance with political and legal behaviours ($r = .307$, $p < .01$), environmental behaviour ($r = .208$, $p < .01$) and physical protection behaviours ($r = .110$), $p < .01$). The ecocentric approach had a positive relationship with low significance with environmental behaviour ($r = .285$, $p < .01$) and physical protection behaviour ($r = .313$, $p < .01$), political and legal behaviour ($r = .102$, $p < .01$), and individual and social persuasion ($r = .333$, $p < .01$).

Discussion and Conclusion

This section presents the findings regarding whether the ethical approaches and behaviours of the teacher candidates differ according to their gender, department and place of residence, as well as the results of the relationship between the ecocentric and anthropocentric approaches to environmental ethics and the environmental behaviours of the prospective teachers. It is observed that the teacher candidates generally do not adopt an anthropocentric approach in terms of environmental ethics as expected. It is seen that ecocentric approaches to environmental ethics are at a good level (I agree), which means they have an environmentalist approach that takes into account the environment in terms of all living and non-living entities. Similar results were obtained in some studies conducted with teacher candidates (Çolak, 2017; Gürüçin, Sevinç, 2020; Karakuş & Çimen, 2020; Özdemir, 2012; Rachmatullah, Lee, Ha, 2020; Sönmez, 2019), which points out that the teacher candidates adopt an environmentalist approach and take into account the importance of all beings living in the environment.

Moreover, in terms of environmental behaviours, it is observed that the teacher candidates “sometimes” perform actions as part of physical protection behaviours and individual and social persuasion behaviours. These results show that individuals' behaviours of working directly for the natural world and persuading other individuals and communities in order to prevent or solve environmental problems (Volk and Mcbeth, 2001, cited in Karatekin, 2011) are not at a sufficient level. It was determined that they rarely display political and legal behaviours. Therefore, it was determined that teacher candidates rarely behave in terms of participating in environmental activities (Volk and Mcbeth, 2001, cited in Karatekin, 2011) to use political tools, to prevent and solve environmental problems, and to support and strengthen laws. When addressed together with the sub-dimensions, it is seen that they rarely display positive environmental behaviours in general. Koç and Karatekin (2013) found in their study conducted with geography teachers that prospective teachers showed environmentalist behaviours at a moderate level. In another study carried out with primary school teachers, the conclusion that the positive environmental behaviours were at a low level, although environmental attitudes were high (Erbaşan & Erkol, 2020), is similar to the result of this study.

The gender factor can be an effective factor making a difference in individuals' attitudes, tendencies or beliefs, along with their behaviour patterns. It is stated that such difference is significantly effective not only in biological but also in psychological and socio-cultural variables in the context of biology (Bandura, 1986; Bussey & Bandura, 1999). According to the results obtained from this study, it could be stated in terms of gender that females adopt more ecocentric approaches in ethical approaches. In terms of environmental behaviours, it is understood that females are more environmentally friendly in their physical protection behaviour and individual and social persuasion behaviours. Although there are studies concluding that gender is not effective in terms of environmental behaviour (Erbaşan & Erkol, 2020; Karakaya, Avcı & Yılmaz, 2018; Karakaya, Avcı & Yılmaz, 2018; Karakuş & Çimen, 2020; Özdemir, 2012; Sungur, 2017), they indicate that females have a more friendly approach to the environment than males (Fernandez Manzanal, Rodriguez-Barreiro and Carrasquer, 2007; Gürüçin, Sevinç, 2020; Karakaya and Yılmaz, 2017; Keleş and Özer, 2020; Plavsic, 2013; Sönmez, 2020; Sönmez, 2019; Zelezny, Chua and Aldrich, 2000). Ecofeminist literature suggests that females relate to the environment at a more empathetic level and there are gender differences in human relationships (Bloodhart & Swim, 2010; Stephens, Jacobson, & King, 2010). It is stated that women are more sensitive and concerned about environmental issues such as environmental health and climate change than men (Ciocirlan & Pettersson, 2012; Talu, 2016). In addition, it is also stated that being more aware of social and environmental issues women can make more efforts to create values for social and environmental issues and improve them (Buil-Fabrega, Alonso-Almeida and Bagur-Femenias, 2017). Gender-specific structural differences in society and family life can cause differences in the environment as well as in many aspects of social life. While technical solutions are at the forefront for men, changing the lifestyle (such as demand of green space, low consumption of energy and water) is more important for women and they strive for this (Johnsson-Latham, 2007).

