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RESEARCH ARTICLE

A Comparison of Gifted and Non-gifted Students' Perceptions Concerning Plants Through Metaphors

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Abstract

The aim of this study is to compare the perceptions of the gifted students and non-gifted students concerning plants through metaphors. The phenomenology design, which is one of the qualitative research designs, was used in this study. Participants were was comprised of 136 gifted students from the Science and Art Centers (BİLSEM) in two different cities in the Marmara region and 136 non-gifted students studying at a secondary school in the Marmara region in the fall semester of the 2015-2016 academic year. The research group was selected through convenience sampling method. The data were collected using the sentence "The plants are like / similar to .....; because ....." that was completed by the participant students. The data were analyzed through the content analysis and the Chi-Square test of independence which is among the non-parametric statistical methods. As the conclusion of the research study, it was determined that the gifted students emphasized human, water, lungs, breath, and air metaphors concerning plants more compared to the non-gifted students, while the non-gifted students empahsied oxygen, sun, flower, friend, beautiful, meal and bead metaphors compared to the gifted students. In addition to these, it was determined that the non-gifted students emphasized the "Plant, as the source of peace and happiness" category more, while the gifted students were emphasizing the "Plant structure" category more. Moreover, it was observed that both student groups particularly emphasized the "Plant analogous to the human" category and that their perceptions concerning plants were shaped as anthropocentrically and in a self centered way. As the conclusion, it was found that there was not a significant difference between the perceptions of the gifted and non-gifted students concerning plants.

Keywords: Gifted student, non-gifted student, plants, perception, metaphor.

Introduction

The existence of gifted individuals can be an opportunity for protection of the environment and the biodiversity, and for finding solutions to the environmental problems. Because it is stated that gifted individuals are interested in and sensitive about problems related with humanity and nature, and they also make effort for suitable solutions (Dąbrowski, 2015; Piechowski, 1997; Sak, 2012; Stuart and Beste, 2011; Şahin, 2015). Owing to some of their characteristics such as intelligence, creativity, motivation, art capacity etc., these individuals, who have higher levels of performance compared to their peers, are sensitive about issues such as war, famine, injustice, damaging the nature, overhunting, and species in danger of extinction. It is considered that this tendency of the gifted individuals is originating from their high level of awareness, demand of justice, observing skills, and sensitivity about humanity-related issues (Ataman, 2009; Cross, 2011; Çitil, 2016; Van der Meulen et al., 2014). Since the gifted students have high levels of personal characteristics and since some of their features differ from the non-gifted students, their education expectations and needs are quite different. Routine educational approaches that are disregarding the individual differences of these students cannot meet the needs of the gifted students sufficiently (Şahin and Levent, 2015). Thus, it is considered that the science and

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environment educations of the gifted and non-gifted students should be differentiated in line with the characteristics of these students.

The attitudes, views and perceptions of the students are determinative in the differentiation of the science and environment educations of the gifted students (Kök, 2012; Özarslan, Çetin and Yıldırım, 2017). Therefore, in order for the individuals to embrace an ecological lifestyle, to protect the environment and biodiversity, to develop solutions for the problems in these fields, it is necessary to differentiate the science and environment educations of the students, to determine the perception levels of the students concerning these fields, and to improve them in a positive way.

Developing positive perceptions and views concerning plants may be a first step for the gifted individuals to focus on and take responsibility in issues such as environment, biodiversity, and plants, which are an important component of the biodiversity. It is because we have quite intense interactions with plants in our environment and they are contributing living beings that meet our numerous needs (Ahi, Atasoy and Balci, 2018; Özel, Sürücü and Bilen, 2013). In addition, the plants are associated with many disciplines such as pharmacology, chemistry, cosmetics, agriculture, tourism and art (Çil, 2016). Developing the interest, perception, curiosity, and awareness of the gifted students towards plants through education, may not only develop the views and behaviors of these students about the bio-diversity and environment, but also lead them numerous different disciplines.

It is considered that the studies in the literature conducted on the perceptions of the gifted students about the environment and the bio-diversity are not sufficient. For example, Özarslan and Çetin (2018) determined that some of the gifted students have low level interest and curiosity towards the plants and animals which are often and easily seen in their environment. Ugulu, Akkaya and Erkol (2013), and Aydın, Coskun, Kaya and Erdönmez (2011) stated that attitudes of the gifted students towards environment were high, and similarly, attitudes of female students were higher compared to the male students. Ugulu et al., (2013), and Esen (2011) stated that the attitudes of the gifted students towards environment did not differ in terms of age, gender, and grade level. Considering the abovementioned studies, it is considered that the studies in the literature conducted on the perceptions of the gifted students about the bio-diversity and particularly about plants are not sufficient. Therefore, today, when the number of metaphoric studies has increased, it is focused on the metaphorical perception studies about plants.

Metaphorical Perception

Metaphors make it easier to perceive and comprehend the concepts in the mind (Saban et al., 2006). While perceiving a concept, students either liken it to another concept or focus on common traits of the two concepts (Ocak and Gündüz, 2006; Yapıcı, 2015). People reveal their perceptions, senses, and opinions by means of metaphors and with different analogies (Cerit, 2008; Girmen, 2007; Inbar, 1996). Moreover, metaphors also play an important role in information learning process (Ocak and Gündüz, 2006; Yapıcı, 2015). One of the theories that attempt to explain the characteristics of metaphors is the Mental Metaphor Theory (Lakoff, 1993).

Mental Metaphor Theory defines the metaphor as one of the basic mental models shaping the thoughts of individuals concerning the reality and the world. From this aspect, metaphors are expressions of senses, opinions, and perceptions of the individuals through similar concepts in their minds (Lakoff, 1993; Lakoff and Johnson, 1980; Fredriksson and Pelger, 2016). In this respect, metaphors ensure apprehensibly revealing the incomprehensible and difficult issues, or perceptions, senses, and opinions on certain concepts in education (Jensen, 2006; Karaçam and Aydın, 2014).

