An analysis of emotional semantic values that preservice teachers ascribe to the concept of sustainability: A scale development and implementation study

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Abstract

The concept of sustainability includes many different definitions and diversified perspectives with its ecological, economic, social, and cultural dimensions. However, building positive attitudes towards sustainability is important to fulfill broad and comprehensive sustainability goals. The present study aimed to determine the meanings that pre-service teachers ascribed to the concept of sustainability. The study applied an explanatory mixed-method design. In the quantitative part of the design, preservice teachers' compositions regarding sustainability were analyzed using document analysis. In the qualitative part of the design, a scale was developed and evaluated using the survey method. Data of the study were collected using the Emotional Semantic Difference towards Sustainability Scale. The scale consisted of 13 two-tailed pairs of opposite adjectives ranging from very positive, quite positive, slightly positive, neutral, slightly negative, quite negative, and very negative. The Cronbach Alpha reliability coefficient of the scale was calculated as .94. The study data were analyzed using SPSS 27 software. The results revealed that the preservice teachers ascribed positive but mostly slight emotional semantic values to the concept of sustainability. The preservice teachers most ascribed the positive meanings of important, useful, and clean to sustainability. Also, they ascribed the negative meaning of Complex to sustainability. This situation can be read as the preservice teachers' perspective towards sustainability is generally positive, as well as experiencing problems in perceiving the concept.

Keywords: Sustainability, emotional semantic values, preservice teachers.

1. Introduction

In this rapidly changing world, the increasing population, people's new needs, changing consumption habits, and human-centered value judgments towards the environment have increased the pressure on natural resources in a short time, (Çakır, Çakır, & Usta, 2010; Çelik & Küçük, 2020; San-Francisco, Sopelana, Fernandez, Otegi, &

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Minguez, 2020), which has led to the emergence of the concept of sustainability with economic and social bases (Köse, 2020). Sustainability has many meanings in daily language. Nevertheless, scholars generally avoid defining the term in their studies on sustainability (Salas-Zapata, Rios-Osorio, & Cardona-Arias, 2017). Researches generally focused on the goals of sustainability rather than the meaning. For this reason, sustainability has become a buzzword today (Bourke, 2004), which therefore caused confusion.

Sustainability is an interdisciplinary concept with over a thousand different definitions (Dale, 2001), and can be described specific to the field of use (Basiago, 1995). Sustainability, in the simplest sense, can be expressed as preserving, maintaining, and supporting the existing situation (Onions, 1964). Sustainability is used in science, social, law, engineering, city planning, health, economy, tourism, education, and many other fields and its fields are gradually expanding.

The concept of sustainability has become a topic of the world's agenda with the report, also known as Brundtland Report, which was published by the World Environment and Development Commission in 1987. The report included sustainable development as "humanity can make the development sustainable by meeting daily needs without jeopardizing the ability of nature to respond to future generations' needs". This definition, which mainly included an anthropocentric approach, has been later referred to as weak sustainability in the following years. This approach values nature for its material, physical and tangible benefits (Aslan Efe, Yücel, & Efe, 2020) and emphasizes that no matter how much science and technology develop, human beings should pay attention to their responsibilities towards nature (Markandya, Harou, Bellu & Cistulli, 2002). However, this well-known definition has caused confusion between sustainability and the interchangeably inappropriate use of these terms on some occasions. Sustainability represents a long-term goal, whereas sustainable development refers to a path to success in certain fields (UNESCO, n.d.).

The sustainability concept, although it is considered newly produced, was first seen in the printed sources dating back to the 18th century and its origins even go back to civilizations that lived long before today (Heinberg, 2010; Kılıçoğlu, 2005; Nath, 2003), which shows that environmental problems are not specific to today, and similar problems were experienced in the human-nature relationship even in ancient times. The concept reached its peak in the second half of the 20th century, and the desire for unlimited growth and development in a plated with limited resources and the burdensome consequences of this desire in the ecological, economic, and social dimensions (Blühdorn, 2007; WWF, 2020; Wood, 2012) increased the importance of the sustainability concept. Even if due to force, being sustainable is deemed appropriate for everyone because, without sustainability, unsustainability becomes inevitable together with undesired consequences (Bossel, 1999; Yearworth, 2016).

