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The Self-Efficacy Perception for Environmental Education and Ecological Footprint Awareness of the Child Development Programme Students

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Abstract

The purpose of this study was to examine the correlation between the self-efficacy perception for environmental education and ecological footprint awareness of the child development programme students. Sample group of the study which was carried out according to the correlational survey model was specified according to convenience sampling. The sample group consisted of students studying in child development departments in four universities in Turkey. In the study, "Self-Efficacy Scale for Environmental Education" and "Ecological Footprint Awareness Scale" were used as data collection tools. For the data analysis, the Kolmogorov-Smirnov, t, variance tests and The Spearman's correlation coefficient was used. In the research results, it was revealed that the environmental education self-efficacy perception and ecological footprint awareness levels of the students of the child development programme positively affect each other at a moderate level.
Keywords: environmental education, ecological footprint, child development programme

Introduction

Environmental problems are structurally dependent on the lifestyles of communities. As a result of the quest for a quality life standard, together with developments in science and technology, have resulted in human activities being brought together with environmental problems. Young people who are raised with environmental consciousness are potentially the greatest tool of change for the long-term protection and management of environment. Therefore, environmental problems need to be solved with both social and individual changes. Accordingly, the goal of environmental education is to enable current and future citizens to move both at the personal and social levels (Jensen and Schnack, 1997, p.164; Erhabor and Don, 2016, 5374; Heasly & Iliško, 2023). Education in general and environmental education in particular should draw the attention of students to nature and enable us to develop natural environmental consciousness related to our place in nature and our attitude toward the environment (Bonnett, 2007, 709).

Environmental education brings skills and attitudes to students in order to enhance life in the world by stressing the mutual dependence between humans, community, and nature. It follows a holistic approach to recognize the mutual correlation between knowledge, attitudes, values and behaviours. Environmental education gives information about environment-friendly behaviours by developing appropriate environmental concepts (Meyer, 2004). An efficient environmental education course aims to develop environmental knowledge and attitudes rather than relaying unilateral information and to add skills requiring positive environmental actions (Ardoin, Bowers, and Gaillard, 2020).

Education is the key to a desirable future (Meyer, 2004; Salīte, Fjodorova & Ivanova, 2023) and a way of sustainability (Gottlieb, Vigoda-Gadot, Haim & Kissinger, 2012). Positive environmental attitudes and high knowledge level acquired via environmental education provided in educational institutions have a great impact on students in terms of the sustainability of environmental resources (Erhabor & Don, 2016, p. 5374). Environmental education and sustainable development are inseparable concepts that play a key role for people to live sustainably in the world. Environmental education provides not only a lifestyle contributing to sustainable development, but also information about the environment by infusing a positive attitude and responsible behaviour toward the environment (Meyer, 2004). Environmental education aims for individuals to strive for a more ecological life and gain that lifestyle (Roczen, Kaiser, Bogner, & Wilson, 2013). In order to enhance the quality of life of people worldwide, it is necessary to track whether or not every person lives within the scope of their own ecological opportunities and measure their effects on nature to decrease and manage their effects on the world resources (Meyer, 2004). The concept of ecological footprint is used for this criterion.

Ecological footprint measures how much of the annual renewal capacity of the biosphere is necessary for renewing the natural resources which are used by a specific population in a specific year (Venetoulis and Talberth, 2008, p. 441). Ecological footprint helps to see the dimension of individual and global footprints of the change in behaviours and lifestyles of people and how they affect the world (Meyer, 2004, p.33). Ecological footprint shows the effect of lifestyles of communities on the natural environment (Gottlieb, Vigoda-Gadot, Haim & Kissinger, 2012). Capital of nature should not be used faster than it can be renewed. This condition is explained with sustainability. In order to increase the consciousness and knowledge of sustainability, it is necessary to use a series of educational opportunities and methods (Meyer, 2004, p.33-34). Sustainability will be achieved as long as individuals have awareness of ecological footprints. It is believed that this awareness will develop with quality environmental education.

Child development curriculum within the body of vocational schools contains courses aimed at environmental education. These courses include both environmental content knowledge and pedagogical knowledge aimed at realizing environmental education. It is very important that environmental awareness is gained from an early age. Because only in this way, individuals can transform the love and consciousness of the environment into each personality. At this point, parents and teachers play a big role. Preschool teachers, especially, who have a great share in the development of children's personalities, have a great influence in this process.