Metaphors function as a means of perception determination (Arnett, 1999). It is considered that the mentioned characteristics and effectiveness of the metaphors will be influential in the learning and perceiving the abstract notions in environment and biology.

An important part of the information concerning the biology and environment is about living beings that are non-visible to the naked eye and abstract data about the human being. For example, cell nucleus-company manager, neural system-electric network, mitochondrion-energy production plant, white blood cells-soldiers, DNA model-stairs/databank/life book, and the interactions of the creatures concerning nutrition-food chain/food pyramid (Ekici, 2016; Fredriksson and Pelger, 2016; Yücel Cengiz and Ekici, 2016). In this context, metaphors are highly used in biology lessons.

In Turkey, Science and Art Centers (BİLSEMs) support the gifted students in their leisure times after the formal education hours through biology and environment education activities in order to introduce them to the environmental and global problems, and to help them study on solutions for these problems (MNA BILSEM Directive, 2007). In this context, the education of the gifted students needs to be differentiated in accordance with their learning speed and requirements (Kök, 2012; Özarslan, Çetin and Yıldırım, 2017). At this point, determining the perceptions of these students about plants, which are an important component of the environment and biodiversity, in comparison with the non-gifted students is a remarkable case. However, no previous study was encountered in the literature that is comparatively analyzing the perceptions of the gifted and the non-gifted students concerning plants.

The results of this study will contribute to determining the impacts of the perceptions of the students concerning plants on the formation of their cognitive, affective, and psychomotor characteristics about the environment and the biodiversity, and additionally, the results will contribute to revealing the perceptional differences of the gifted and non-gifted students concerning plants. Thus, it will enable us to differentiate the education activities that will meet the interest, curiosity, and requirements of the gifted students concerning the environment and biodiversity. In this point, it is considered that the results of the study will make important contributions to the literature.

The study was conducted to compare the perceptions of the gifted and non-gifted students concerning plants through metaphors. For this purpose, answers were sought for the following questions:

1. What are the metaphors of the gifted and non-gifted students concerning plants?

2. In which categories are the metaphors of the gifted and non-gifted students concerning plants are examined according to their common traits?

3. Is there a statistically significant difference between the frequencies of the conceptual categories concerning the perceptions of gifted and non-gifted students about plants?

Methodology

In this study, the "Phenomenology Design", which is one of the qualitative research designs, was used. In phenomenology, it is attempted to define the experiences, perceptions, and interpretations of the research group that are ascribed to certain perceptions, phenomenons, concepts etc. (Akturan and Esen, 2008; Creswell, Hanson, Clark Plano, Morales, Alejandro, 2007).

Participants

Participants were selected through convenience sampling method (Büyüköztürk, Kılıç Çakmak, Akgün, Karadeniz and Demirel, 2011). *Participants* were comprised of 136 gifted students (81 males, 55 females) from the Science and Art Centers (BİLSEM) in two different cities in the Marmara region and 136 non-gifted students (70 males, 66 females) studying at a secondary school in the Marmara region in the fall semester of the 2015-2016 academic year. The 11-14 years old students voluntarily participated in the study. The distribution of the students according to their grades is presented in Table 1.

Table 1.

Descriptive statistics of the students concerning their grades

Grade	Gifted Student	Non-gifted Student	Total
5	39	31	70
6	33	36	69
7	36	31	67
8	28	38	66
Total	136	136	272

Identification of the students as gifted was conducted by the experts in the Ministry of National Education (MNE). In this identification, the experts used intelligence and general ability tests. The leading institutions that serve to the gifted students in our country are the Science and Art Centers (BİLSEMs). The gifted students study in the BİLSEM institutions during out-of-school times or at the weekends (Dönmez, 2004). In the BİLSEM program, the students respectively participate in harmony, support, recognizing the individual skills, developing the special talents, and creating project trainings (MNA BILSEM Directive, 2007).

Data Collection

Relevant literature was examined for comparatively revealing the perceptions of the gifted and non-gifted students concerning plants (Aktamış and Dönmez, 2016; Ekici, 2016; Özarslan, 2019; Yıldızlı, Acar Erdol, Baştuğ and Bayram, 2018; Yılmaz and Altıntaş, 2018). It was determined that metaphors had been used as a means of data collection in numerous studies in education field (Guerrero and Villamil, 2002; Jensen, 2006; Yılmaz and Altıntaş, 2018). In line with the literature and for revealing the metaphors concerning plants, the students were asked to complete the sentence "The plants are like / similar to .....; because .....". Each student was given an A4 sheet with this sentence written on it. No time limitation was put for their sentence completion.

Data Analysis

The data obtained in the study were analyzed through the content analysis method (Yıldırım and Şimşek, 2011). The metaphors mentioned by the students and the motive behind using these metaphors were separately analyzed by two expert academicians, who are experts in biology education and content analysis. The phases followed through the analysis of the study data are as follows (Ekici, 2016).

Coding and Sorting Phase: The data obtained from the students were numbered and computerized. The metaphors of the students were separately evaluated as the gifted students and non-gifted students. The metaphors were examined through their meanings and they were coded. For example, "human, life, and oxygen". The forms of

2 students that were left blank and considered as meaningless in the pre-assessment process were excluded from the evaluation.

Category Development Phase: The metaphors emphasized by the students were correlated with certain themes. Thus, different conceptual categories were formed as 4 themes and 7 sub-themes.

Ensuring Validity and Reliability Phase: Expert opinions were taken in order to check the reliability of the study and to determine whether the metaphors, which were correlated with the 4-theme and 7-sub-theme conceptual categories, are representing those conceptual categories. Considering the consensus and dissidence among the experts, the reliability of the data analysis were calculated via the Miles and Huberman (2015)'s formula: "Reliability = Consensus / [Consensus + Dissidence] X 100", and the reliability value was determined as 92%. Following the data analysis, the frequency of the metaphors was calculated.

