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DOES THE MINING ENGINEERING PROFESSION HAVE A GENDER?: EVALUATION OF THE PROFESSION FROM THE STUDENTS' PERSPECTIVE BASED ON GENDER PERCEPTION

MADEN MÜHENDİSLİĞİ MESLEĞİNİN CİNSİYETİ VAR MI?: ÖĞRENCİLERİN PERSPEKTİFİNDEN MESLEĞİN TOPLUMSAL CİNSİYET ALGISINA GÖRE DEĞERLENDİRİLMESİ

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ABSTRACT

The main scope of this study is to analyse the mining engineering profession from the perspective of both female and male mining engineering students and to examine the profession in terms of gender equality. This study also aims to identify the problems faced by mining engineering students in Turkey based on gender roles and to find solutions to these problems. In this context, a field study was conducted based on the views of 236 participants. In the study, a digital questionnaire consisting of two parts was distributed to the participants. In the first part of the questionnaire, demographic information was asked, and in the second part, questions were asked about the evaluation of female and male students' professions based on gender. The data obtained from the study were evaluated and interpreted and solution suggestions were presented.

Keywords: Mining Engineering, Gender, Male-dominated professions, Descriptive case study, Quantitative analysis

ÖZET

Maden mühendisliği mesleğinin hem kadın hem de erkek maden mühendisliği öğrencileri açısından incelenmesi ve mesleğin toplumsal cinsiyet eşitliği açısından irdelenmesi bu çalışmanın ana kapsamını oluşturmaktadır. Bu çalışma aynı zamanda Türkiye'de maden mühendisliği öğrencilerinin cinsiyetçi rollere dayalı olarak karşılaştıkları sorunları tespit etmeyi ve bunlara çözüm getirmeyi amaçlamaktadır. Bu kapsamda 236 katılımcının görüşlerine dayalı olarak bir saha çalışması yapılmıştır. Çalışmada katılımcılara iki bölümden oluşan dijital bir anket dağıtılmıştır. Anketin ilk kısmında demografik bilgiler, ikinci kısmında ise kadın ve erkek öğrencilerin mesleklerini toplumsal cinsiyete dayalı olarak değerlendirmelerine ilişkin sorular sorulmuştur. Çalışmadan elde edilen veriler değerlendirilerek ve yorumlanarak çözüm önerileri sunulmuştur.

Anahtar Kelimeler: Maden Mühendisliği, Toplumsal Cinsiyet, Erkek Egemen Meslekler, Betimleyici Vaka Çalışması, Kantitatif (Nicel) Analiz

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INTRODUCTION

Engineering education and research is becoming more developed and emphasised worldwide. Identifying the best, brightest and most innovative engineering competencies is crucial for maintaining the competitive advantage of national industries and the country itself (NAAN, 2006). The main function of engineering is to manipulate materials, energy and information to bring tremendous benefits to humanity. Engineering is therefore recognised as one of the most important fields that adds value to products, processes and services, thus contributing to economic development and improving the quality of life (Balakrishnan and Low, 2016). The scarcity of engineering professionals is a global phenomenon (Gill et al., 2008). Despite the increasing need for engineers, the participation of women in engineering professions is still insufficient (Balakrishnan and Low, 2016). Engineering has a hard, heavy and dirty image from a student's point of view. These strong cultural images have helped to reproduce occupational segregation, where engineering is considered unsuitable for women. Despite these widespread views, some women decide to study engineering with the expectation of a career in the sector (Powell et al., 2007). The number and proportion of women receiving bachelor's, master's and PhD degrees in science and engineering has increased significantly compared to the past (NAAN, 2006).

As countries' need for engineering professionals increases, both educators and industry leaders are focusing their efforts on attracting women to this traditionally male career. Given that different institutions are likely to offer different levels and types of support, exploring the potential relationship between institution and engineering self-efficacy is an important part of understanding student satisfaction, success and ultimately retention in engineering programmes (Marra et al., 2009). Another important interpretation of gender stereotypes in engineering suggests that the observed differences, such as the proportion of women and men in various engineering programmes, are due to the fact that women's values are different from men's. According to this interpretation, men are more interested in "technology as technology", while women are more interested in contextualised applications, especially the human perspective (Uden, 2002). For both women and men, the decision to become an engineer is based on academic interest as well as encouragement from teachers, parents or mentors (Cech, 2005). Until recently, much of the research conducted on university campuses has focused on women's perceptions, expectations and choices, and on placing women in existing engineering departments and laboratories. Since gender differences in learning and achievement have been identified in previous research, it was hypothesised that women are "inadequate" in the engineering sciences and lack motivation to participate. However, recent research has shown that gender differences in course registration and achievement have become statistically insignificant (Bystydzienski and Bird, 2006).