In order to add environmental consciousness to the lives of children, environmental consciousness of child development programme students who actively work in preschool institutions primarily need to have self-efficacy beliefs related to

environmental education. In this study, it was aimed to examine the self-efficacy perceptions of the sample determined for environmental education and the awareness of the ecological footprint for a sustainable environment both according to certain variables; and to determine the relationship between them. The aim was to reveal the current situation of the teacher candidates who will bring the sustainable environmental awareness to the children at an early age. This study attaches great importance to determining and improving the current situation.Accordingly, the aim of the current study is to examine the correlation between the environmental education self-efficacy perception and ecological footprint awareness of the child development programme students.

Purpose of the Study

General purpose of the study was to examine the correlation between the self-efficacy perception for environmental education and ecological footprint awareness of the child development programme students. Within the frame of this general purpose, the following subgoals were specified:

1. Do the self-efficacy perception for environmental education and ecological footprint awareness of the child development programme students vary according to the class level variable?
2. Do the self-efficacy perception for environmental education and ecological footprint awareness of the child development programme students vary according to the university variable?
3. What is the level of the correlation between the self-efficacy perception for environmental education and ecological footprint awareness of the child development programme students?

Research Methodology

Study Design

This study was conducted according to the correlational survey model. The Survey model aimed to reveal specific characteristics of a group and determine the correlations between more than two variables. Clues about the causes and effects of the correlations between the variables are also revealed (Büyüköztürk, Kılıç Çakmak, Akgün, Karadeniz and Demirel, 2012, pp. 14-15; Karasar, 2018, pp.109-114).

The Sample

The sample group of the study was created using convenience sampling. Voluntary people and groups on whom the researcher can easily conduct research were included in the study (Sönmez and Alacapınar, 2014, p. 142; Gliner, Morgan, & Leech, 2015, p.125). The sample group of the study consisted of 280 first-year and second-year students studying in child development programmes in Erzincan Binali Yıldırım University (30), Fırat University (67), Kayseri University (120) and Munzur University (64) in the 2020-2021 academic year.

Data Collection Tools

In the study, "*Self-Efficacy Scale for Environmental Education*" (SESEE) which was developed by Özlü, Özer-Keskin and Gül (2013) and "*Ecological Footprint Awareness Scale*" (EFAS) which was developed by Çelik-Coşkun and Sarıkaya (2014), were used

as data collection tools. The *Self-Efficacy Scale for Environmental Education* has 24 items and 2 subscales. The Cronbach's Alpha reliability coefficient of the scale is 0.97. The subscales are content knowledge (0.93) and teaching strategies (0.96). The scale is graded from 0 to 100 in such a way to have a 10-unit increase. The lowest and highest scores of the scale are 0 and 2400, respectively. The Ecological Footprint Awareness Scale has 46 items and 5 subscales. The Cronbach's Alpha reliability coefficient of the five-point likert scale is 0.76. The subscales are food (0.70), transportation and housing (0.76), energy (0.86), wastes (0.81) and water consumption (0.68).

Data Analysis

The data were analysed via a computer-aided statistics programme. First of all, the Kolmogorov-Smirnov test of normality was used to determine whether the data were normally distributed, since the sample group was more than 50 people. If $p>0.05$ as a result of the test, the data is normally distributed. If $p<0.05$, the data is not normally distributed and skewness and kurtosis coefficients are checked. If the skewness and kurtosis coefficients are in the range of -2 and +2, the data is interpreted to be normally distributed (Büyüköztürk, 2007, p. 42; Kalaycı, 2010, 212; Yazıcıoğlu and Erdoğan, 2014, p. 247; Büyüköztürk, Çokluk and Köklü, 2019, p. 59). Table 1 shows the Kolmogorov-Smirnov test related to the scales.

