

## THE EFFECT OF "THE FASHION OF THE GENES EDUCATIONAL EVENT" ON THE GIFTED STUDENTS' POSITIVE ATTITUDE CHANGE ON FASHION AND SUSTAINABILITY

GENLERİN MODASI EĞİTİM ETKİNLİĞİNİN ÖZEL YETENEKLİ ÖĞRENCİLERİN MODA VE SÜRDÜRÜLEBİLİRLİK KONUSUNDA OLUMLU TUTUM DEĞİŞİMİNE ETKİSİ

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### Abstract

This study aims to reveal the importance of fashion awareness education on sustainable fashion design for gifted students and the change in their attitude and behavior. In addition, by teaching the attitudes and behaviors of sustainable fashion design; attention is drawn to the importance of applied (practical) training.

The research was carried out at the Mamak Science and Art Center within the scope of the TÜBİTAK 4004 Nature and Science Schools "Modelling Agricultural Gene Resources with Technology" project. The study sample consists of 30 gifted students aged between 12-17 who voluntarily participated in this study. The quasi-experimental design approach was used with pre- and post-tests. In the study, named "the Fashion of Genes" theoretical knowledge training was applied with slide presentations and a collage workshop using natural materials. Statistical analyzes of the data were made with the Wilcoxon Ordinal Numbers Test by the SPSS program.

After the training, it was observed that there was a significant difference ( $p=,000$ ) in the sum of the student's attitude and behavior scores towards fashion awareness, and 50% of them planned to use their clothes for more than 2-3 years. It was concluded that the training on "the need to think about whether there is a reason (need) before purchasing the product" has a significant ( $p=,020$ ) effect on increasing awareness. When the sums of general attitude and behavior scores in the subjects of "Fashion and Sustainability" ( $p=,013$ ), "Fashion Ethics" ( $p=,003$ ), and "Fashion Trends" ( $p=,002$ ) are compared, it was found to be a significant change ( $p=,000$ ).

As a result, it was concluded that sustainable fashion design education affects the attitude and behavior change of gifted students. In addition, with sustainable fashion design education, awareness was created for students to think multi-dimensionally in future projects. Thus, an important step was taken to support the circular economy.

**Keywords:** Fashion, sustainability, gifted students, circular economy, circular fashion, attitude, awareness.

## Özet

Bu çalışmanın amacı, genlerin modası eğitiminin özel yetenekli öğrencilerin moda ve sürdürülebilirlik konusunda olumlu tutum değişimine etkisini ortaya koymaktır. Ayrıca sürdürülebilir moda tasarımına ait tutum kazanımında, yaparak yaşayarak uygulamalı eğitim çalışmalarının önemine dikkat çekilmektedir.

Araştırma TÜBİTAK 4004 Doğa ve Bilim Okulları "Tarımsal Gen Kaynaklarını Teknoloji ile Modelliyoruz" projesi kapsamında, Mamak Bilim ve Sanat Merkezinde gerçekleştirilmiştir. Araştırmanın örneklemini, 12-17 yaş özel yetenekli öğrencilerden çalışmaya gönüllü olarak katılan 30 öğrenci oluşturmaktadır. Deneysel araştırma yöntemlerinden ön-son test yarı deneysel tasarım yaklaşımı kullanılmıştır. Çalışmada öğrencilere, aktif öğrenme etkinliği ile "Sürdürülebilir Moda Tasarımına Ait Tutum ve Davranışlar Konusunda Farkındalık Eğitimi" slayt sunumları ve kolaj çalışması ile gerçek malzemeler kullanılarak gerçekleştirilmiştir. Verilerin istatistiksel çözümlenmesi SPSS programı ile Wilcoxon Sıra Sayıları Testi ile yapılmıştır.