While the gender role distribution of university students varies over time, it is known that university education generally changes students' gender role attitudes in a positive way. However, in the research conducted, it was found that female students exhibited a more equalitarian view on gender roles, while male students had a more traditionalist attitude. In this context, it is important to determine in which direction the attitudes of university students develop and to what extent university education can change social attitudes (Ertuğrul Yaşar and Zorluoğlu, 2021). Although there are various studies on female engineering students, the number of studies on female mining engineering students is limited (Laznjak and Medjimurec, 1997a; Cruise, 2011; Brickey et al., 2018; Laznjak and Medjimurec, 1997b). These studies did not include any field work. However, significant information has been compiled from the literature. The purpose of this study, consequently, is to define and offer solutions to the issues based on sexist roles faced by both female and male mining engineering students in Turkey. It is anticipated that the result of this study will light the way for both the mining sector and researchers who do academic studies.

THE AIM, THE IMPORTANCE AND THE METHOD OF THE STUDY

Although various institutions and organizations are working to destroy the perception of women's profession/men's profession, which has been accepted by society, it is obvious that this perception still continues and cannot be destroyed in an instant. One of the professions classified as "men's profession" is mining engineering. Although there seems to be an increase in favour of female engineers in both the rate of university entrance and the rate of working in the mining sector, the belief that this profession can also be a "women's profession" is not at the desired level; due to the reasons such as the fact that the mining industry is a masculine sector, that mining is carried out in places far from the city and under difficult conditions due to its nature, that it is a profession that requires a body load as well as a brain

load, and that it has adopted the form of working in shifts. It is thought that this situation also feeds the perception of the female profession/male profession since the society does not find it strange that the woman takes on all the work and responsibilities in the home despite working outside the home. For this reason, mining engineering is not a profession suitable for women in the eyes of society (Kara and Tombal Kara, 2022; Tombal Kara and Kara, 2023). The aim of this study is to identify the problems faced by female mining engineering students who have studied mining engineering in Turkey, based on sexist roles, and to offer solutions. It is not possible for this study to find a solution to all the problems mentioned, but it is expected that the result of the study will shed light on both the mining sector and researchers doing academic studies.

Since this study is based on the participation and opinions of both male and female mining engineering students, the "descriptive case study" method was preferred as the method in this study. All of the questions were prepared as a result of detailed research and studies, and were finalized by consulting experts' opinions. Ethics committee approval has been received from 25.04.2022 date and 04/19 number of ethics committee of Adana Alparslan Turkes Science and Technology University. Since the study focuses on Mining Engineering students in Turkey whose mother language was Turkish, there was an additional ethical responsibility to correctly translate all data from Turkish to English while preserving the entity of their emotions and recountments. The consent forms were translated into Turkish to make probable the collection of informed consent from every attendant. The universe of the research is mining engineering students who are currently study mining engineering in Turkey's universities. While the total number of mining engineering students in Turkey is 2856, only 17.0% of them are female (Table 1).

Table 1. Number of Female, Male and total Students of Universities with Mining Engineering Departments in Turkey (HEIMS, 2023)