In order to determine the difference between the perceptions of the gifted students and non-gifted ones, the conceptual category frequency values were input into SPSS program. Since the data were categorical, the Chi-Square Test of Independence, which is among the non-parametric techniques, was used (Pallant, 2013). Some examples concerning the metaphors and explanations of the students about plants are presented as '…' (NS_{45}; Non-gifted 45th student) or (GS_{23}; Gifted 23rd student) (Yıldırım and Şimşek, 2006).

Findings

The findings of this study, which was conducted to compare the perceptions of the gifted and non-gifted students concerning plants, are presented below.

Sub-Problem 1. The findings concerning the questions "What are the metaphors of the gifted and non-gifted students concerning plants?" are presented in Table 2.

Table 2.

Frequency distribution of the metaphors of the students concerning plants

Metaphor	G	N	T	Metaphor	G	N	T	Metaphor	G	N	T
	f	f	f		f	f	f		f	f	f
Life/living	32	36	68	Green	1	-	1	Beautiful	-	3	3
Human	28	20	48	Eternal life	1	-	1	Meal	-	2	2
Water	7	4	11	Valuable	1	-	1	Bead	-	2	2
Lungs	4	1	5	Armor	1	-	1	Clock	-	1	1
Life source	4	4	8	Star in the sky	1	-	1	Pole of nature	-	1	1
Breath	4	1	5	Internet	1	-	1	Father	-	1	1
Oxygen	3	8	11	Teeth	1	-	1	Sense organs	-	1	1
Sun	3	6	9	Pet	1	-	1	Yoga	-	1	1
Air	3	-	3	Senses	1	-	1	Peace angel	-	1	1
Flower	2	5	7	Woman	1	-	1	Relaxing	-	1	1
Music	2	4	4	Greenery	1	-	1	Information	-	1	1
Medicine	2	2	4	Art piece	1	-	1	World	-	1	1
Factory	2	1	3	Butterfly	1	-	1	Joy	-	1	1
Biology	2	-	2	Numbers	1	-	1	Soft	-	1	1
Friend	1	4	5	Assistant	1	-	1	Cotton	-	1	1
Child	1	3	4	Our organs	1	-	1	Human lover	-	1	1
Spirit	1	3	4	Air filter	1	-	1	Family	-	1	1
Alive	1	1	2	Grass	1	-	1	Color	-	1	1
Oxygen source	1	1	2	Me in the test week	1	-	1	It is something unnecessary	-	1	1
Heart	1	1	2	Scissors	1	-	1	Nail polish	-	1	1
Animals	1	1	2	Human life	1	-	1	Baby	-	1	1
Mother	1	1	2	Aspirator	1	-	1	Fragrance	-	1	1
Machine	1	-	1	Sleep	1	-	1	Human	-	1	1
Cat	1	-	1	Home	1	-	1	Energy	-	1	1
Game	1	-	1	Cloud	1	-	1	Nature	-	1	1
Peace	1	-	1								

G: Gifted, N: Non-gifted, T: Total

When Table 2 is examined, it is observed that the gifted students mentioned 51 different metaphors concerning their plant perceptions, while it is 45 different metaphors for the non-gifted students. The gifted and the non-gifted students mostly emphasized life/living and human metaphors in common.

In the findings, it was determined that gifted students emphasized human, water, lungs, breath, and air metaphors more compared to the non-gifted students. As per the non-gifted students, they emphasized oxygen, sun, flower, friend, beautiful, meal, and bead more compared to the gifted students. Examples about the findings are as follows:

$GS_{9:}$ *Plants are like lungs. Because they clean the air…*
GS_{65}: *Plants are like human beings. Because they, like us, have senses.*
GS_{23}: *Plants are like air filter. Because they intake carbondioxide and emit oxygen.*
GS_{37}: *Plants are like friends. Because I share my problems that I cannot tell to anyone.*
$NS_{5:}$ *Plants are like human beings. Because they also need love.*
$NS_{47:}$ *Plants are like source of life. Because they produce nutrition and oxygen.*

Sub-Problem 2. "In which categories are the metaphors of the gifted and non-gifted students concerning plants are examined according to their common traits?" are presented in Table 3.

Table 3.

The distributions of the metaphors of the students concerning plants to the themes and sub-themes.

Theme	Sub-Theme	Metaphor	G	N	Metaphor	G	N	Metaphor	G	N
			f	f		f	f		f	f
Benefit	Plant as the oxygen source	Life/living	15	17	Spirit	-	2	Assistant	1	-
		Lungs	4	1	Human	-	1	Our organs	1	-
		Oxygen	3	6	Meal	-	1	Air filter	1	-
		Life source	2	3	Nature	-	1	Breath	2	-
		Oxygen source	1	1	Energy	-	1	Human life	1	-
		Medicine	-	2	Factory	-	1	Aspirator	1	-
		Air	-	2						
	Plant as the life source	Life/Living	17	15	Oxygen	-	2	Medicine	2	-
		Water	7	4	Human	-	1	Alive	1	-
		Sun	2	4	Sense organs	-	1	Eternal life	1	-
		Life source	2	1	Meal	-	1	Valuable	1	-
		Breath	2	1	Pole of nature	-	1	Armor	1	-
		Heart	1	1	Father	-	1	Star in the sky	1	-
		Spirit	1	1	Air	3	-	Internet	1	-
	Plant as the source of peace and happiness	Friend	1	3	Life	-	2	Green	1	-
		Music	2	1	Bead	-	1	Sleep	1	-
		Relaxing	-	1	Soft	-	1	Cat	1	-
		Yoga	-	1	Cotton	-	1	Game	1	-
		Peace angel	-	1	Human lover	-	1	Peace	1	-
		Joy	-	1						
Trait	Plant analogous to the human	Human	28	19	Family	-	1	Me in the test week	1	-
		Child	1	3	Friend	-	1	Senses	1	-
		Mother	1	1	Alive	-	1	Woman	1	-
	Diversity / Art	Flower	2	5	Color	-	1	Clock	-	1
		Music	-	1	Baby	-	1	Greenery	1	-
		Beautiful	-	3	Fragrance	-	1	Art piece	1	-
		Sun	-	2	Nail polish	-	1	Butterfly	1	-
		Life	-	2	World	-	1	Numbers	1	-
	Plant structure	Factory	2	-	Biology	2	-	Grass	1	-
		Machine	1	-	Teeth	1	-			
	Reproduction	Information	-	1	Cloud	1	-	Pet	1	-