Studies showed that education is key in promoting sustainability correctly and achieving its comprehensive goals (Bonnet, 1999; Foster, 2001; UNESCO, 2005). Sustainability education enables people's development of knowledge, values, and skills to increase the quality of life without harming the planet for the future, and to participate in decisions about the individual and collective measures to be taken on a local and global scale (Summers, Corney, & Childs, 2005). To be sustainable, it is necessary to be aware of sustainability goals and to act accordingly; in a more general sense, to know what the concept of sustainability is and what is not. However, individuals' perceptions have a notable place in the formation of values and appropriate behaviors. Greenwald (1989) stated that perceptions towards a certain issue will have predictable and multiple effects on behavior. Therefore, individuals with positive attitudes towards sustainability will be a part of a sustainable society and contribute to fulfilling sustainability goals. All sections of society should contribute to fulfilling sustainability goals since they are comprehensive.

A review of the related literature showed that there exists a limited number of studies on the analysis of emotional semantic values of sustainability. In a review by Bourke (2004), questions on whether sustainability is a philosophy, theology, economics, politics, or environmental science were posed, and whether sustainability includes a common meaning in which either process, product, or both contribute was discussed.

Yanarella, Levine and, Lancaster (2009) stated that sustainability has been used at diversified scales like from informal forums to well-attended academic discussions at both local and international levels. They thought that this contributed to the popularity of the term but also harmed the developmental process of the concept, which leads to a cacophony in the semantic sense.

Considering applied studies on the analysis of emotional semantic values, a study by Ekici and Ertürk (2018) attracted attention. In their study, they investigated primary school students' attitudes towards the concept of the world. They implemented 11 two-tailed semantic values measurement tools that are developed by them to 72 students. As a result of the implementation, they determined that the students' attitudes towards the concept of the world were positive. They also determined that the students perceived the concept of the world as Great, Precious, Far and, Clean at most and that they did not attribute any negative value to the world.

Abasız (2019) examined the emotional semantic attitudes of secondary school students on ecology and found that students generally exhibit positive attitudes towards the ecosystem. In this study, it was determined that students most preferred the adjective "perishable" regarding ecology. It was later emphasized that students comprehend the importance of the ecosystem they live in and that the ecosystem cannot be sustained in a healthy way if the necessary precautions are not taken.

Many disciplines contribute to sustainability with their social, economic, spatial, and cultural dimensions, and it includes important goals to establish the balance between environment and human. Education plays a key role in explaining sustainability and its goals and the ways to achieve these goals. In this context, the views of preservice teachers, who are the future practitioners of the curriculum, towards sustainability are essential. The present study aimed to reveal the meanings that university students ascribe to the concept of sustainability. The results obtained by the present study are thought to reveal the main perceptions of preservice teachers on sustainability and to contribute to the strategies to be followed in this regard.

2. Method

2.1. Design of the Study

The present study mainly aimed to determine the trend in emotional semantic values that preservice teachers ascribe to the sustainability concept. In the study, the Emotional Semantic Values towards Sustainability (ESVTS) scale was first developed. Later, this scale was applied and the results were shared. The study applied an explanatory mixed-method design. In explanatory mixed-method design, studies mostly aim to explore a concept or phenomena using qualitative method, to develop an instrument regarding this concept or phenomena, and test the instrument developed (Creswell, 2012). In line with the design, qualitative data were first collected. Later, using the data obtained, an instrument was formed and the development process of the scale was initiated.

2.2. Participants

The study consisted of four different stages and different preservice teachers were included in each stage. In the first stage, qualitative data were collected. In this stage, 24 preservice teachers participated and they were asked to write an essay on sustainability. The items of the ESVTS scale were created according to the adjectives obtained from the essays of the preservice teachers and literature review, and pilot studies of the scale were carried out. 46 preservice teachers participated in these pilot studies and the comprehensibility and response times of the scale were determined. With the data obtained by the pilot studies, the scale was finalized and applied to 168 preservice teachers, and the explanatory factor analysis procedures were carried out. Finally, the ESVTS scale was applied to 136 preservice teachers, and their responses to the scale were analyzed and the results obtained were shared.

2.3. Scale Development Process

In the development process of the ESVTS scale, the five-step scale development model by Cohen and Swerdik (2009) was followed. According to the model, the conceptual structure of the scale should be determined first. To determine the conceptual structure of the scale, it should be first stated what the developed scale measures, whether there is a need for the scale or not, and the purpose of the scale. After completing the first stage, the scale should be structured in the second stage. In this stage, the type of the scale (classification, ranking, range, and ratio) and which scaling technique to be used are decided. Items should be written according to the scale type determined and scaling technique preferred and an item pool should be created. In the third stage, the scale should be implemented to the sample determined. In this regard, the sample size should be as large as possible. Although it is not a definite rule, applying a scale to at least five

times the number of items will make it more likely to obtain reliable results (Cohen & Swerdik, 2009). After the implementation of the scale, the fourth stage includes conducting factor analysis, internal consistency, and validity studies. In the fifth stage, the last stage, the scale is reviewed and instruction for the implementation of the scale should be prepared.