	F	**M**	**T**	**F (%)**	**M (%)**
Adana Alparslan Turkes Science and Technology University (ATU)	0	3	3	0.0	100.0
Afyon Kocatepe University (AKU)	6	52	58	10.3	89.7
Canakkale Onsekiz Mart University (COMU)	5	27	32	15.6	84.4
Cukurova University (CU)	17	138	155	11.0	89.0
Dicle University (DU)	0	10	10	0.0	100.0
Dokuz Eylul University (DEU)	44	313	357	12.3	87.7
Eskisehir Osmangazi University (ESOGU)	18	164	182	9.9	90.1
Hacettepe University (HU)	85	286	371	22.9	77.1
Inonu University (INU)	2	10	12	20.0	80.0
Istanbul Technical University (ITU)	92	290	382	24.1	75.9
Istanbul University-Cerrahpasa (IUC)	38	219	257	14.8	85.2
Karadeniz Technical University (KTU)	13	82	95	13.7	86.3
Konya Technical University (KTUN)	7	51	58	12.1	87.9
Kutahya Dumlupinar University (DPU)	16	122	138	11.6	88.4
Mugla Sitki Kocman University (MSKU)	11	58	69	15.9	84.1
Middle East Technical University (METU)	110	341	451	24.4	75.6
Nigde Omer Halisdemir University (OHU)	1	16	17	5.9	94.1
Sivas Cumhuriyet University (SCU)	1	20	21	4.8	95.2
Süleyman Demirel University (SDU)	5	42	47	10.6	89.4
Sirnak University (SU)	0	3	3	0.0	100.0
Usak University (UU)	3	31	34	8.8	91.2
Van Yuzuncu Yil University (YYU)	0	1	1	0.0	100.0
Zonguldak Bulent Ecevit University (BEU)	12	91	103	11.7	88.3
Total	**486**	**2370**	**2856**	**17.0**	**83.0**

A total of 236 participants, including 76 female and 160 male students participated in this study. Participation from all universities was realized. The questionnaire prepared for data collection consists of two parts. The first part of the questionnare includes such demographic information as gender, age range, marital status, graduation, university and grade while the second part is inclusive of questions about the gender-based assessment of the students. Questionnaires were distributed to students digitally. Students participating in the questionnaire were reached through the Chamber of Mining Engineers.

Quantitative statistical analyzes were made using the SPSS22 program with the data obtained from the questionnaire and the findings were interpreted according to the results of the analysis. There are 12 questions in the second part, which includes evaluation questions and forms the basis of the questionnaire. Only students who have done internships were asked to answer questions about their internship experience. The answers to the following questions were sought:

1. In what rank was your department in your university preferences?
2. How did you decide to study mining engineering?
3. Are you satisfied with the department you are currently studying?
4. Do you think your profession is androcentric?
5. While choosing your department, have you encountered any gender-based intervention (that your department is not suitable for your gender) from your surroundings?
6. Do you currently hear gender-based comments/criticism about your department from your circle?
7. Do you think being female or male is a factor affecting the success in Mining Engineering education?
8. Have you experienced any difficulties/discrimination based on gender in your current institution?
9. Have you faced any gender-based discrimination while looking for an internship place?
10. Have you been exposed to any gender-based discrimination while doing your internship?
11. If you received a salary while doing your internship, do you think there are gender-related differences in your salary?
12. Based on your internship experience, do you think you will be exposed to gender-based discrimination in your professional life?

In some of the evaluation questions, using a five-point Likert scale, the participants were asked to mark one of the options (1) Strongly disagree, (2) Disagree, (3) Indecisive, (4) Agree, (5) Strongly Agree. The other part of the evaluation questions required open answers. The distribution of the data regarding the answers given to the questions is given as frequency and percentage.

RESULTS

Although there are participants from every age group, the participants of "24 and above" are in the majority. 96.2 percent of the participants are single and 75.9 percent of them graduated from Anatolian High School. Demographic characteristics of the participating students are given in Table 2.

Table 2. Demographic Characteristics of the Participating Students

Feature	Grade	Frequency (f)			Percentage (%)		
Gender	Female	76			32.2		
	Male	160			67.8		
	Not specified	0			0.0		
	Total	236			100.0		
		F	**M**	**T**	**F**	**M**	**T**
Age Range	17	4	9	13	5.3	5.6	5.5
	18	5	12	17	6.6	7.5	7.2
	19	6	13	19	7.9	8.1	8.1
	20	5	18	23	6.6	11.3	9.7
	21	9	15	24	11.8	9.4	10.2
	22	6	12	18	7.9	7.5	7.6
	23	17	29	46	22.4	18.1	19.5
	24 and above	24	52	76	31.6	32.5	32.2
	Total	76	160	236	100.0	100.0	100.0
Marital Status	Single	73	154	227	96.1	96.3	96.2
	Married	3	6	9	3.9	3.7	3.8
	Not specified	0	0	0	0.0	0.0	0.0
	Total	76	160	236	100.0	100.0	100.0
Graduation	Anatolian High School	60	119	179	78.9	74.3	75.9
	Science High School	3	11	14	4.0	6.9	5.9
	Multi-Program Anatolian High School	8	23	31	10.5	14.4	13.1