Table 1
Results of the Kolmogorov-Smirnov Test Related to the Scales

		K-S	p	Skewness Coefficient	Kurtosis Coefficient
SESEE	Content knowledge	0.071	0.002	-0.732	-0.327
	Teaching Strategy	0.078	0.000	-0.635	-0.031
	Total Scale	0.080	0.000	-0.664	0.091
EFAS	Food	0.087	0.000	0.036	0.931
	Transportation and Housing	0.083	0.000	-0.171	0.720
	Energy	0.112	0.000	-1.616	7.878
	Wastes	0.090	0.000	-0.787	2.260
	Water Consumption	0.137	0.000	-1.262	2.668
	Total Scale	0.069	0.002	-1.237	7.552

Table 1 shows that both the overall Self-Efficacy Scale for Environmental Education and its subscales were normally distributed. However, it was determined that the food and transportation and housing subscales of the Ecological Footprint Awareness Scale were normally distributed, whereas the energy, wastes and water consumption subscales and the overall scale were not normally distributed. In the normally distributed data, the independent samples t-test, which is among parametric tests, and the analysis of variance were used. In analysis of the non-normally distributed data, the MWU and KWH tests which are among non-parametric tests were used. In order to determine the level of the correlation between the scales, the Spearman's correlation coefficients of the scales were examined.

Reserch Findings

This section includes results of the analysis which was performed for the data acquired from the Self-Efficacy Scale for Environmental Education and the Ecological Footprint Awareness Scale.

Table 2
The Results of t Test Related to the Self-Efficacy Scale for Environmental Education According to the Class Level Variable

	Class Level	n	$\overline{X}$	sd	sd	t	p
Content knowledge	Year I	185	1037.11	213.462	279	0.641	0.522
	Year II	96	1020.00	209.787			
Teaching Strategy	Year I	185	754.21	143.581	279	1.240	0.216
	Year II	96	731.77	144.390			
Overall Scale	Year I	185	1791.32	349.685	279	0.901	0.368
	Year II	96	1751.77	147.099			

*p<0.05

According to Table 2, there was no significant difference in the content knowledge [t(279)=0.641; p>0.05] and teaching strategy [t(279)=1.240; p>0.05] subscales and the overall scale [t(279)=0.901; p>0.05] in terms of the class variable. However, considering the arithmetic means, environmental education self-efficacy perception was higher in first-year students ($\overline{X}$ =1791.32) than second-year students ($\overline{X}$ =1751.77).

Table 3
The Results of Analysis of Variance Related to the Self-Efficacy Scale for Environmental Education According to the University Variable

	University	n	$\overline{X}$	sd	V.K.	K.T.	sd	K.O.	F	p	LSD
Content knowledge	Erzincan U.	30	894.00	251.802	Intergroup	784968.047	3	261656.016	6.143	0.000*	1-2, 3,4
	Fırat U.	67	1051.64	225.292	Intragroup	1.180E7	277	42594.615			
	Kayseri U.	120	1067.12	189.270	Total	1.258E7	280				
	Munzur U.	64	1007.03	193.018							

Teaching S.	Erzincan U.	30	682.00	160.353	Intergroup	239657.138	3	79885.713	3.976	0.008*	1-2, 3 4-2, 3
	Fırat U.	67	769.70	140.809	Intragroup	5565998.556	277	20093.858			
	Kayseri U.	120	763.67	133.600	Total	5805655.694	280				
	Munzur U.	64	720.45	148.141							
Total Scale	Erzincan U.	30	1576.00	407.445	Intergroup	1847730.742	3	615910.247	5.299	0.001*	1-2, 3,4
	Fırat U.	67	1821.34	356.651	Intragroup	3.220E7	277	116231.137			
	Kayseri U.	120	1830.79	317.185	Total	3.404E7	280				
	Munzur U.	64	1727.48	333.675							

*p<0.05

According to Table 3, there was a significant difference in the content knowledge [F(3-280)=6.143; p<0.05] and teaching strategy [F(3-280)=3.976; p<0.05] subscales and the overall scale [F(3-280)=5.299; p<0.05] according to the university variable. This difference was observed between Erzincan University and Fırat, Kayseri and Munzur universities for the content knowledge subscale and the overall scale. There was a difference between Erzincan University and Fırat and Kayseri Universities; between Munzur University and Fırat and Kayseri Universities for the teaching strategy subscale. Environmental education self-efficacy perception was highest among Kayseri University students and lowest among Erzincan University students.