Moreover, it was found that the male teacher candidates displayed more friendly behaviours to the environment in terms of political and legal environmental behaviours. The higher risk-taking tendency of men is shown as a reason for their less environmentalist perspective than women (Eisler, Eisler, & Yoshida, 2003). The view that females have an important effect on environmental protection is shown as a reason leading them to have more environmentalist perspectives and behaviours than males (Eisler, Eisler and Yoshida, 2003).

As for the departments, it can be stated that prospective science teachers adopt an ecocentric approach more than both primary school and social sciences teacher candidates, which is considered to be a result of the relevant department as only the science teaching program includes a course for environmental education. In

addition, there are some acquisitions especially in the context of the Science course of Turkey's Ministry of National Education. The fact that these subjects are constantly being addressed as part of the education provided to the teacher candidates is considered to be effective. Similarly, in the studies conducted by Gürüçin and Sevinç (2020), Tan (2014) and Sönmez (2019), it was observed that science teacher candidates had higher level of ethical approaches to the environment, while another study conducted with prospective science and primary school teachers (Sönmez, 2019) determined that the department was not effective. In another study conducted with students studying in economics, sociology, psychology and biology departments, no difference was found in terms of department (Özdemir, 2012). In addition, in the study conducted by Dalbudak (2013), it was determined that biology teaching students' attitudes towards the environment were significantly different from physics teacher candidates, which may be due to the fact that the content of the courses of biology teaching department is more related to environmental issues.

Considering the effect of the department on environmental behaviours, it can be stated that both prospective science teachers and primary school teacher candidates exhibit more environmentally friendly behaviours than social sciences teacher candidates in terms of physical protection behaviour. In addition, it is observed that science teacher candidates exhibit more environmentally friendly behaviours than social sciences teacher candidates in terms of individual and social persuasion behaviours. Therefore, it indicates that prospective science teachers tend to show more environmental behaviours in terms of persuading other individuals and the society, in addition to solving environmental problems and taking measures for possible problems (Volk and Mcbeth, 2001, cited in Karatekin, 2011).

It is observed that the place of residence of the teacher candidates does not make a significant difference in terms of both environmental ethics approaches and environmental behaviours. Although Turkey has a wide geography, it is observed that working from different universities and living in different residential areas does not have an impact. While no ecocentric difference was observed in the studies of Karakuş and Çimen (2020), it was determined that the anthropocentric tendencies of the teacher candidates living in rural areas were higher. In some studies conducted with prospective teachers, it was concluded that place of residence did not make a difference in prospective teachers' environmental awareness (Gürüçin & Sevinç, 2020), environmental ethics (Dikicil, 2018) or environmental awareness level (Erol & Gezer, 2006; Yalçın, 2009). The research by Plavsic (2013) determined that students who are part of the campus life have an environmentalist approach at a similar level with those who live with their families. It is stated that such behaviour patterns are affected more by social norms. Considering the views suggesting that language, lifestyle, history and geography of cultural structure are more effective in terms of perspective and evaluation of events (Eisler, Wester, Yoshida, & Bianchi, 1999; Shweder, 1990; Triandis, 1996), it is seen that common culture is more effective on the environment.