Environment	Animals	1	1	Home	1	-			
Negative Opinion	It is something unnecessary	-	1	Bead	-	1	Scissors	1	-
	Sun	1	-						

G: Gifted, N: Non-gifted

According to the Table 3, the metaphors of the gifted and the non-gifted students were categorized under 4 themes and 7 sub-themes. Under the 'Benefit' ($f_{Gifted\ (G)}$ =83; $f_{Non\text{-}gifted\ (N)}$ =87) theme, the metaphors of the gifted and the non-gifted students were categorized as the following sub-themes: 'Plant as an oxygen source' ($f_{G=}$ 32; f_N=39), 'Plant as the life source' ($f_{G\ =}$ 43; $f_{N=}$ 34), 'Plant as the source of peace and happiness' ($f_{G\ =}$ 8; f_N=14). The sub-themes under the 'Trait' theme ($f_{G=}$ 48; f_N=46) are grouped as follows: 'Plant analogous to the human' ($f_{G=}$ 33; f_N=26), 'Diversity/Art' ($f_{G=}$ 6; f_N=19), 'Plant structure' ($f_{G=}$7; f_N=0), 'Reproduction' ($f_{G=}$2; f_N=1). In addition to these, the metaphors of the students were also grouped as 'Environment' theme ($f_{G=}$ 3; f_N= 1) and 'Negative Opinion' theme (f_G=2; f_N=2). As the conclusion, it was determined that the metaphors of the gifted and the non-gifted students mostly gathered under the 'Benefit' and 'Trait' themes. The examples of the conceptual categories concerning the perceptions of the students about plants are as follows:

$GS_{15:}$ *Plants are like water, because water is needed for plants as much as plants are needed for life*. (The plant as the *life source* sub-theme)
$GS_{68:}$ *Plants are like human, because plants feed, grow, and excrete as well*. (The plant analogous to the *human* sub-theme)
$GS_{22:}$ *Plants are like life, because plants provide oxygen and nutrients to us and we cannot live without them*. (The plant as the *life source* sub-theme)
$GS_{13:}$ *Plants are like green, because they make us peaceful*. (The plant as the *source of peace and happiness* sub-theme)
$NS_{10:}$ *Plants are like music, because they make us relaxed.* (The plant as the *source of peace and happiness* sub-theme)
NS_{56}: *Plants are like human, because plants, as well, breathe like human.* (The *plant analogous to the human* sub-theme)
NS_{26}: *Plants are like water, because we cannot live without water.* (The *plant as the life source* sub-theme)
$NS_{32:}$ *Plants are like flowers, because they emit fragrance for us.* (The *plant as diversity/art* sub-theme)

Sub-Problem 3. The findings concerning the question "Is there statistically significant difference among the frequencies of the conceptual categories about the perceptions of the gifted and non-gifted students concerning the plants ?" are presented in this part. The results of the Chi-Square test of independence are presented in Table-4.

Table 4.

The results of the Chi-Square test of independence among the metaphorical perceptions of gifted and non-gifted students concerning plants.

Theme		G		N	
		f	T	f	T
Benefit	Plant as the oxygen source	32	83	39	87
	Plant as the life source	43		34	
	Plant as the source of peace and happiness	8		14	
Trait	Plant analogous to the human	33	48	26	46
	Diversity / Art	6		19	
	Plant structure	7		0	
	Reproduction	2		1	
Environment		3	3	1	1
Negative Opinion		2	2	2	2
Total		136		136	
p>0.05	X^2= 15.333 df=14 p=.356				

G: Gifted, N: Non-gifted, T: Total

According to Table 4, it was determined that the perceptions of the gifted and the non-gifted students were grouped under the 'Benefit' theme ($f_{G=}$ 83; $f_{N=}$ 87), 'Trait' theme ($f_{G=}$ 48; $f_{N=}$ 46), 'environment' theme ($f_{G=}$ 1; $f_{N=}$ 1) and 'Negative Opinion' theme ($f_{G=}$ 2; $f_{N=}$ 2). Examining the Table 2, it was determined that non-gifted students emphasized the 'Diversity/Art' sub-theme ($f_{G=}$ 6; $f_{N=}$ 19) more compared to the gifted students. Moreover, it was also determined that the gifted students emphasized the 'Plant structure' ($f_{G=}$ 7; $f_{N=}$ 0) sub-theme more compared to the non-gifted students.

Analyzing the frequencies of the conceptual categories concerning the perceptions of the non-gifted and gifted students about plants through the Chi-Square test of independence, it was determined that, there was statistically no significant difference at α=0.05 level among the perceptions of the students concerning plants. According to these results, it can be mentioned that there is no difference among the metaphorical perceptions of the gifted and non-gifted students concerning plants.