In the scale development process, adjectives and their opposites were determined by examining the preservice teachers' articles on sustainability in line with the exploratory mixed research design. In this process, the views of an expert in the field of the Turkish Language were consulted. Later, the semantic values scale was created with these adjectives determined. In the process of creating the scale, an assessment-evaluation expert was also consulted. The pilot applications of the scale were carried out and the comprehensibility and average response time were determined. After the necessary edits, it was decided to apply the scale.

2.4. Data Collection Tool

The present study developed and implemented the ESVTS scale. Semantic difference scales, which is one of the three ordered scales together with Likert and Stapel (Russell, 2010), are a tool that reveals respondents' attitudes towards the associations of the object or concepts presented to them (Stoklasa, Talášek, & Stoklasová, 2019).

Semantic difference scales were developed by Osgood and some scholars in the early 1950s to reveal people's thoughts on certain concepts (Rosenberg & Navarro, 2018) and consist of grading different pairs of opposite adjectives for a concept. İslamoğlu and Alnıaçık (2019) stated that the semantic difference scales are generally seven-point scales and reveals participants' evaluation regarding the desired concept. Evaluation is made by taking the arithmetic average of the answers given by participants. A semantic difference scale can be evaluated from positive three to negative three, as well as from one to seven. An example adjective and evaluation range are shown in Figure 1.

Figure 1. An example of the evaluation of an adjective

Acquiescence bias expresses respondents' tendency to positive options that they are particularly indecisive for in surveys (Kuru & Pasek, 2016). In this regard, semantic difference scales can prevent this situation and, therefore, allow individuals to express their true thoughts more accurately (Friborg, Martinussen, & Rosenvinge, 2006).

2.5. Data Analysis

SPSS 27.0 software was used to analyze data. After the scale was implemented, the data were first processed into the software. Later, any lost or incorrectly entered data was checked. In addition, histograms and box charts, and z values were examined to determine outliers. The analysis results showed no outlier.

After excluding the missing data from the analysis, Explanatory Factor Analysis (EFA) was made to reveal the factorial structure of the scale and to investigate the construct validity using SPSS 27 software. In cases where there is no criterion to compare the structure to be measured, the construct validity is tested (Karakoç & Dönmez, 2014). In the present study, EFA was made to reveal the construct validity of

the scale. With EFA, the factor(s) of the scale to be measure is revealed. Before the EFA, it was first tested whether the data of the present study is suitable for factor analysis. In this regard, the Kaiser-Meyer Olkin (KMO) coefficient was calculated and the Barlett Sphericity test was used to determine that the data of the present study is suitable for factor analysis. After this suitability was confirmed, the EFA was made. The principal component analysis method was used to reveal the factors in the EFA. The Cronbach Alpha coefficient was calculated for the reliability of the scale developed.

After a reliable and valid scale was developed, descriptive statistics were used to analyze the preservice teachers on the ESVTS scale, and the t-test was used to reveal the change of their scores by gender.

3. Results

In this section, findings that were obtained by the validity and reliability studies of the ESVTS scale were presented.

3.1. Findings Obtained by Explanatory Factor Analysis (EFA)

EFA was made to reveal the factor structure of the scale developed by the present study. Kaiser-Meyer Olkin (KMO) and Bartlett Sphericity tests were used to test the suitability of the data for factors. The results showed that the KMO coefficient was found as 0.907 and the Barlett test of sphericity was found to be significant as $\chi^2_{(66)}$=1554.362 (p<0.01). The KMO value must be at least .50 for the dataset to be clustered. This value is interpreted to indicate the suitability of a dataset for factor analysis. In this regard, a value between 0.50-0.60 indicates weak suitability, 0.60-0.70 indicates moderate suitability, 0.70-0.80 indicates good suitability, and 0.80 and above indicates excellent suitability. Therefore, the KMO value that was found in the present study indicated excellent level (KMO = 0.907). The significance of the Barlett Sphericity test indicates that there is a sufficient level of relationship between variables and that the data shows a multivariate normal distribution (Field, 2009). Considering all these points, it can be concluded that the scale developed is suitable for factor analysis.