According to the analyses, it is observed that the ecocentric approaches of the teacher candidates are mostly correlated with physical protection and individual and social persuasion environmental behaviours. However, it is remarkable that the said relationship is at a low level since the main purpose of ensuring that individuals acquire ethical approaches is to help individuals acquire more environmentalist behaviours. According to the results, it is seen that the approaches to environmental ethics of the teacher candidates do not have much effect on environmental behaviours. Similarly, in the study by Said, Ahmadun, Paim and Masud (2003), it was concluded that teachers' environmental knowledge was at a good level, but they were incapable of understanding the underlying causes of environmental problems, and there was not a sufficient level of harmony between teachers' environmental knowledge and anxiety levels and behaviours. Again, Liu, Yeh, Liang, Fang, Tsai (2015) observed that, although Taiwanese teachers have a high level of environmental awareness and attitude, they are inadequate in terms of responsible environmental behaviours. In another study conducted by Yılmaz, Yıldız, and Arslan, it was determined that environmental sensitivity and attitudes of university students explained 28% of the change in environmental behaviour, while Siu and Cheung (1999) put forward that the actual behaviour towards the environment was at 19%, and the level of explanation of environmental attitude for the actual behaviour level was very low. In their study conducted with prospective science teachers, Uçar and Canpolat (2019) concluded that although the ecocentric tendency was high, the compliance with behaviour was not at a sufficient level. This study and previous results show that ethical approaches of prospective teachers towards the environment and their environmental behaviour patterns are not in harmony as expected.

Another significant conclusion is that anthropocentric approaches are directly correlated with political and legal behaviour, albeit at a low level. In some studies, it is seen that, although environmental awareness is high, individuals calculate cost-benefit rather than positive behaviour towards the environment, especially in consumption habits (Said, Ahmadun, Paim and Masud, 2003). It is stated that media tools have an effect on this result. In a study conducted by Erve (2013) with young people between the ages of 21 and 26 with different education levels, it was observed that, although they have a positive attitude towards the consumption of

environmentally harmless products, the attitude-behaviour relationships arising from the prices of the products are in the opposite direction. It is seen that the age, gender, personality traits and social environment of individuals are effective in the formation of environmental risk perception. Especially attitudes and values based on culture are expressed as determinants of risk and uncertainty (Vaughan & Nordenstam, 1991). In the studies conducted, it was concluded that individuals who adopt environmental approaches exhibit positive behaviour towards the environment (Gheith, 2013; Kil, Holland, & Stein, 2014; Martin & Bateman, 2014; Thapa, 2010). Moreover, there are results indicating that the environmental protection behaviours of individuals with anthropocentric approach may be in the opposite direction, in addition to the results showing that there is an inverse relationship (Kaida & Kaida, 2016).

Recommendations

It should be remembered that teachers are important role models, as well as planners and implementors of the teaching process. To this end, ethical approaches to the environment of teachers and their environmentally friendly behaviours will be effective in the behaviours and approaches of their students. Studies should be carried out to detect the obstacles to the transition between ethical approaches and behaviour, by looking at the focus of environmental values that are not in harmony with environmental behaviours. Environmental approaches and environmental behaviours of teachers should be evaluated properly and developed with in-service trainings in line with the data obtained. Such and similar studies show that training in environmental education of teachers is either not at all available or incomplete. According to the results of this study and similar studies, it is stated that prospective teachers who have received environmental courses in undergraduate programs and who are more interested in the environment as a field are more involved in the environmentalist approach and behaviour compared to teacher candidates from other branches. The said result reveals that environmental education courses should be added to teacher education programs. However, the results of the study show that the low-level relationship between environmental approaches and environmental behaviour is not only due to environmental education courses. During the creation of the contents of such courses, they should be designed not only for teaching environmental information, but especially for practical purposes, to ensure the acquisition of the ability to evaluate and solve environmental problems. Programs and applications, especially with non-class practices, which involve industry and sector creators and policy makers should be developed. While creating such programs and contents, it can be ensured that individuals are aware of the ethical dimension of environmental problems, by including environmental ethics education. As in the new teaching approaches, the use of arguments together with critical thinking skills in the environmental ethics education process increases the tendency towards the concept of ethics, while there are a few studies showing that individuals who encounter environmental climates can apply ethical thinking. (Baker, Grundy, Junmookda, Macer, Manzanero, Reyes, Tuyen & Waller, 2019). The results show that long-term education of environmental ethics is more motivational for individuals to be involved in solving environmental problems (Baker et al., 2019). Therefore, creating environmental education programs that include different perspectives and different applications beyond solely providing information can affect the thinking and behaviour of not only teachers but also teacher candidates and students.

Scientific Ethics Declaration

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

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