	Vocational and Technical Anatolian High School	2	1	3	2.6	0.6	1.3
	Other	3	6	9	4.0	3.8	3.8
	Total	76	160	236	100.0	100.0	100.0
University	ATU	0	1	1	0.0	0.6	0.4
	AKU	2	7	9	2.6	4.4	3.8
	COMU	1	4	5	1.3	2.5	2.1
	CU	8	14	22	10.5	8.7	9.3
	DU	0	3	3	0.0	1.9	1.3
	DEU	3	8	11	4.0	5.0	4.7
	ESOGU	3	8	11	4.0	5.0	4.7
	HU	14	17	31	18.5	10.5	13.1
	INU	0	4	4	0.0	2.5	1.7
	ITU	7	11	18	9.2	6.9	7.6
	IUC	8	15	23	10.5	9.4	9.8
	DPU	2	5	7	2.6	3.1	3.0
	KTU	8	13	21	10.5	8.1	8.9
	KTUN	0	5	5	0.0	3.1	2.1
	MSKU	2	7	9	2.6	4.4	3.8
	METU	9	6	15	11.9	3.8	6.4
	OHU	0	4	4	0.0	2.5	1.7
	SCU	2	6	8	2.6	3.8	3.4
	SDU	1	7	8	1.3	4.4	3.4
	SU	0	2	2	0.0	1.3	0.8
	UU	1	5	6	1.3	3.1	2.5
	BEU	5	8	13	6.6	5.0	5.5
	Total	76	160	236	100.0	100.0	100.0
Grade	Prep class	8	19	27	10.5	11.9	11.4
	1.	9	20	29	11.9	12.5	12.3
	2.	8	26	34	10.5	16.3	14.4
	3.	18	29	47	23.7	18.1	19.9
	4.	33	66	99	43.4	41.2	42.0
	Total	76	160	236	100.0	100.0	100.0

*F: Female, M: Male, T: Total

Distributions of answers of participating students to questions are given in Table 3.

Table 3. Distributions of Answers of Participating Students to Questions.

	Frequency (f)			**Percentage (%)**		
	F	**M**	**T**	**F**	**M**	**T**
In what rank was your department in your university preferences?						
1-5	42	98	140	55.3	61.3	59.3
6-10	23	36	59	30.3	22.5	25.0
11-15	8	19	27	10.5	11.9	11.5
16 and above	3	7	10	3.9	4.3	4.2
Total	76	160	236	100.0	100.0	100.0
How did you decide to study mining engineering?						
I made a choice based on the score I got as a result of the university exam.	35	94	129	46.1	58.8	54.7
I made up my mind by doing research about the department.	17	28	45	22.4	17.5	19.1
I was guided by my family/relatives/close friends whose profession was mining engineering.	13	21	34	17.1	13.1	14.4
I was informed by my teachers.	8	11	19	10.5	6.8	8.0
Not Specified	3	6	9	3.9	3.8	3.8
Total	76	160	236	100.0	100.0	100.0
Are you satisfied with the department you are currently studying?						
Strongly Disagree	2	8	10	2.6	5.0	4.3
Disagree	7	14	21	9.2	8.8	8.9
Indecisive	13	27	40	17.1	16.9	16.9