Results and Discusion

The aim of this study was to compare the perceptions of the gifted students and non-gifted students concerning plants through metaphors. Among findings of the research, it was demonstrated that both the gifted and the non-gifted students mostly emphasized life/living metaphors. Moreover, it was revealed that the metaphors of students from both groups were grouped under 'Plant as the oxygen source' and 'Plant as the life source' sub-categories. In addition to these findings, it was determined that gifted students emphasized water, lungs, breath and air metaphors concerning the plants more, and that non-gifted students emphasized oxygen, sun, and meal metaphors more. These findings can be attributed to the fact that plants have a vital importance for the life of the living creatures, particularly the human beings. It is because plants are meeting vital requirements of all creatures as well as human beings (Özel et al., 2013). In this context, it is considered that students emphasized the critical role of plants for the life such as photosynthesis, oxygen production, nutrition, and decreasing air pollution. It was demonstrated that the photosynthesis process was particularly emphasized, in which the oxygen needed for life in the nature is produced while the carbondioxyde is being consumed.

On the other hand, it was revealed that the metaphors of the students in both groups were mostly grouped under the 'Benefit' category. According to this finding, it is considered that both the gifted and the non-gifted students have benefit-oriented perceptions about plants. Accordingly, the importance of plants for the ecosystem and the living beings, their benefits, oxygen and nutrient production of plants, and how these processes are functioning can be the subjects of biology and environment education for the students from both groups. Moreover, in the lessons, the benefits of plants can be mentioned in certain industrial fields such as medicine, clothing, cosmetics, and paint production. Thus, the perceptions of the students concerning plants can be supported in a positive manner.

As one of the findings of this study, it was revealed that the non-gifted students emphasized the metaphors under the 'Plant as a source of peace and happiness' more compared to the gifted students. In other words, the non-gifted students perceive plants as living beings, which are accompanying, relaxing, and restful, rather than the gifted students. In the literature, Kaplan and Topsakal (2013), revealed that the non-gifted students want to live in areas such as seaside, places with animals, and forests (open spaces, plants). According to these findings, the science, biology, and environment educations that the gifted students, particularly the non-gifted students, will participate can be arranged in a way that the students will closely interact with the nature. Additionally, the number of the out-of-class activities can be increased such as nature excursions, plant growing, and garden and park arranging activities. Thus, a positive plant perception development can be ensured for the students from both groups.

Among the findings of the research study, it was found that, similar to each other, students from both groups emphasized 'Plant analogous to the human' category, and particularly to the 'Human' metaphor. According to these findings, it can be mentioned that the plant perceptions of the students have developed in a human/self-centered way. These findings are emerging from the 'Egocentric' and 'Anthropocentric' thoughts of the students (Yörek, 2006). Anthropocentrism is a human-centered way of thinking or it places the human at the center of the nature (Hage and Rauckienė, 2004). This findings is interpreted in such a way that the students place the individual themselves/human being in the development of their perceptions concerning plants. The findings demonstrate that the students think that plants exist for themselves/human beings and that they form their perceptions according to the benefits or losses. Today, with the egocentric understanding that both the gifted and the non-gifted students have, they cannot make contribution to the solution of the current problems in biodiversity and environment fields. Therefore, while discussing plants and biological diversity in the science and biology activities, it should be mentioned in the context of ecological balance rather than benefit and loss. During the plant activities of the students, the plant species around them can be observed and recognized. They can be given tasks concerning research and projects about the plants in their environment. The balancing role of the biodiversity and plants in the ecosystem can be discussed in the activities, and in-depth learning can be ensured.

Among the findings of this research study, it was found that the non-gifted students emphasized the diversity/art category more compared to the gifted students. Additionally, it was determined that non-gifted students emphasized flower, beautiful, and bead metaphors more compared to the gifted students. These results were accepted as remarkable. It is because gifted individuals are stated to be creative, they are exploration-lovers and good observers, they have diverse and different fields of interests, they like their interesting and different sides, and they are aware of their aesthetic traits (Ataman, 2009; Çağlar, 2004; Çitil and Ataman, 2018; Stuart and Beste, 2011). In line with these characteristics, it is expected that the gifted students

emphasize the art and diversity aspects of plants. However, it is observed that this expectation contradicts the findings of the study. This finding is similar to that of a previous study, in which it was stated that the gifted students are not interested in animals and plants that they frequently see around themselves (Özarslan and Çetin, 2018). Additionally, it is known that the gifted students are eager and curious for innovations and research, and that they are getting bored with the routine (Gökdere, 2004; Özarslan and Gülcan, 2018). This finding can be originating from the fact that the gifted students are living in urban areas, where they cannot recognize the plant diversity around themselves and the existence of these living beings becomes a routine. Therefore, it can increase the perceptions of the gifted students towards plants if the less-known plants in their environments are focused during the biology activities of the BİLSEM centers. The students should be encouraged to deal with plants at their homes or schools, and they should be supported to develop projects to increase the green spaces and plant diversity.

It was found that the gifted students emphasized the 'plant structure' category more compared to the non-gifted students. This finding might have emerged from the fact that the gifted students have a wider variety of fields of interest and curiosity, and from their characteristics that they comprehend complex and abstract issues with a better performance (Sak, 2012; Renzulli, 2005; Stuart and Beste, 2011; Trna, 2014). Therefore, in the differentiated activities of biology and environment for the gifted students, complex and complicated issues can be analyzed in detail such as the anatomical structures of plants and their photosynthesis and respiration processes.

Among the findings of this study, it was demonstrated that there was statistically no significant difference between the perceptions of the gifted and the non-gifted students concerning plants. In other words, it can be mentioned that giftedness has no impact on the perceptions of the students concerning plants. When the research findings were evaluated in general, a significant difference was not determined between the perceptions of the gifted and the non-gifted students concerning plants. This is a remarkable finding. Because, compared to their peers, the gifted students show higher performance in one or more skills, they are creative in their fields of interest, they love exploration, they make good observations, and they like their interesting aspects and differences (Ataman, 2009; Çağlar, 2004; Stuart and Beste, 2011). Considering these features, it is expected that the gifted students have higher perceptions concerning plants compared to the non-gifted students.