Table 4

The Results of t Test Related to the Ecological Footprint Awareness Scale According to the Class Level Variable

	Class Level	n	$\overline{X}$	ss	sd	t	p
Food	Year I	185	3.39	0.52	279	0.755	0.451
	Year II	96	3.35	0.35			
Transportation and Housing	Year I	185	3.63	0.63	279	1.812	0.071
	Year II	96	3.49	0.50			

*p<0.05

According to Table 4, there was no significant difference in the food [t(279)=0.755; p>0.05] and the transportation and housing [t(279)=1.812; p>0.05] subscales according to the class variable. In the food subscale, the awareness of both first-year ($\overline{X}$=3.39) and second-year ($\overline{X}$=3.35) students was at the level of

undecided. In the transportation and housing subscales, the awareness of both first-year ($\overline{X}$ =3.63) and second-year ($\overline{X}$ =3.49) students was at the level of agree.

Table 5
The Results of MWU Test Related to the Ecological Footprint Awareness Scale According to the Variable of Class Level

	Class Level	n	Mean Rank	Total Rank.	Z	U	P
Energy	Year I	185	148.89	27544.50	-2.264	7.420E3	0.024*
	Year II	96	125.80	12076.50			
Wastes	Year I	185	146.16	27039.50	-1.482	7.926E3	0.138
	Year II	96	131.06	12581.50			
Water Consumption	Year I	185	144.25	26687.00	-0.940	8.278E3	0.347
	Year II	96	134.73	12934.00			
Total Scale	Year I	185	147.27	27430.50	-2.084	7534.500	0.037*
	Year II	96	126.98	12190.50			

*p<0.05

According to Table 5, there was a significant difference in the energy (MWU=7.420E3, p<0.05) subscale and the overall scale (MWU=7534.500, p<0.05) according to the class variable. In the energy subscale, the mean rank scores were higher among first-year students (SO=148.89) than second-year students (SO=125.80). Similarly in the overall scale, the mean rank scores were higher among first-year students (SO=147.27) than second-year students (SO=126.98). In the overall scale, the awareness of the students ($\overline{X}$ =3.98) was at the level of agree.

According to Table 6, there was no significant difference in the food [F(3-280)=0.565; p>0.05] subscale and the overall scale [F(3-280)=0.714; p>0.05] according to the university variable. While the highest awareness level in the food subscale was observed in Fırat University students, the highest awareness level in the transportation and housing subscale was observed in Munzur University students.

Table 6
The Results of Analysis of Variance Related to the Ecological Footprint Awareness Scale According to the University Variable

	University	n	$\overline{X}$	ss	V.K.	K.T.	sd	K.O.	F	p	LSD
Food	Erzin-can U.	30	3.29	0.41	Intergroup	0.370	3	0.123	0.565	0.639	-
	Fırat U.	67	3.42	0.51	Intragroup	60.562	277	0.219			
	Kay-seri U.	120	3.37	0.44	Total	60.932	280				

	Mun-zur U.	64	3.39	0.50							
Transportation and Housing	Erzin-can U.	30	3.60	0.50	Intergroup	0.754	3	0.521	0.714	0.544	-
	Fırat U.	67	3.57	0.60	Intragroup	97.473	277	0.352			
	Kay-seri U.	120	3.53	0.61	Total	98.226	280				
	Mun-zur U.	64	3.67	0.59							

*p<0.05

Table 7

The Results of KWH Test Related to the Ecological Footprint Awareness Scale According to the University Variable

	University	n	Mean Rank	sd	KWH	p	Significant Difference
Energy	Erzincan U.	30	117.43	3	5.100	0.165	-
	Fırat U.	67	155.70				
	Kayseri U.	120	137.10				
	Munzur U.	64	143.97				
Wastes	Erzincan U.	30	119.70	3	2.367	0.500	-
	Fırat U.	67	142.89				
	Kayseri U.	120	144.65				
	Munzur U.	64	142.16				
Water Consumption	Erzincan U.	30	141.50	3	0.608	0.895	-
	Fırat U.	67	147.19				
	Kayseri U.	120	137.64				
	Munzur U.	64	140.58				
Total Scale	Erzincan U.	30	125.57	3	3.157	0.368	-
	Fırat U.	67	152.83				
	Kayseri U.	120	135.92				
	Munzur U.	64	145.37				

*p<0.05

According to Table 7, there was no significant difference in the energy [KWH(3)=5.100; p>0.05], wastes [KWH(3)=2.367; p>0.05] and water consumption [KWH(3)=0.608; p>0.05] subscales and the overall scale [KWH(3)=3.157; p>0.05] according to the university variable. When evaluating the mean ranks, it was determined that the highest awareness level in the energy and water consumption subscales and the overall scale was observed in Fırat University students and the highest awareness level in the wastes subscale was observed in Kayseri University students.