Agree	25	35	60	32.9	21.8	25.4
Strongly Agree	29	76	105	38.2	47.5	44.5
Total	76	160	236	100.0	100.0	100.0
Do you think Mining Engineering profession is androcentric?						
Strongly Disagree	7	1	8	9.2	0.6	3.4
Disagree	8	7	15	10.5	4.3	6.4
Indecisive	12	2	14	15.8	1.3	5.9
Agree	27	47	74	35.5	29.4	31.4
Strongly Agree	22	103	125	29.0	64.4	52.9
Total	76	160	236	100.0	100.0	100.0
While choosing your department, have you encountered any gender-based intervention (that your department is not suitable for your gender) from your surroundings?						
Strongly Disagree	2	142	144	2.6	88.7	61.0
Disagree	7	13	20	9.2	8.1	8.5
Indecisive	0	2	2	0.0	1.3	0.8
Agree	19	2	21	25.0	1.3	8.9
Strongly Agree	48	1	49	63.2	0.6	20.8
Total	76	160	236	100.0	100.0	100.0
Do you currently hear gender-based comments/criticism about your department from your circle?						
Strongly Disagree	4	152	156	5.3	95.0	66.1
Disagree	5	7	12	6.6	4.4	5.1
Indecisive	0	1	1	0.0	0.6	0.4
Agree	24	0	24	31.5	0.0	10.2
Strongly Agree	43	0	43	56.6	0.0	18.2
Total	76	160	236	100.0	100.0	100.0
Do you think being female or male is a factor affecting the success in Mining Engineering education?						
Strongly Disagree	53	128	181	69.7	80.0	76.7
Disagree	23	29	52	30.3	18.1	22.0
Indecisive	0	3	3	0.0	1.9	1.3
Agree	0	0	0	0.0	0.0	0.0
Strongly Agree	0	0	0	0.0	0.0	0.0
Total	76	160	236	100.0	100.0	100.0
Have you experienced any difficulties/discrimination based on gender in your current institution?						
Yes	5	2	7	6.6	1.3	3.0
No	71	158	229	93.4	98.7	97.0
Total	76	160	236	100.0	100.0	100.0
Have you faced any gender-based discrimination while looking for an internship place?						
Yes	39	2	41	67.2	1.8	24.6
No	19	107	126	32.8	98.2	75.4
Total	58	109	167	100.0	100.0	100.0
Have you been exposed to any gender-based discrimination while doing your internship?						
Yes	46	0	46	79.3	0.0	27.5
No	12	109	121	20.7	100.0	72.5
Total	58	109	167	100.0	100.0	100.0
If you received a salary while doing your internship, do you think there are gender-related differences in your salary?						
Yes	4	1	5	17.4	2.6	8.2
No	19	37	56	82.6	97.4	91.8
Total	23	38	61	100.0	100.0	100.0
Based on your internship experience, do you think you will be exposed to gender-based discrimination in your professional life?						
Strongly Disagree	5	92	97	8.6	84.4	58.1
Disagree	3	11	14	5.2	10.1	8.4
Indecisive	9	3	12	15.5	2.8	7.2
Agree	22	1	23	37.9	0.9	13.8
Strongly Agree	19	2	21	32.8	1.8	12.5
Total	**58**	**109**	**167**	**100.0**	**100.0**	**100.0**

In the first question, they were asked in what rank were their department in their university preferences, and 59.3 percent of the participants gave the answer "1-5" to the question. When the answers given to the question "How did you decide to study mining engineering?" were examined, it was noted that the rate of participants who gave the answer "I made a choice based on the score I got as a result of the university exam" was 54.7 percent. It was monitored that 50.0 percent of the female participants and 37.4 percent of the male participants chose the Mining Engineering profession with knowledge before making a choice. 17.1 percent of female and 13.1 percent of male participants said that they were guided by their family/relative/close friends whose profession was mining engineering. 22.4 percent of female and 17.5 percent of male participants stated that they had knowledge about the department by doing previous research. 10.5 percent of female and 6.8 percent of male participants also stated that they were informed by their teachers. In the study conducted by Coşar (2016), approximately 66% of the students answered as "During the preference period" as the time to choose the university. It is estimated that the score obtained by the students in the university exam is an important factor in this behaviour. In the third question, they were asked if they were satisfied with the department they were currently studying. 38.2 percent of female and 47.5 percent of male students answered "strongly agree". When the total rate was analysed, it was seen that 69.9 percent of the students were concentrated in the answers "strongly agree" and "agree". One of the participants expressed his opinion as follows:

> I decided to study by researching the programme. As I started to study and get to know the profession more closely, I think I made the right decision.

When it comes to questions about the gender-based evaluation of the profession, it was observed that 31.4 percent of the participants agreed with the idea that their profession was androcentric, and 52.9 percent of them strongly agreed. It was observed that approximately 85 percent of the participants thought that their profession was male-dominated. When the answers given by the male and female participants to the question were analyzed separately, it was observed that the distribution varied. Some participants expressed their opinions regarding this question as below:

> No matter how much I am strongly against it, women are seen as not being able to do this profession. I will fight this forever.
>
> Although it is a difficult profession for women in terms of conditions, it does not mean that they cannot do it.