As the conclusion, in order to develop the perceptions of the gifted students concerning plants, the advantages of herbal oils, extracts, and secretions can be discussed such as olive oil, coconut, methanol, and turmeric in medical, medicine, nutrition, hygiene, and natural paint production etc., in the differentiated biology and environment activities in BİLSEM centers. The function of plants and the plant diversity in the ecological balance can be discussed, and project studies concerning these issues can be implemented. Garden arranging, community gardens, hi-tech greenhouse establishments, preparing herbariums, and producing organic vegetable and fruits can be implemented with the students. Within the context of the out-of-school science, biology, and environment activities, various nature settings can be visited such as museums and arboretums, ensuring that the students get close contact with plants and realize the plant diversity (Eschenhagen, Katmann and Rodi, 2008; Sturm and Bogner, 2010). In this context, the perceptions of the gifted students concerning plants can be developed. Thus, the gifted students can tend towards behaviors protecting the environment and towards the solutions for the environment problems. Most of the implementations and activities that are suggested for differentiation of educations of the gifted students, if deemed appropriate and within the bounds of possibility of the program can be beneficial to the non-gifted students as well.

For further studies, researchers can develop similar studies using different assessment instruments on wider and more diverse research groups. Additionally, the impact of plant perceptions on the attitude, motivation, and academic success can also be a study subject. The instructors of the gifted students can discuss the importance and balancing role of plants for the ecosystem and other creatures in the science and environment lessons. The lesser known, different, and interesting aspects of plants around us can be emphasized. The benefits of plants in industrial areas such as pharmaceuticals, clothing, cosmetics and dyes can be studied in independent project. To enhance the interaction of both gifted and non-gifted students with the environment, more activities can be planned for out-of-classroom activities, nature excursions, plant cultivation, garden and park arrangements.

References

Ahi, B., Atasoy, V., & Balci, S. (2018). An analysis of plant blindness in Turkish textbooks used at the basic education level. *Journal of Baltic Science Education*, *17*(2), 277-287.

Arnett, R.C. (1999). Metaphorical guidance: Administration as building and renovation. *Journal of Educational Administration, 37*(1), 80-89.

Aktamış, H., & Dönmez, G. (2016). Metaphoric perceptions of students' towards science course, science, science teacher and scientist. *Ondokuz Mayis University Journal of Faculty of Education,* 35(1), 7-30.

Akturan, U., & Esen, A.(2008). *Fenomenoloji: Nitel araştırma yöntemleri [Phenomenology: Qualitative research methods],* (Ed. Baş, T. and Akturan, U.), Ankara: Seçkin Yayıncılık.

Ataman, A. (2009). *Special needs children and introduction of special education.Gifted and talented children*. Ankara: Gündüz Education and Publishing.

Aydin, F., Coskun, M., Kaya, H., & Erdonmez, I. (2011). Gifted students attitudes towards environment: A case study from Turkey. *African journal of agricultural research*, *6*(7), 1876-1883.

Büyüköztürk, Ş., Kılıç Çakmak, E., Akgün, Ö. E., Karadeniz, Ş., & Demirel, F. (2011). *Bilimsel araştırma* yöntemleri [Scientific research methology]. 8. Baskı, Ankara: Pegem Yayıncılık.

Cerit, Y. (2008). Öğretmen kavramı ile ilgili metaforlara ilişkin öğrenci, öğretmen ve yöneticilerin görüşleri. [Students, teachers and administrators' views on metaphors with respect to the concept of teacher], *Journal of Turkish Educational Sciences, 6*(4), 693-712.

Creswell, J. W., Hanson, W. E., Clark Plano, V. L., & Morales, A. (2007). Qualitative research designs: Selection and implementation. *Counseling Psychologist*, 35(2), 236-264.

Cross, T. L. (2011). *On the social and emotional lives of gifted children*. Prufrock Press Inc.

Çağlar, D. (2004). *Okulda başarısız olan üstün zekâlı çocuklar*. *Üstün yetenekli çocuklar seçilmiş makaleler kitabı [Gifted children who fail at school. Gifted congress selected articles book*], Istanbul: Çocuk Vakfı Yayınları, 409-415.

Çil, E. (2016). Instructional integration of disciplines for promoting children's positive attitudes towards plants. *Journal of Biological Education*, 50(4), 366-383.

Çitil, M. (2016). *Üstün yetenekli öğrencilere sunulan olumlu davranışsal destek temelli problem davranışları önleyici sınıf yönetimi uygulamaları: Eylem araştırması [Positive behaviour support based preventive classroom management practices for gifted students: An action research].* Doktora tezi (Doctoral thesis), Gazi Üniversitesi Eğitim Bilimleri Enstitüsü, Ankara.

Dąbrowski, K. (2015). *Personality-shaping through positive disintegration*. Otto, NC: Red Pill Press.

De Guerrero, M. C. M., & Villamil, O. S. (2002). Metaphorical conceptualization of ESL teaching and learning. *Language Teaching Research*, 6, 95-120.

Dönmez, N. (2004). *Bilim Sanat Merkezleri'nin kuruluşu ve işleyişinde yapılması gereken düzenlemeler [Arrangements to be made in the establishment and operation of Science Art Centers.].* (Ed. Kulaksızoğlu A., Bilgili A. E and Şirin M. R.), I. Türkiye üstün yetenekli çocuklar kongresi, seçilen bildiriler kitabı [1st gifted congress selected articles book], İstanbul: Çocuk Vakfı Yayınları, 69-84.

Ekici, G. (2016). Biyoloji öğretmeni adaylarının mikroskop kavramına ilişkin algılarının belirlenmesi: Bir metafor analizi çalışması [Determination of the preservice biology teachers' perceptions of microscope: Example for metaphor analysis]. *Ahi Evran Üniversitesi Kırşehir Eğitim Fakültesi Dergisi (Ahi Evran University Journal of Kırşehir Educational Faculty*), *17*(1), 615-636.