Table 8

Results of the Correlation between the Environmental Education Self-Efficacy Perception and Ecological Footprint Awareness of the Students

		Content knowledge	Teaching Strategy	SESEE	Food	Transportation and Housing	Energy	Wastes	Water Consumption	EFAS
Content knowledge	S.Correlation	1	.917''	.985''	.288''	.231''	.263''	.330''	.114''	.343''
	Sig. (2-tailed)		.000	.000	.000	.000	.000	.000	.057	.000
	N	281	281	281	281	281	281	281	281	281
Teaching Strategy	S.Correlation	.917''	1	.969''	.254''	.243''	.245''	.265''	.121''	.308''
	Sig. (2-tailed)	.000		.000	.000	.000	.000	.000	.042	.000
	N	281	281	281	281	281	281	281	281	281
SESEE	S.Correlation	.985''	.969''	1	.283''	.246''	.260''	.311''	.118''	.337''
	Sig. (2-tailed)	.000	.000		.000	.000	.000	.000	.049	.000
	N	281	281	281	281	281	281	281	281	281
Food	S.Correlation	.288''	.254''	.283''	1	.253''	.302''	.336''	.154''	.541''
	Sig. (2-tailed)	.000	.000	.000		.000	.000	.000	.010	.000
	N	281	281	281	281	281	281	281	281	281
Transportation and Housing	S.Correlation	.231''	.243''	.246''	.253''	1	.388''	.433''	.361''	.661''
	Sig. (2-tailed)	.000	.000	.000	.000		.000	.000	.000	.000
	N	281	281	281	281	281	281	281	281	281
Energy	S.Correlation	.263''	.245''	.260''	.302''	.388''	1	.552''	.581''	.810''
	Sig. (2-tailed)	.000	.000	.000	.000	.000		.000	.000	.000
	N	281	281	281	281	281	281	281	281	281
Wastes	S.Correlation	.330''	.265''	.311''	.336''	.433''	.552''	1	.496''	.799''
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.000		.000	.000
	N	281	281	281	281	281	281	281	281	281
Water Consumption	S. Correlation	.114	.121''	.118''	.154''	.361''	.581''	.496''	1	.691''
	Sig. (2-tailed)	.057	.042	.049	.010	.000	.000	.000		.000
	N	281	281	281	281	281	281	281	281	281
EFAS	S.Correlation	.343''	.308''	.337''	.541''	.661''	.810''	.799''	.691''	1
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.000	.000	.000	
	N	281	281	281	281	281	281	281	281	281

*p<0.05

A Spearman's correlation coefficient of 1.00 indicates an excellent and positive correlation. A coefficient of -1.00 indicates an excellent and negative correlation. A coefficient of 0.00 indicates that there is no correlation. A coefficient value ranging from 0.00 to 0.30 indicates a low correlation, from 0.30 to 0.70 indicates a moderate correlation and from 0.70 to 1.00 indicates a high correlation between the scales

(Büyüköztürk, 2007: 42). Table 8 shows a moderate and positive significant correlation between the environmental education self-efficacy perception and ecological footprint awareness of the students ($r=0.337$, $p<0.05$). When evaluating the subscales, it was determined that there was no significant correlation only between the content knowledge subscale of the Self-Efficacy Scale for Environmental Education and the water consumption subscale of the Ecological Footprint Awareness Scale. Except for these subscales, significant correlations were found in the context of the subscales of the scales. Environmental education self-efficacy perception level and ecological footprint awareness level affected each other positively.