Eğitim sonrası öğrencilerin moda farkındalığına yönelik tutum ve davranış puanları toplamında anlamlı bir farkla ( $p: ,000$ ) değişim gerçekleştiği, %50'sinin giysilerini 2-3 yıldan fazla kullanmayı planladığı görülmüştür. Ürünü satın almadan önce ihtiyaç olup olmadığını düşünmeleri gerekliliğine yönelik eğitimin, farkındalığı arttırmada anlamlı ( $p=,020$ ) bir etkisi olduğu sonucuna ulaşılmıştır. "Moda ve Sürdürülebilirlik" ( $p=,013$ ), "Moda Etiği" ( $p=,003$ ), "Moda Akımları" ( $p=,002$ ) konularında, genel tutum ve davranış puanlarının toplamları karşılaştırılmasına ait sonuçlar incelendiğinde ( $p:,000$ ) anlamlı bir farkla değişim olduğu, görülmüştür.

Sonuç olarak sürdürülebilir moda tasarımı eğitiminin özel yetenekli öğrencilerde tutum ve davranış değişikliğine etki ettiği sonucuna ulaşılmıştır. Ayrıca sürdürülebilir moda tasarımı eğitimi ile öğrencilerin geleceğe yönelik projelerde çok yönlü düşünceleri için farkındalık oluşturulmuştur. Böylece döngüsel ekonominin desteklenmesi için de önemli bir adım atılmıştır.

**Anahtar sözcükler:** Moda, sürdürülebilirlik, özel yetenekli öğrenciler, döngüsel ekonomi, döngüsel moda, tutum, farkındalık.

## Introduction

As in all other global sectors of the fashion industry also, the threat of depletion of natural resources, which arises with rapid production and uncontrolled consumption brought about by industrialization, necessitates taking some precautions all over the world. The first remedy that comes to mind is to transform the linear production and consumption chain into a cyclical structure. This structure emerges as a circular fashion model and requires an important social responsibility for textile, clothing, and accessory manufacturers and consumers. Thus, it combines the fashion system with the goal of "designing, producing and consuming clean, safe and ethical clothing" (Blum, 2021). Sustainability education is the basis of this goal.

The European circular economy textile report states that “a focus on sustainable design education will be a strong in design culture” (Vercauteren, et al, 2019); The United Nations 2030 sustainable development goals incentive for change emphasize the necessity of “a focus on raising young people's awareness of sustainable development and living in harmony with nature” (Web: 2021 a, b). As can be seen from these reports, the main factor in sustainability effectiveness comes from the education of people. In this study, the aim was to introduce the concept of sustainability to the students who will be the architects of the future.

For the gifted children who are defined as "Undiscovered diamonds" by Baldwin (1987) and "unprocessed ores in nature" by Işık and Güneş (2017), “the importance of art education becomes even more important in universal issues such as sustainability” (Sanborn, 2018). Gifted children who can put their creative ideas into practice are important values in the development of society with what they can achieve (Hacıoğlu & Türk, 2018; MEB, 2017). Because “Creativity and innovation” are one of the 21st-century key skills that individuals must-have for the development of societies (Partnership for 21st Century Skills, 2009). It is of particular importance to raise awareness to develop positive attitudes in the gifted students who have these skills naturally, to achieve multidisciplinary studies on such global issues.

In the context of textile and fashion brands, many studies on design processes and conscious consumption awareness in the circular economy are carried out (Moorhousea & Moorhousea, 2017). Within the main theme of sustainability concepts such as sustainable fashion, carbon footprint, ecological footprint, biodegradability, fast fashion, slow fashion, ecological fashion, ethical fashion, waste management, natural product, organic product, artificial product, upcycling, reduction, recycling, reuse have emerged. However, to apply these mentioned fashionable concepts in daily life; individuals must first gain awareness and acceptance then develop a positive attitude, and finally transform it into a behavior.