Eschenhagen, D., U. Katmann, & Rodi, D. (2008). *Fachdidaktik biologie*. 4th Edition, (Ed. Ulrich Kattman), Koeln: Aulis Verlag Deubner.

Esen, T. (2011). *Üstün yetenekli öğrencilerin çevreye yönelik bilgi ve tutumlarının incelenmesi [A research study on gifted student's knowledge and attitudes towards environment]*. (Master's thesis), Adıyaman University Institute of Science Primary Education Department, Adıyaman.

Fredriksson, A., & Pelger, S. (2016). Metaphorical concepts in molecular biology students' texts–a way to improve subject-matter understanding. *Nordic Studies in Science Education*, *12*(1), 90-106.

Girmen, P. (2007). *İlköğretim öğrencilerinin konuşma ve yazma sürecinde metaforlardan yararlanma durumları.[The capacity of the primary students usage of metaphors in the speakıing and writing expression],* Doktora tezi (Doctoral thesis), Anadolu University, Eskişehir.

Gökdere, M. (2004). *Üstün yetenekli çocukların fen bilimleri öğretmenlerin eğitimine yönelik bir model geliştirme çalışması* [A model suggestion for the education of science teachers of gifted students]. Doctoral thesis, Karadeniz Teknik Üniversitesi Fen Bilimleri Enstitüsü, Trabzon.

Hage, R., & Rauckiene, A. (2004). Ecocentric worldview paradigm: The reconstruction of consciousness. *Journal of Baltic Science Education,* (6), 60-68.

Jensen, F. N. (2006). Metaphors as a bridge to understanding educational and social contexts. *International Journal of Qualitative Methods*, 5(1), 1-17.

Kaplan, K., & Topsakal, U. U. (2013). Primary school students' attitudes toward plants. *Procedia-Social and Behavioral Sciences*, *89*, 598-606.

Karaçam, S., & Aydın, F. (2014). Metaphor analysis of secondary school students' perceptions related to technology concept. *Gaziantep University Journal of Social Sciences*, 13(2), 545-572.

Kök, B. (2012). *Üstün zekâlı ve yetenekli öğrencilerde farklılaştırılmış geometri öğretiminin yaratıcılığa, uzamsal yeteneğe ve başarıya etkisi [The Influence of differentiated geometry teaching on creativity, spatial ability and success in gifted and talented students].*Doctoral Thesis, Institute of Social Sciences of Istanbul University, Istanbul.

Lakoff, G. (1993). *The contemporary theory of metaphor.* (Ed. A. Ortony), Metaphor and thought (2nd ed.), Cambridge: Cambridge Univ. Press.

Lakoff, G., & Johnson, M. (2008). *Metaphors we live by*. Chicago: The University of Chicago Press.

MEB Biyoloji Dersi Öğretim Programı [MoNE Biology Course Curriculum]. (2013). *Güncellenen Ortaöğretim Biyoloji Dersi (9, 10, 11 ve 12. sınıflar) Öğretim Programı. [Updated Secondary Education Biology Courses (9, 10, 11 and 12th Grades) Course Curriculum]*. Last accessed on 2018 July 14, Available from http://www.ttkb.meb.gov.tr/www/guncellenen-ogretimprogramlari/icerik/151.

Miles, M. B., & Huberman. A. M. (2015). *Genişletilmiş bir kaynak kitap: Nitel veri analizi [An expanded resource book: Qualitative data analysis]* (Trans. Ed. S. Akbaba Altun and A. Ersoy), Ankara: Pegem Akademi.

Ocak, G., & Gündüz, M. (2006). Eğitim fakültesini yeni kazanan öğretmen adaylarının öğretmenlik mesleğine giriş dersini almadan önce ve aldıktan sonra öğretmenlik mesleği hakkındaki metaforlarının karşılaştırılması. [The comparison of pre-service teachers' metaphors about the teacher-profession before and after the 'introduction to teacher-profession' course], *Afyon KocatepeUniversity Social Sciences Journal*, *8*(2), 293-311.

Özarslan, M., G. Çetin, & Yıldırım, O. (2017). Üstün zekâlı ve yetenekli öğrenci ailelerinin bilsem biyoloji proje çalışmaları hakkındaki görüşleri [Parental views of gifted and talented students about biology projects in science and art centre]. *Abant İzzet Baysal Üniversitesi Eğitim Fakültesi Dergisi (Journal of Abant İzzet Baysal University Educational Faculty)*, 17(3), 1411-1436.

Özarslan, M.(2019). The comparison of gifted and talented students and non gifted students' perception of biology: Metaphoric Study. *Pamukkale University Journal of Education*, 45 (45).

Özarslan, M., & Cetin, G. (2018). Gifted and talented students' views about Biology activities in a science and art center. *Science Education International, 29*(1), 49-59.

Özel, M., Sürücü, A., & Bilen, K. (2013). Primary school students' attitudes toward plants. *Pamukkale University Journal of Education*, *34*(34), 119-132.

Pallant, J. (2013). *SPSS survival manual*. New York: McGraw-Hill Education.

Piechowski, M. M. 1997. *Emotional giftedness: The measure of intrapersonal intelligence*, (Ed. N. Colangelo and G. A. Davis), Handbook of gifted education (2nd ed.), Boston: Allyn & Bacon.

Renzulli, J. S. (2005). *The three-ring conception of giftedness*. (Ed. R. J. Sternberg andJ. E. Davidson), New York, NY: Cambridge University Press.

Roczen, N., Kaiser, F.G., Bogner, F.X., &Wilson, M., (2014). A competence model for environmental education. *Environment and Behavior,* 46, 972-992.

Saban, A., Koçbeker, B. N.,& Saban, A. (2006). Öğretmen adaylarının öğretmen kavramına ilişkin algılarının metafor analizi yoluyla incelenmesi. *Kuram ve Uygulamada Eğitim Bilimleri (Educational Sciences: Theory & Practice), 6*(2), 461-522.