Discussion

The result of the study determined that the students had high levels of environmental education self-efficacy perception and ecological footprint awareness. Günal, Yücel-Işıldar and Atik (2018) also found in their study that university students had a high level of ecological footprint awareness. Environmental education self-efficacy perception was the highest among Kayseri University students and the lowest among Erzincan Binali Yıldırım University students. Ecological footprint awareness level was the highest among Fırat University students and the lowest among Erzincan Binali Yıldırım University students. Child development programme students who actively work in educational institutions after graduation are an important part of the early childhood education process. In order to add environmental consciousness and love to preschool children, it is crucial that child development programme students have a high level of environmental education self-efficacy perception and ecological footprint awareness. This is because the attitudes of preservice teachers toward environmental problems reflect on their behaviours and also affect the attitudes and behaviour of students in the classroom as they will be a role model for these students when they take on their duty (Şahin & Doğu, 2018).

Güngör and Cevher-Kalburan (2022) stated in their research that early childhood experiences are very important for the formation of environmental awareness, increasing awareness of sustainable life and developing a perspective specific to nature. For this reason, it is necessary to provide children with relevant experiences in early childhood and to organize educational environments accordingly; In order to do this, they expressed the importance of the people around the child being the right model with the desired environmental awareness. Similarly, in the study conducted by Güngör (2019) it was found that ecological footprint applications of teachers positively affected the ecological footprint awareness levels of children in the preschool process.

Finally, it was concluded that the environmental education self-efficacy perception and ecological footprint awareness levels of the child development programme students affected each other positively. At the point of content knowledge and teaching strategies, it is believed that environmental education self-efficacy perception will positively affect anxieties, attitudes and behaviours related to environmental problems and ecological footprint awareness. Similarly, Sarıbaş, Teksöz and Ertepınar (2014) found in their study that environmental education self-efficacy beliefs of preservice teachers increased with their environmental anxieties. In the study by Meyer (2004), it was found that there was a positive correlation between the ecological footprint awareness and environmental knowledge, attitudes and behaviour of the students.

One of the important elements of environmental education is to raise awareness about the ecological footprint, which is an important indicator of environmental sustainability (Güngör and Cevher-Kalburan, 2018). For this reason, it is very significant that especially pre-school teachers carry out environmental education in a qualified way. Pullu and Pullu (2021) found that activity-based environmental education course increased the self-efficacy of child development programme students at the point of teaching strategies related to environmental education and also their awareness, consciousness and responsibility levels related to environmental problems. In addition, it was determined that the students questioned their own behaviours causing environmental problems and gained awareness to prevent this situation. Günşen (2023), on the other hand, concluded that environmental education activities increased pre-school teacher candidates' awareness of ecological footprints and their level of interest in environmental awareness.

Conclusions

The study aimed to determine the correlation between the environmental education self-efficacy perception and ecological footprint awareness of the child development programme students. Within the scope of this purpose, the environmental education self-efficacy perception and ecological footprint awareness levels of the students were determined and the variation occurring in these levels according to the class level and university variables was examined.

One of the study results revealed that first- and second-year students receiving education in the child development programme had a high level of environmental education self-efficacy perception. When evaluating in the context of subscales, it was determined that the students had a moderate level of self-efficacy perception related to content knowledge; however, their self-efficacy perception related to teaching strategies was below the average. In the context of the university variable, environmental education self-efficacy perception level was the highest among Kayseri University students, who were observed among students studying in Fırat, Munzur, and Erzincan Binali Yıldırım Universities.

Another result of the study was that the child development programme students had a high level of ecological footprint awareness. Ecological footprint awareness levels of first-year students were higher than second-year students in the food, transportation and housing, energy, wastes and water consumption subscales and in the overall scale. In the context of university variable, ecological footprint awareness level was the highest among Fırat University students, who were observed among students studying in Munzur, Kayseri, and Erzincan Binali Yıldırım Universities.

The final result obtained in the study was that the environmental education self-efficacy perception and ecological footprint awareness levels of the child development programme students affected each other moderately in a positive direction. It was determined that there was no significant correlation only between the content knowledge subscale of the Self-Efficacy Scale for Environmental Education and the water consumption subscale of the Ecological Footprint Awareness Scale. Apart from these subscales, it was determined that there were positive significant correlations between the other subscales of the scales.

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