### **Aim**

Attitudes are a tendency that cannot be observed directly and consists of affective, cognitive, and behavioral components that guide our actions (Morgan, 2010, p. 336). Attitude is not a behavior that is exhibited but a preparatory tendency for the behavior. Based on this approach, the "Fashion of Genes" activity was planned for students to adopt the concept of sustainable fashion design and transform it into a behavior. With this educational activity, it is aimed that students;

- a) to develop positive attitudes and behaviors towards the environment by helping them realize and embody the concepts of sustainable fashion,
- b) to develop environmental awareness and understanding of the importance of personal preferences in the pollution of the world,
- c) to gain preliminary experience so that they can carry out studies that will support sustainability in the future.

In this context, with the "Fashion of Genes" educational activity, it has been sought that there is a significant difference between the answers of the students to the following questions:

- 1) Pre-test/Post-test scores regarding the duration of clothing use,
- 2) Pre-test/Post-test scores on fashion and sustainability,
- 3) Pre-test/Post-test scores on fashion ethics,
- 4) Pre-test/Post-test scores on fashion trends.

### **Method**

In this study, descriptive and quasi-experimental methods were used together. The study group consists of 30 gifted students (15 girls and 15 boys) who are between the ages of 10-17, studying in different schools that are included in the project carried out by the Ankara Province Mamak District Science and Art Center (BİLSEM).

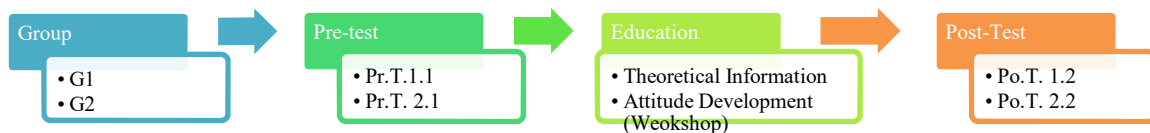
Students are volunteer participants of the "Fashion of Genes" training event held within the scope of TÜBİTAK 4004 Nature and Science Schools' "Modelling Agricultural Gene Resources with Technology" project. Information about the age of the participants and their educational institutions is given in Table 1. The age distribution of the sample group of the study concentrates on the ages of 14-15 (%70,0).

**Table 1:** Age and School Distribution of the Study Group

Demographic features		n	%
Age	12-13	4	13,3
	14-15	21	70
	16-17	5	16,6
	<b>Total</b>	<b>30</b>	<b>100</b>
Institution of Education	Anatolian High School	10	33,3
	Science High School	9	30
	Fine Arts High School	1	3,3
	College	7	23,3
	Other <sup>1</sup>	3	10
	<b>Total</b>	<b>30</b>	<b>100</b>

### Research Pattern

The Fashion of Genes Training, which is seen in the research pattern given in Figure 1, was applied to the students who were randomly divided into two groups due to the pandemic conditions.



**Figure 1:** Research Pattern

Education has two separate pillars: “theoretical knowledge of fashion products” and “developing an attitude towards sustainability”. The results for theoretical knowledge were presented in another paper. This study includes the part of education to measure its contribution to developing positive attitudes. The educational activity was planned according to active learning based on “experience by doing” (Bonwell & Eison, 1991). The process was carried out under the “student-centered learning” approach which activates the student in the sequential titles of "application, trip-observation, problem-solving, research-examination, and experimentation" (Köksal et al., 2017).

### Data Collection Tools

**Pre-Test: Current Attitude Detection:** A pre-test developed by the researchers was applied to both groups before the education in order to measure the student's readiness for fashion and sustainability (understanding their attitudes and behaviors).

<sup>1</sup> Students who have not yet enrolled in high school.

**First Stage:** Concept Acquisition Training Activity: After the test, a theoretical education was given to students with slides with current examples of sustainability in fashion and their questions were answered. Thus, students were provided to review their current attitudes and behaviors toward the concept of fashion products and sustainability.