Sak, U. (2012). *Üstün zekalılar: Özellikleri tanılanmaları eğitimleri [Gifted: Features identified their training],* 2. Baskı. Ankara: Vize Yayıncılık.

Stuart, T.,& Beste, A. (2011). *Farklı olduğumu biliyordum: Ustun yeteneklileri anlayabilmek [I knew I was different: To understand the gifted].* 3 Baskı, (Trans. Gönenli A.), Ankara: Kök Yayıncılık.

Sturm, H., & F. X. Bogner (2010). Learning at workstations in two different environments: A Museum and a classroom. *Studies in Educational Evaluation,* 36, 14-19.

Şahin, F. (2015). Educational programs, services and support for gifted students in Turkey.*Journal of Theory and Practice in Education*,11(4), 1207-1223.

Şahin, F., & Levent, F. (2015). Examining the methods and strategies which classroom teachers use in the education of gifted students. *The Online Journal of New Horizons in Education*, *5*(3), 73-82.

Trna, J. (2014). IBSE and gifted students. *Science Education International, 25*(1), 19-28.

Uğulu, I., Akkaya, Z., & Erkol, S. (2013). An investigation on environmental attitudes of gifted students and the assessments in terms of some demographic variables. *Education Sciences*, 8(4), 400-410.

Van der Meulen, R. T., Van der Bruggen, C. O., Spilt, J. L., Verouden, J., Berkhout, M., & Bögels, S. M. (2014). The pullout program day a week school for gifted

children: Effects on social-emotional and academic functioning. *In Child & Youth Care Forum*, 43(3), 287-314.

Yapıcı, Ü. İ. (2015). Lise öğrencilerinin biyoloji kavramına ilişkin metaforik algıları [High school students' metaphorical perceptions towards biology].*Electronic Journal of Social Sciences, 14*(*55)*, 139-147.

Yıldırım, A., & Şimsek, H. (2011). *Nitel araştırma yöntemleri [Qualitative research methods],* 7. Baskı. Ankara: Seçkin Yayıncılık

Yıldızlı, H., Acar Erdol, T.,Baştuğ, M.,& Bayram, K. (2018). Meta-Synthesis on turkish metaphor studies of teachers. *Education and Science,* 43 (193), 1-43.

Yılmaz,O., & Altıntaş, G. (2018). The metaphors developed by students for the concepts in 'I learn my past' unit of social studies. *Kastamonu Education Journal*, 26(2), 613-619. doi:10.24106/kefdergi. 405471.

Yörek, N. (2006). *Ortaöğretim öğrencilerinin biyolojik çeşitlilik (Biyoçeşitlilik) konusundakavramsal anlama düzeylerinin araştırılması [Investigation of secondary school students'conceptual understandings of the topic of biological diversity 'Biodiversity'].* Doctoral thesis, DEÜ Eğitim Bilimleri Enstitüsü (DEU Institute of Education Department), İzmir.

Yücel Cengiz, İ., & Ekici, G. (2016). Biyoloji öğretmen adaylarının laboratuvar kavramına ilişkin görsel imajları. Visual images of biology teacher candidates regarding laboratory concepts. *Journal of Research in Education and Teaching*, 5(3), 164-177.

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RESEARCH ARTICLE

Üstün Zekâlı ve Üstün Zekâlı Olmayan Öğrencilerin Bitkilere Yönelik Algılarının Metaforlar Yardımıyla Karşılaştırılması

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Özet

Bu çalışmanın amacı, üstün zekâlı ve üstün zekâlı olmayan öğrencilerin bitkilere ilişkin algılarının metaforlar yardımı ile karşılaştırılmasıdır. Çalışmada nitel araştırma desenlerinden olgubilim deseni kullanılmıştır. Çalışma grubu 2015-2016 akademik yılı güz döneminde, Marmara bölgesinde 2 farklı ildeki Bilim ve Sanat Merkezine (BİLSEM) devam eden 136 üstün zekâlı öğrenci ve Marmara bölgesinde bir ortaokulda öğrenim gören üstün zekâlı olmayan 136 öğrenciden oluşmaktadır. Çalışma grubu, kolay ulaşılabilir durum örneklemesi yöntemi ile seçilmiştir. Çalışmada veriler her öğrencinin 'Bitkiler……. gibidir/benzer; çünkü…….' cümlesini tamamlamasıyla elde edilmiştir. Veriler içerik analizi ve Ki-Kare testi yöntemleri ile analiz edilmiştir. Araştırma sonuçlarında üstün zekâlı öğrencilerin üstün zekâlı olmayan öğrencilere göre bitkilere yönelik insan, su, akciğer, nefes ve hava metaforlarını daha fazla vurguladıkları, üstün zekâlı olmayan öğrencilerin ise oksijen, güneş, çiçek, arkadaş, güzel, yemek ve boncuk metaforlarına üstün zekalı öğrencilere göre daha fazla vurgu yaptıkları belirlenmiştir. Ayrıca üstün zekâlı olmayan öğrencilerin 'Huzur ve mutluluk kaynağı olarak bitki' kategorisine, üstün zekâlı öğrencilerin ise 'Bitki yapısı' kategorisine daha fazla vurgu yaptıkları tespit edilmiştir. Ayrıca her iki öğrenci grubunun da 'İnsana benzer olarak bitki' kategorisine özellikle vurgu yaptıkları ve bitkilere yönelik algılarının insan/ben merkezli geliştiği görülmüştür. Sonuçta, üstün zekâlı ve üstün zekâlı olmayan öğrencilerin bitkilere yönelik algıları arasında önemli bir farklılık olmadığı belirlenmiştir.

Anahtar Kelimeler: Üstün zekalı öğrenci, üstün zekalı olmayan öğrenci, bitkiler, algı, metafor

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