Upon the feedback of the experts, EFA first started with 14 items. No factor limitation was applied and unrotated principal component analysis was applied. Factor load values calculated for scale items show the ability of those items to represent the relevant structure (Kline, 2011). In this regard, "a factor load value of 0.32 is considered poor, 0.45 medium, 0.55 good, 0.63 very good and 0.71 excellent "(Tabachnick & Fidell, 2012). The present study considered 0.32 as the critical factor load and items with a factor load below this value were excluded from the analysis. In addition, the difference between the factor load values of the two items should be at least 0.10. If this difference is below 0.10, these items are called overlapping items (Büyüköztürk, 2012). Overlapped items are omitted from a scale development process. As a result of EFA made in the present study, the factor load value of only one item was found to be below 0.32 and it was observed that there was no overlapping item since the structure consisting of a single factor emerged. As a result of the principal components analysis performed after that item was removed, it was determined that there was only one factor with an eigenvalue that is greater than 1.00. The single factor explains 64.860% of the variance.

To decide the appropriate number of factors as a result of EFA, the scree plot was also examined as well as eigenvalues. According to the scree plot, values with eigenvalues of

one and above one are considered as the appropriate factor number. The scree plot that was obtained as a result of EFA was depicted in Figure 2.
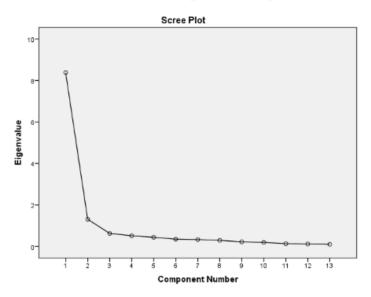

Figure 2. Scree Plot

As can be seen in the scree plot, the scale consisted of a single factor. The distribution of scale items by the factors, the eigenvalues of the factors, and the variance rates explained were presented in Table 1.

Table 1. EFA analysis results on the emotional semantic values towards sustainability Scale

Items	Factor 1
I1	0.595
I2	0.714
I3	0.756
I4	0.827
I5	0.880
I6	0.885
I7	0.810
I8	0.906
I9	0.880
I10	0.741
I11	0.748
I12	0.800
I13	0.822
Eigenvalue	7.783
Variance explained (%)	64.860

As seen in Table 1, a single factor structure with an eigenvalue greater than 1 was obtained. The single factor explained 64.860% of the analyses made in social sciences"

(Tavşancıl, 2014). In this regard, the total variation rate explained by the single factor of the scale is sufficient. Considering the factor load values, it was seen that the load values of the 13-item single factor vary between 0.595 and 0.906.

3.2. Findings Obtained Regarding the Reliability of the Scale

The Cronbach Alpha coefficient was calculated on the scale items to provide evidence for the reliability of the scale developed. The reliability coefficient obtained for the entire scale was shown in Table 2.

Table 2. Reliability coefficient obtained for the entire scale *statistics and data analysis*

Factor	Number of Items	Cronbach's Alpha (α)
Emotional Semantic Values Towards Sustainability Scale	13	0.94

As can be seen in Table 2, the reliability coefficient obtained for the entire scale was found to be 0.94, which is higher than 0.80. According to Büyüköztürk (2012), a Cronbach Alpha coefficient above .70 is considered to be sufficient. The coefficient obtained showed that the scale has high reliability.

After the scale development studies, the Emotional Semantic Values towards Sustainability scale with 13 items was implemented to pre-service teachers and the results were shared.

Descriptive statistics of preservice teachers' Emotional Semantic Views on the Concept of Sustainability were shown in Table 3.

Table 3. Descriptive statistics of preservice teachers' emotional semantic views on the concept of sustainability