**Second Stage:** Creative Practice Activity: To embody and experience the theoretical knowledge, fibers, and fabrics made from vegetable, animal, and synthetic origin presented by the aims of the project in the educational environment. Thus, learning information in both visual and sensory senses was supported. Based on their theoretical knowledge and material examination/tactile experience, students separated into small groups of 2-3 people. Each group made a fashion collage under the supervision of instructors by using male and female silhouettes that were prepared and suitable for their age level (Çakmak and Çeğindir, 2021). In this way, it was ensured that abstract concepts were transformed into the design by “doing and living” with real materials. Thus, it was pointed out that everyone can gain design skills by using their creativity and with the materials at their side. On the other hand, attention was drawn to the value of time and effort given to a product design, while emphasizing that prolonging the product use period will respect the environment and production labor. Student collages have been published on the project's online events page (Genes Fashion, 1 and 2, 2020).

**Post-Test-Detection of Attitude Change:** At the end of the training activity, a post-test was administered to the students to measure the effect of change on their attitudes. Students' attitudes were examined under three titles with subcategories which are: fashion product and sustainability (Social Dimension, Economic Dimension, and Environmental Dimension); fashion ethics (Human Rights and Animal Rights), and fashion awareness (Fast Fashion and Slow Fashion).

### Data Evaluation

Statistical analyzes of the data from the pre-test and post-test were performed with the Wilcoxon Signed Ranks by using the SPSS program. In comparison to non-parametric scores, the Wilcoxon Signed Ranks Test is the most popular test used to define the difference between two measurements belonging to a group (Semiz, Ocak, & Aydiner, 2008, pp. 93-96). Non-parametric tests used in small samples do not require the principle of distribution normality. These tests are also called "distribution-free" tests (Büyüköztürk, 2019, p. 139). In this study, non-parametric tests were applied due to the small sample size. The level of significance in the tests was accepted as  $p=0.05$ . The results obtained are presented and interpreted in the tables.

The score intervals of the questionnaires prepared according to the “Likert-type” five-point rating scale, and the interval width of the scale (array width/number of groups to be made) were calculated with the formula suggested by Tekin (2010, p. 262). The calculation process is to divide the largest score and the smallest score difference ( $5-1=4$ ) by the total range ( $4/5= 0.8$ ) and gradually find the value equivalents by adding 1 to the result. According to the score range, 2.60 and above were accepted as positive participation. The expressions were coded as follows (Tekin, 2010, p. 262);

**Strongly Disagree:** 1.00-1.80; **Disagree:** 1.81-2.60; **Undecided:** 2.61-3.40; **Agree:** 3.41-4.20; **Totally Agree:** 4.21-5.00

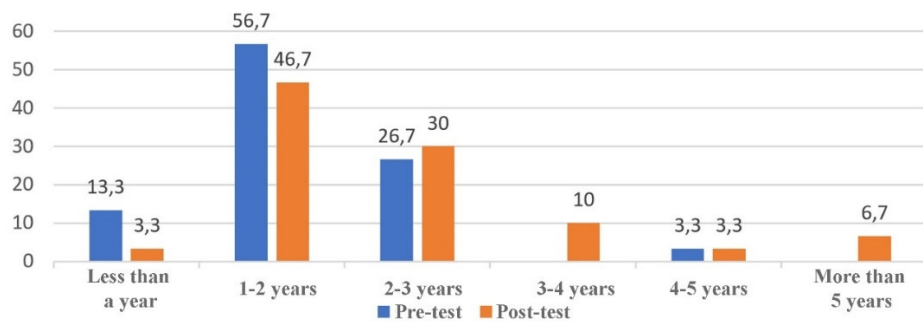
### Findings

At the end of the training, the findings regarding the relationship between the pre-test and post-test scores of the student's attitudes toward product use and sustainable fashion design are presented in the tables below.

**Findings regarding the pre-test/post-test scores of the students regarding the duration of wearing clothes:**

As seen in Table 2, while 96.5% of the students limits their duration of using clothes to 2-3 years, they changed it to "I can use it for more than 5 years" with the awareness formed after the training. According to the post-test point averages, it is seen that 50% of the students plan to use their clothes for more than 2-3 years. These results indicate that fashion awareness education has achieved its purpose in providing students with attitude change.