It is thought that the participants claimed Mining Engineering is a male-dominated profession since it is currently perceived as male-dominated by society. Correspondingly, although the opinions are very diverse, it cannot be put forward that there is no female student who thinks that it is a male-dominated profession from her point of view. However, because there are a wide variety of subjects that are traditionally "accepted" or "embraced" by society, the perception of the female profession/male profession invocations is mostly based on their "social acceptance". Laplonge (2017) stated in his study that the mining industry is defined as a particularly masculinized industry that prefers extreme masculinity and rejects femininity. According to Lahiri-Dutt (2011), there is not only clear visibility of men in mining but an inherently accepted combination of men with institutionalized authority expertise and prestige, institutions, laws, and governance structures.

Examining the answers to the question "While choosing your department, have you encountered any gender-based intervention (that your department is not suitable for your gender) from your surroundings?", it was observed that 61.0 percent of the participants gave the answer "strongly disagree". However, when the answers given to this question were analysed on the basis of gender; it is determined that the rate of female and male participants is 2.6 percent and 88.7 percent, respectively. A similar picture was observed in the "strongly agree" and "agree" responses. In this question, it was observed that the opinions of male and female participants differed sharply from each other. Some participants added the following ideas regarding this question:

> I think everyone should study in the department of their choice. I will be deciding this, not someone else.
>
> When one of our neighbours heard that I had decided to study in the Mining Engineering Department, he said, "What are you going to do? Are you going to dig coal?" People don't even know what engineering is, let alone Mining Engineering.

According to Cech (2005), the role of their teachers, parents or close surroundings in the decision of both female and male students to study in engineering departments is quite large. For this reason, any negative comments that students will hear from these people they consult will perhaps cause

their life course to change completely. Therefore, it is of great importance to raise awareness not only among students but also among the society that there is no gender in the profession. According to Gönel et al. (2012), it was concluded that the families of female students who have reached/can reach the higher education stage do not have any hesitation about attending university. However, discriminatory interventions occur on the basis of departments in terms of whether the department or profession is suitable for the student.

While 66.1 percent of the participants answered "strongly disagree" to the question "Do you currently hear gender-based comments/criticism about your department from your circle?", 18.2 percent said, "Strongly agree". This question, like the previous question, was one of the questions where the answers of male and female participants were very distinctly separated. While 95 percent of the male participants answered "strongly disagree", 56.6 percent of the female participants answered "strongly agree" and 31.5 percent answered "agree". Some of the participants' ideas for this question are as follows:

> People are often surprised by the answer I give when they ask me what I study. They look at you as if to say, "What are you doing in this department?". Is it so hard to accept that a woman can also study in this discipline?
>
> A relative of mine was very surprised at first. Then he was very supportive. He was one of those who thought women should be everywhere.

When asked whether they thought being female or male was a factor affecting the success in Mining Engineering education, it was seen that a total 98.7 percent of the participants gave the answer "strongly disagree" and "disagree". When the answers given by the male and female participants to this question were examined, it was observed that the rate of male participants who answered "strongly disagree" is more than the rate of female participants. According to Zhang et al. (2004), female engineering students enter engineering programmes with less confidence than their male counterparts in their background knowledge of engineering, their ability to succeed in engineering, and their perceptions of how engineers contribute to society.

Moreover, when asked whether they had experienced any difficulties/discrimination based on gender in their current institution, 97.0 percent of the participants gave the answer "no". When the female and male participants were analyzed separately, it was seen that 93.4 percent of the female participants and 98.7 percent of the male participants answered "no". This was one of the questions on which participants of both genders compromised.

Since only students who had completed an internship were asked to answer the questions about the internship, 58 female and 109 male students continued to answer the questions about the internship. When posed the question of whether they had faced any gender-based discrimination while looking for an internship place, 24.6 percent of the participants answered "yes". When these rates were examined separately, while the rate of responses given by male participants was 1.8 percent, it reached 67.2 percent for female participants. Some participants stated as follows:

> I had a hard time looking for a company for my underground mining internship. Some of the companies I contacted said that they did not have places such as toilets and changing rooms that could be used by women because they did not have female employees, while others stated that they did not prefer female interns and staff because their employees would not be comfortable with a female employee.
>
> I did not face any difficulties due to my gender because I am a male. However, what I heard from my female friends was not entirely optimistic.