Semantic views	N	X	ss	Quite Positive		Positive		Slightly positive		Neutral		Slightly negative		Negative		Quite negative	
				F	%	f	%	f	%	f	%	f	%	f	%	f	%
Fair-Unfair	136	4.04	2.11	12	8.8	36	26.5	18	13.2	24	17.6	5	3.7	8	5.9.	33	24.3
Simple-Complex	136	2.25	1.18	1	0.7	0	0	0	0	28	20.6	18	13.2	45	33.1	44	32.4
Egalitarian-Discriminatory	136	4.65	1.27	15	11.0	21	15.4	20	14.7	70	51.5	4	2.9	4	2.9	2	1.5
Precious-Unworthy	136	5.88	1.21	61	44.9	28	20.6	18	13.2	28	20.6	1	0.7	0	0	0	0
Useful-Useless	136	5.97	1.21	68	50.0	24	17.6	17	12.5	26	19.1	1	0.7	0	0	0	0
Clean-Dirty	136	5.94	1.21	65	47.8	30	22.1	10	7.4	31	22.8	0	0	0	0	0	0
Improving-Regressive	136	5.75	1.22	53	39.0	31	22.8	19	14.0	32	23.5	1	0.7	0	0	0	0
Important-Unimportant	136	5.98	1.21	69	50.7	24	17.6	16	11.8	26	19.1	1	0.7	0	0	0	0
Necessary-Unnecessary	136	5.89	1.69	57	41.9	36	26.5	16	11.8	26	19.1	1	0.7	0	0	0	0
Protective-Pollutant	136	5.02	1.24	25	18.4	25	18.4	19	14.0	65	47.8	0	0	2	1.5	0	0
Accessible-Unreachable	136	5.22	1.29	31	22.8	31	22.8	18	13.2	52	38.2	3	2.2	0	0	1	0.7
Close-Far	136	5.60	1.30	47	34.6	30	22.1	23	16.9	33	24.3	1	0.7	1	0.7	1	0.7
Efficient-Inefficient	136	5.81	1.27	56	41.2	34	25.0	16	11.8	27	19.9	2	1.5	0	0	1	0.7

As shown by Table 3, the preservice teachers expressed sustainability positively most frequently with the adjectives of Important ($\overline{X}$=5.98), Useful ($\overline{X}$=5.97), and Clean ($\overline{X}$=5.94). The preservice teachers exhibited neutral attitudes towards being fair for sustainability ($\overline{X}$=4.04). The only adjective that represented the preservice teachers' negative attitudes towards sustainability was Complex ($\overline{X}$=2.25)

On the other hand, the total emotional semantic difference attitude score towards the concept of sustainability was calculated using the arithmetic mean of a total of 13 two-tailed semantic adjectives. In this regard, the total attitude point average of the preservice teachers was calculated as $\overline{X}$= 5.19, which showed that the semantic values of the concept of sustainability are at a positive level and in a slight category. Table 4 showed the change of the emotional semantic values the preservice teachers ascribed to sustainability by gender.

Table 4. T-test results on the preservice teachers' Emotional Semantic Attitudes towards Sustainability by gender

Semantic Expressions	Gender	N	X	SS	sd	t	p
Fair-Unfair	Female	102	4.24	2.10	134	1.93	.055
	Male	34	3.44	2.06			
Simple-Complex	Female	102	2.05	1.05	134	-3.52	.001*
	Male	34	2.85	1.37			
Egalitarian-Discriminatory	Female	102	4.69	1.34	134	.66	.511
	Male	34	4.52	1.05			
Precious-Unworthy	Female	102	6.09	1.12	134	3,.55	.000*
	Male	34	5.23	1.25			
Useful-Useless	Female	102	6.20	1.08	134	3.78	.000*
	Male	34	5.26	1.30			
Clean-Dirty	Female	102	6.18	1.09	134	3.88	.000*
	Male	34	5.23	1.28			
Improving-Regressive	Female	102	6.0	1.13	134	4.15	.000*
	Male	34	5.02	1.19			
Important-Unimportant	Female	102	6.24	1.06	134	4.21	.000*
	Male	34	5.20	1.29			
Necessary-Unnecessary	Female	102	6.16	1.03	134	4.72	.000*
	Male	34	5.08	1.19			
Protective-Pollutant	Female	102	5.27	1.25	134	4.23	.000*
	Male	34	4.29	0.83			
Accessible-Unreachable	Female	102	5.44	1.33	134	3.44	.000*
	Male	34	4.58	0.92			
Close-Far	Female	102	5.87	1.18	134	4.17	.000*
	Male	34	4.79	1.34			
Efficient-Inefficient	Female	102	6.09	1.07	134	4.17	.000*
	Male	34	4.97	1.44			

p<.05

As can be seen in Table 4, independent samples t-test was made to determine the change of the emotional semantic values the preservice teachers ascribed to sustainability by gender. Fair-Unfair and Egalitarian-Discriminatory semantic expressions did not show a significant difference by gender at the p<0.05 level. The remaining expressions, Simple-Complex, Precious-Worthless, Useful-Useless, Clean-Dirty, Improving-Regressive,

Important-Unimportant, Necessary-Unnecessary, Protective-Pollutant, Accessible-Unreachable, Close-Far, and Efficient-Inefficient, showed a significant difference at the $p < 0.05$ in favor of females. This result indicated that the female preservice teachers, compared to the male preservice teachers, have a more positive perspective regarding sustainability.