**Table 2:** Pre-Test/Post-Test Responses Regarding the Students Duration of Garment Usage



**Findings on the pre-test/post-test scores of the students on fashion and sustainability:**

Table 3 shows the statistical findings of the pre-test/post-test scores of the student's attitudes toward fashion and sustainability in social, economic, and environmental dimensions. According to the findings, while there was no significant difference in the social dimension, it was observed that there was a significant difference ( $p:034$ ) in the statement "There are clothes that I bought but not used" in the economic dimension.

**Table 3: Pre-Test/Post-Test Scores of Students' Attitudes and Behaviors on Fashion and Sustainability**

Concept	Statements	Sign	N	M.R	S.R	z	p	Pre/Post Test $\bar{x}$
Fashion and Sustainability	I give my unused clothes to those in need.	Negative	3	6,00	18,00	-,577 <sup>b</sup>	,564	4,60
		Positive	6	4,50	27,00			4,60
		Tie	21					
		All	30					
	I keep up with fashion (current trends).	Negative	7	7,50	52,50	-1,175 <sup>b</sup>	,240	3,07
		Positive	10	410,05	100,50			3,30
		Tie	13					
		All	30					
	Sustainability and waste management can eradicate poverty.	Negative	9	7,28	65,50	-,852 <sup>b</sup>	,394	4,17
		Positive	5	7,90	39,50			3,93
		Tie	16					
		All	30					
Economic dimension	Ecological products are expensive.	Negative	14	9,71	136,00	-1,721 <sup>b</sup>	,085	3,40
		Positive	5	10,80	54,00			3,03
		Tie	11					
		All	30					
	I can pay additionally for recyclable products that do not harm the environment.	Negative	5	11,10	55,50	-1,385 <sup>b</sup>	,166	3,73
		Positive	13	8,88	115,50			4,00
		Tie	12					
		All	30					
	There are clothes that I bought but not use	Negative	13	9,23	120,00	-2,115 <sup>b</sup>	<b>,034</b>	2,63
		Positive	4	8,25	33,00			2,17
		Tie	13					
		All	30					
I keep my unused clothes.	Negative	12	9,63	115,50	-1,339 <sup>b</sup>	,180	2,86	
	Positive	6	9,25	55,50			2,53	
	Tie	12						
	All	30						
I use secondhand clothes.	Negative	6	8,67	79,50	-,860 <sup>b</sup>	,390	2,30	
	Positive	10	8,40	88,50			2,50	
	Tie	14						
	All	30						
Cheapness of fast fashion products; makes them easy to buy.	Negative	9	8,83	79,50	-1,823 <sup>b</sup>	0,68	3,40	
	Positive	14	14,04	196,50			3,87	
	Tie	7						
	All	30						
Environmental dimension	Fast fashion is the main factor in the consumption of natural resources.	Negative	4	5,50	22,00	-3,469 <sup>b</sup>	,001	3,07
		Positive	18	12,83	231,00			4,03
		Tie	8					
		All	30					
	The fashion industry pollutes the environment.	Negative	6	10,00	60,00	-1,138 <sup>b</sup>	,255	3,60
		Positive	12	9,25	111,00			3,87
		Tie	12					
		All	30					
	Eco fashion prevents environmental pollution.	Negative	4	11,00	44,00	-2,599 <sup>b</sup>	<b>,009</b>	3,70
		Positive	17	11,00	187,00			4,30
		Tie	9					
		All	30					
Eco fashion promotes sustainability.	Negative	3	7,50	22,50	-3,069 <sup>b</sup>	<b>,002</b>	3,73	
	Positive	16	10,47	167,50			4,33	
	Tie	11						
	All	30						
Awareness-raising trainings about the consumption of natural resources are sufficient.	Negative	5	6,30	31,50	-1,651 <sup>b</sup>	,099	2,90	
	Positive	10	8,85	88,50			3,30	
	Tie	15						
	All	30						