Examining the answers to the question "Have you been exposed to any gender-based discrimination while doing your internship?", it was observed that all male participants answered "no" to the question. Of course, the situation was quite different among female participants, 79.3 per cent of whom answered "yes". Some participants added the following ideas regarding this question:

> Of course, I do not think that the employees at the place where I did my internship have bad intentions, but even the goodwill they showed in the form of helping was actually discrimination against women. This essentially means the following: You cannot do it alone.
>
> Towards the end of my internship, an employee said: "You've finally masculinised like the rest of us." I think he meant it as a compliment. What does it mean to be masculinised? Is it really necessary?

> I guess I was one of the lucky ones. Since there were also female employees in the company where I did my internship, I can say that even if there was sexist discrimination, I did not feel it.

According to Bayer and Şahin Nardalı (2019), female students are mostly exposed to gender discrimination during internships. As a result of being subjected to gender discrimination, the most common situations are disengagement from the profession and self-confidence problems. There are many things that need to be done socially in combating gender discrimination, and it may be useful to take social measures such as imposing sanctions on those who discriminate, making regulations in laws, organising campaigns and public service announcements.

When the question "If you received a salary while doing your internship, do you think there are gender-related differences in your salary?" was asked, 23 female and 38 male participants gave answers. 91.8 percent said, "no" to this question. 82.6 percent of the female and 97.4 percent of the male participants stated that they did not think that there was a gender-based difference in their salaries.

When asked if they think they thought they would be exposed to gender-based discrimination in their professional life, based on their internship experience, it was seen that 58.1 percent of the participants gave the answer "strongly disagree". However, this was also a question where the answers of male and female participants were quite different. While this rate was 84.4 per cent for male participants, it was only 8.6 per cent for female participants. Some participants said the following about this issue:

> As a woman, aside from the reactions I have already received from outside about my profession; I realised that there was a huge wall in front of me with the reaction of people or institutions in the mining sector, stating that I would have difficulties and maybe I could not do it just because I was a woman, and even learning that some (most) companies did not hire female mining engineers. Unfortunately, as women, there are restrictions on this issue as in every situation.
>
> I think both men and women have different difficulties. While women are comfortable in the education phase, men are more comfortable in the field. But there are also options for women such as academics or working in consultancy companies. So life treats everyone both good and bad.
>
> If I have so much difficulty even when looking for an internship, I honestly don't know how it will be when looking for a job.

According to Hersh (2000), female engineering students are concerned about sexual harassment, discrimination and working in an all-male environment. While these concerns are quite reasonable and humanitarian, not only women but also the whole of humanity must fight against these sexist phenomena in order to eradicate them.

DISCUSSION

Although the presence of female students in mining engineering education has tended to increase from past to present, various difficulties faced by female students in their educational life still exist. Although the visibility of women in engineering fields that are mostly identified with men, such as mining engineering, is increasing day by day, it is still difficult to talk about gender equality even under today's conditions. Of course, each department has its own responsibilities and challenges; women who are studying mining engineering also have common problems with women studying in other departments. However, it is observed that women in mining engineering, which is one of the fields with the highest emphasis on "male dominated" even among engineering disciplines, experience gender-based problems. As a result of this study, which was carried out to identify the problems experienced by female mining engineering students in terms of gender equality and to offer solutions, it was seen that female students still struggle with gender-based prejudices and discrimination and have to continue their education under these conditions.

It is extremely important to end gender discrimination in the sector so that more women can choose to study mining engineering. Being subjected to sexist discrimination even during the job search process prevents women from choosing these departments, which are considered to be male-dominated, from the very beginning, and this situation leads to the strengthening of the male-dominated stance of the related professions. If it is intended to establish a balance in terms of female/male employment in the sector by directing more women to mining engineering education, it is essential to make new

regulations independent of gender roles. The following suggestions can be offered for women to be interested in Mining Engineering education:

- The first step to be taken is undoubtedly to provide detailed information about mining engineering before entering higher education and to ensure that women get rid of the prejudice that these departments are male-dominated departments.
- Although well-intentioned, academics often assign male students to physically demanding tasks, especially in laboratory work (Du and Kolmos, 2009). It would be an important step to break down gender stereotypes if the same responsibilities were given equally to female students.
- Firms can be requested to consider the balance of male/female students for internships.

Elective courses and/or regular seminars on gender studies in engineering can be offered in the departments in order to raise awareness of both female and male students

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