4. Discussion and Conclusions

The present study investigated the emotional semantic values that the preservice teachers ascribed to sustainability which is a popular term of the age but also contains a lot of confusion. With the United Nations 2030 Agenda for Sustainable Development, where the emphasis on education has been increased, new opportunities for transformation towards sustainability are created at Higher Education Institutions (Ruiz-Mallén & Heras, 2020), and an important step has been taken to raise awareness of the society on sustainability. That is because, universities have responsibilities to develop high-level cognitive skills and communication skills, such as creating and spreading knowledge, rational thinking ability in young people, motivation to challenge the status quo, and capacity to develop intellectual values (Gülmez & Yavuz, 2019). Also, educational faculties have a key role in the sustainability processes of informing people, perceiving them correctly, developing positive attitudes, and taking action towards goals. Within the framework of Mustafa Kemal Atatürk's "A new generation of teachers will be your masterpiece." saying, in particular, education faculties have very strategic roles towards sustainability.

The average point of the sustainability semantic difference scale of the preservice teachers was found to be 5.19. This value indicated that the semantic values that preservice teachers ascribed to sustainability are positive and in the slight category.

It is important that the preservice teachers' general attitudes are positive. Ekici and Ertürk (2018) stated that determining attitudes is important in terms of behavioral goals to be gained by the individual and the teaching method to be followed. Preservice teachers with a positive attitude will be more eager to learn about sustainability and their eagerness to participate in actions that are necessary for sustainability goals will be enhanced.

It was also determined that the preservice teachers ascribed some neutral and negative meanings to sustainability. The preservice teachers preferred to remain neutral in the adjective pair of Fair-Unfair of sustainability. Fair represents the fair distribution of resources and wealth and points to more social and economic dimensions of sustainability. However, studies reported that individuals generally focus on the ecology field of sustainability (Birdsal, 2013; Summers & Childs, 2007) and, in many cases, neglect the social and economic dimensions of it.

Another noteworthy finding of the present study was the Simple-Complex adjectives which are the only negative meaning that preservice teachers ascribed to sustainability. The preservice teachers ascribed the meaning of "Complex" in a negative and the quite level to sustainability. This shows that the preservice teachers experienced some problems in understanding sustainability. Similarly, studies on the cognitive dimension of sustainability argued that the concept of sustainability is not well understood (Azapagic, Perdan, & Shallcroos, 2005; Birdsal, 2014; Gil-perez, Vilches, Edwards, Praia,

Marques, & Oliveira, 2003; Gökmen, Solak, & Ekici, 2017; Spiropoulou, Antonakaki, Kontaxaki, & Bouras, 2007).

When the semantic values that the preservice teachers ascribed to sustainability were analyzed by gender, it was determined that the female preservice teachers had more positive views than the male preservice teachers. Gürbüz, Çakmak, and Derman (2013) stated that female preservice teachers, compared to male preservice teachers, exhibit more positive behaviors in environmental issues both cognitively and affectively. They further added that the reason for this situation could be that females are more sensitive to nature, while males are more likely to take control of nature and benefit from natural resources. On the other hand, a sustainable environment is just one of the dimensions of the sustainability approach, not the whole sustainability. However, the fundamental starting point of sustainability is a healthy ecosystem. Therefore, it is not surprising to obtain results that are similar or close to those for attitudes towards the environment. Most pre-service teachers start their profession without any education on sustainability (Houisingh, 2006). As the emphasis put on sustainability in formal education increases, it is expected that the chance of developing more positive attitudes towards sustainability for male preservice teachers will also increase.

Sustainability is an important issue that addresses goals that are too important to be left to chance. It is a multifaceted process to which everyone should contribute, and can only be achieved with good planning, implementation, and evaluation. Therefore, preservice teachers' attitudes towards sustainability will directly affect their practices in this regard in their professional lives. Arrangements need to be made to bring the attitudes of preservice teachers, albeit they are positive, to the level of quite rather than slight.

When the related curricula are examined, it is seen that courses on sustainability are recently included. However, these courses are generally theoretical; therefore, those courses should include activities for implementation on the field.

The preservice teachers in the present study expressed sustainability as complex. This infers that they experienced some difficulties in understanding the concept. In line with this finding, courses, projects, and applied activities should be included to help preservice teachers to comprehend the sustainability concept accurately and clearly.

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