In the environment dimension students;

- defined their attitudes towards the statement: “fast fashion is the main factor in the consumption of natural resources” were “I am undecided” in the pre-test ( $\bar{x}$ : 3.07) but changed to “I agree” ( $\bar{x}$ : 4.03) in the post-test with a significant difference ( $p$ :.001).
- while the answers of the students to the statements “Eco-fashion prevents environmental pollution” ( $\bar{x}$ : 3.70) and "Eco-fashion supports sustainability"( $\bar{x}$ : 3,73) were "I agree"; they changed them to "strongly agree" ( $\bar{x}$ : 4,30/  $\bar{x}$ : 4,33) and shown a positive significant difference in favor of the post-test ( $p$ :.009/  $p$ :.002).

In Table 4, when the comparison results of the total scores on “Fashion and Sustainability” (pre-test and post-test) are examined, it is seen that the "environmental dimension total" is changed from  $\bar{x}$ : 3.40 in the pre-test to  $\bar{x}$ : 3.97 in the post-test with a significant difference ( $p$ :.002).

**Table 4:** Comparison of Attitude and Behavior Score Totals on “Fashion and Sustainability”

Con cept	Statements	Sign	N	M.R	S.R	z	p	Pre/Post Test $\bar{x}$
Fashion and Sustainability	Sum of Social dimension	Negative	11	14	154,00	-1,365 <sup>b</sup>	,172	3,90
		Positive	10	7,70	77,00			3,74
		Tie	9					
		All	30					
	Sum of Economical dimension	Negative	9	11,22	101,00	-1,662 <sup>c</sup>	,096	2,95
		Positive	16	14,00	224,00			3,15
		Tie	5					
		All	30					
	Sum of Environmental dimension	Negative	5	12,10	60,50	-3,095 <sup>c</sup>	,002	3,40
		Positive	22	14,43	317,50			3,97
		Tie	3					
		All	30					

**Findings regarding the pre-test-post-test scores of the students on fashion ethics:**

Table 5 shows the results (pre-test and post-test) for the comparison of the students' attitude and behavior scores on "Fashion Ethics". The test is grouped under two sub-titles within the framework of human rights and animal rights. The data of these groups were evaluated with a 5-point Likert scale; as views on four statements on human rights and three on animal rights.

In Table 5, the comparison of the pre-test and post-test scores of the expressions regarding human rights shows that although there is no significant difference in the statements: "In product reliability, I trust label information"; "Brands protect ethical values", "Organic product aims to protect the health of employees and users" and "Carbon Footprint is the responsibility of all humanity", the already high values have increased even more.

Table 5 shows that the opinions of the students in regarding the animal rights,

- “Ethical fashion respects the rights and dignity of all living things”, changed with a significant positive difference ( $p$ :.003) from "I agree" ( $\bar{x}$ : 3,50) to "I totally agree" ( $\bar{x}$ : 4,57).
- "I use advanced and recyclable clothing" showed a positive significant difference ( $p$ :.003) from "I agree" ( $\bar{x}$ : 3,53) in the pre-test to "I totally agree" ( $\bar{x}$ : 4,27) in the post-test.
- Totals of the students' animal rights dimension attitude scores indicates a significant difference (post-test  $\bar{x}$ : 4,20 > pre-test  $\bar{x}$ : 3,57,  $p$ :.002) in favor of the post-test.



**Table 5:** Pre-Test Post-Test Scores of Students' Attitudes Towards Fashion Ethics

Concept	Statements	Sign	N	M.R	S.R	z	p	Pre/Post Test $\bar{x}$
Fashion Ethics	In product reliability, I trust label information	Negative	8	8,38	67,00	-,408 <sup>b</sup>	,683	4,00
		Positive	7	7,57	53,00			3,87
		Tie	15					
		All	30					
	Brands protect ethical values	Negative	7	8,50	59,50	-,457 <sup>b</sup>	,647	3,47
		Positive	9	8,50	76,50			3,53
		Tie	14					
		All	30					
	Organic product aims to protect the health of employees and users	Negative	6	9,00	54,00	-1,454 <sup>b</sup>	,146	4,07
		Positive	12	9,75	117,00			4,33
		Tie	12					
		All	30					
	Carbon Footprint is the responsibility of all humanity	Negative	3	6,17	18,50	-1,942 <sup>b</sup>	,052	4,30
		Positive	10	7,25	72,50			4,67
		Tie	17					
		All	30					
	Sub Total	Negative	12	11,13	133,50	-791 <sup>c</sup>	,429	3,72
		Positive	13	14,73	191,50			3,83
		Tie	5					
		All	30					
Animal Rights	Ethical fashion respects the rights and dignity of all living things	Negative	3	10,67	32,00	-3,012 <sup>b</sup>	,003	3,50
		Positive	18	11,06	199,00			4,27
		Tie	9					
		All	30					
	I support the use of products produced with ecological fashion.	Negative	3	5,00	15,00	-3,147 <sup>b</sup>	,002	3,53
		Positive	15	10,40	156,00			4,27
		Tie	12					
		All	30					
	I use advanced and recyclable clothing	Negative	5	8,70	43,50	-1,608 <sup>b</sup>	,108	3,70
		Positive	12	9,13	109,50			4,07
		Tie	13					
		All	30					
	Sub Total	Negative	4	8,88	35,50	-3,132 <sup>c</sup>	,002	3,57
		Positive	19	12,66	240,50			4,20
		Tie	7					
		All	30					

**Findings regarding the pre-test vs. post-test scores of the students on the subject of fashion trends:**

Table 6 shows the statistical results of the students' pre-test/post-test attitude scores on fashion trends.

In the comparison of fast fashion data, students state;

- The attitude of “I am undecided” ( $\bar{x}$ : 3.10) in the pre-test against the statement: “Fast fashion means high quality”, changed to “I do not agree” ( $\bar{x}$ : 2.30) at the end of the training, with a positive significant difference ( $p$ :.001).
- There was a positive significant difference ( $p$ : ,003) in the "Fast fashion means constant innovation" statement, between the pre-test "I agree" ( $\bar{x}$ : 3,50) to "I totally agree" ( $\bar{x}$ : 4,20) in the post-test.
- It created a significant difference ( $p$ :.034) by responding to the statement "Accessing fast fashion products is easier" as "I disagree" ( $\bar{x}$ : 3,67) in the pre-test and "strongly agree" ( $\bar{x}$ : 4,23) in the post-test.

**Table 6: Students' Pre-Test vs. Post-Test Attitude Scores on Fashion Trends**

Concept	Statements	Sign	N	M.R	S.R	z	p	Pre/Post Test $\bar{x}$
Fashion Trends	Fast fashion means high quality	Negative	19	11,66	221,50	-	,001	3,10
		Positive	3	10,50	31,50			
		Tie	8					
		All	30					
	Fast fashion means constant innovation	Negative	3	10,83	32,50	-	,003	3,50
		Positive	18	11,03	198,50			
		Tie	9					
		All	30					
	Accessing fast fashion products is easier.	Negative	6	13,00	78,00	-	,034	3,67
		Positive	18	12,33	222,00			
		Tie	6					
		All	30					
Slow Fashion	Slow fashion preserves natural resources .	Negative	5	11,80	59,00	-	,043	2,27
		Positive	16	10,70	172,00			
		Tie	9					
		All	30					
	Slow fashion products are of better quality	Negative	5	9,80	49,00	-	,003	3,30
		Positive	19	13,21	251,00			
		Tie	6					
		All	30					

In the comparison of the data of the slow fashion dimension in Table 6, it was shown:

The negative attitudes of "I do not agree" to the statement: "Slow fashion preserves natural resources" in the pre-test changed with a significant difference as "I agree" in the post-test ( $p$ :.043); Attitudes of "I am undecided" in the pre-test to the statement: "Slow fashion products are of better quality" changed positively ( $p$ :.003) to "I agree" in the post-test.

When the statistical data of the comparison of the pre-test/post-test attitude scores of the students towards fashion and sustainability, fashion ethics and trends are analyzed in Table 7;

The total score of their attitudes towards "fashion and sustainability" ( $p$ :.013), "fashion ethics" ( $p$ :.003), and "fashion trends" ( $p$ :.002) showed a significant positive change in favor of the post-test.

In summary, looking at the overall sum of the post-test scores at the end of the training given with the “Fashion of the Genes” activity, it has created a positive and significant ( $p<.000$ ) change in the attitudes of the students towards fashion and sustainability.

**Table 7:** Comparison of Students' Attitude Scores Towards Fashion and Sustainability, Fashion Ethics and Trends

Concept Total	Statements	Sign	N	M.R	S.R	z	p
Fashion and Sustainability	Negative	10	9,45	94,50	-2,471 <sup>b</sup>	<b>,013</b>	3,41
	Positive	18	17,31	311,50			
	Tie	2					
	All	30					3,62
Fashion Ethics	Negative	6	12,17	73,00	-2,962 <sup>b</sup>	<b>,003</b>	3,65
	Positive	22	15,14	282,50			
	Tie	2					
	All	30					4,01
Fashion Trends	Negative	5	11,80	59,00	-3,127 <sup>b</sup>	<b>,002</b>	3,34
	Positive	22	14,50	319,00			
	Tie	3					
	All	30					3,82
Table Total	Negative	6	8,67	52,00	-3,579 <sup>b</sup>	<b>,000</b>	3,47
	Positive	23	16,65	383,00			
	Tie	1					
	All	30					3,81

### Discussion

The research was carried out with 30 students at the Mamak Science and Art Center within the scope of the TÜBİTAK 4004 Nature and Science Schools "We Model Agricultural Gene Resources with Technology" project no:119B767. The study, it was aimed to reveal the positive effect of “Fashion of Genes” education, on the attitude change of gifted students towards fashion and sustainability. In addition, it is aimed to draw attention to the importance of applied education studies by experience regarding sustainable fashion.

In this context, when the results of the research questions regarding the students' attitudes toward product use and sustainability are examined.

It was observed that there was a significant difference ( $p<.000$ ) in the sum of the student's attitude scores towards fashion awareness before and after education and 50% of them planned to use their clothes for more than 2-3 years. It was concluded that the training on "to consider whether there is a need or not" before purchasing the product has a significant ( $p=.020$ ) effect on increasing students' awareness. When the results of the "Fashion and Sustainability" ( $p=.013$ ), "Fashion Ethics" ( $p=.003$ ), "Fashion Trends" ( $p=.002$ ), and general attitude scores were compared ( $p<.000$ ), there was a significant positive difference.

As a result, as seen in previous studies (Akay, 2013):

- Such projects make a positive contribution to the perspectives of individuals, especially young people, towards science and scientific knowledge,
- Experiencing and active learning supports this process, and the scientific activities that students do during their education can guide them in expressing what they want to do in the name of science in the future,
- Gain scientific knowledge by having fun,

Thus, it has been concluded that the “Fashion of Genes” educational activity is effective in a positive attitude change to gifted students about fashion and sustainability.

Because fashion is an important factor in resource consumption and carbon footprint in the world, and the targets are determined in the UN sustainability studies with a focus on 2050, it is important to raise awareness at an early age with the right resources for the youth who will be the adults of tomorrow. In addition to the studies that propose multidimensional arrangements reflecting the complex nature of sustainability problems in the contemporary fashion education curriculum (Murzyn-Kupisz, & Hołuj, 2021), this research reveals that the curriculum for sustainable fashion education should be carried out at the secondary level. For this reason, it is thought that this study will serve as an example to fill this gap and shed light on future studies.

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