

THE LAST 10 YEARS OF GEOSCIENCES ENGINEERING EDUCATION IN TÜRKİYE

G. GÜLSEV UYAR AKSOY¹, C. OKAY AKSOY², A. ALPER UYAR³

¹*Hacettepe University Mining Engineering Department, Ankara /Türkiye*

²*Dokuz Eylül University, Mining Eng. Department, İzmir/ Türkiye*

³*GOA R&D Mining and Environment Technologies Ltd.Co Ankara/ TÜRKİYE*

Abstract

This study explains how geosciences engineering departments in Türkiye have entered a painful process in the last 10 years due to wrong education policies and mine accidents, and reveals the fact that the decreasing interest in these departments is due to the prejudices of the Turkish people and that these prejudices are a natural consequence of the events. There is no doubt that interest in geoscience engineering is on the decline worldwide. However, the situation in Türkiye is serious enough to be the subject of this article. The study aims to draw conclusions on two cases. The political failure of the education system and the effects of social prejudices, reinforced by mining accidents, on the psychology of students.

Key words

Geosciences Engineering ,Mining , Geophysical, Geological ,Education

1. Introduction

Mining is a field of activity that is not fully realized to be present in every area of our lives, except for the generally known mines. In developing countries such as Türkiye, there are situations where the sensitivity and oppositional spirit can be mixed with lack of knowledge and ignorance. It is known that the role of accidents in the mines is an undeniable fact that the societies are so biased in their view of mining activities under the title of sensitivity. Mining, geology and geophysics engineers have a special place and importance in mining and other underground resource activities. In recent years, some universities in Türkiye as well as in the world have opened departments of Petroleum and Natural Gas Engineering, Earth Science Engineering and Mineral Processing Engineering and have taken important steps towards the specialization of the sector. At this point, another starting point of our study, the complexity and meaninglessness of the education system in Türkiye, comes into play. On the one hand, the geosciences are pregnant with the formation of new faculties and are trying to recruit students; on the other hand, the mining, geology and geophysics departments themselves are forced to fill their quotas, let alone many of them are facing the unpleasant consequences of not being able to accept even one student.

Trying to exclude critical approaches, our study presents statistics from the global and Turkish context and focuses on the problems that can be solved in these environments. It then offers suggestions and solutions that may be useful. Finally, it tries to shed light on how to produce graduates who love mining, which is one of the most important professions of today and the future for Türkiye and the world, who are conscious, selected with preferences and who have completed their education with an idealistic mindset.

2. Overview of Universities in Türkiye and Status of Engineering Education

We can say that the history of universities in the Republic of Türkiye started with the University Revolution in 1933. Following the establishment of Istanbul University in 1933, Istanbul Technical University in 1944 and Ankara University in 1946, Karadeniz Technical University and Ege University were opened in 1955, becoming the first universities established in the Republican era.

In 1956, Middle East Technical University (as Middle East Institute of Technology) was opened in Ankara, Atatürk University in Erzurum in 1957, Anadolu University (as Eskişehir Academy of Economic and Commercial Sciences) in Eskişehir in 1958, and Hacettepe University in Ankara in 1967, marking, in the words of our Founder and National Hero Mustafa Kemal Atatürk, the most important beginnings of the young Republic of Türkiye on the road to reaching the level of Contemporary Civilization. Middle East Technical University became the first university in Türkiye to offer education in English. As of 2000, there were 70 universities operating in 39 provinces in Türkiye (Table I).

It can be said that the history of engineering faculties in Türkiye, which are considered to be underground sciences (mining, geology, geophysics, petroleum, earth sciences), began in 1915 with the establishment of the "İlmül Arz ve Maadin Dar-ül Mesaisi", now known as the "Institute of Geology and Mineralogy" at Dârülfünûn-ı Şahane, and was the predecessor of today's Istanbul University. In 1924, Zonguldak hosted the establishment of the Higher School of Mining Engineering, which was created in response to the need for mining engineers. The first studies in the field of geophysics were recognized with the establishment of the Rasathane-i Amire in 1868, which was established after the great Istanbul earthquake. The first academic education in Mining Engineering started with the establishment of the "Faculty of Mining" at Istanbul Technical University in 1953. In 1953, with the establishment of the Maçka Faculty of Mining Engineering, geophysical engineering started at Istanbul Technical University. Geology was the first department to award the degrees of Geological Engineer and Petroleum Engineer, and did so as early as 1961.

The tables below provide a comprehensive overview of the total number of universities in Türkiye, the engineering faculties within these universities and the presence of geoscience departments within these faculties. The before and after analyses, chosen as the methodology, are divided into two periods: until 2000 and from 2000 to the present. Academic quality and world university rankings are included in these tables, which constitute the core of the studies that form the subject of our article, in order to increase the impact of the analysis. Both the world university rankings and the university quotas and academic statuses shown in the tables have been updated according to the 2023-2024 data. After 2000, especially after 2004 when political stability was achieved, new universities were rapidly established in Türkiye with the slogan "A University in Every Province". By 2014, the number of universities in Türkiye had more than doubled to 157. Ten years later, in 2024, 48 new universities were opened, bringing the total number of universities to 205.

The attached tables provide a comprehensive overview of Turkish universities as well as a detailed analysis of their global position in the QS World University Rankings. QS World University Rankings, a leading authority on global university rankings, is based on a comprehensive database of 1,500 universities each year. Among the QS World data, four Turkish universities are ranked in the top 550. METU (ranked 336th), Istanbul Technical University, Boğaziçi University and Koç University. With the exception of Istanbul University, Hacettepe University, Ankara University and Yıldız Technical University, all other universities are ranked in the 1200+ range. Another statistical observation is that all 133 Turkish universities that became operational after 2000 are ranked in the 1500+ range and are therefore not included in the above list. It is clear that the number of universities in Türkiye has almost tripled in the last two decades. However, despite these considerations, without even going into details, it is clear that we have become a country with a significant number of unqualified universities. University planning should be one of the most comprehensive and detailed plans in a state's government program. Just as the number of schools in a neighborhood should be determined according to the population and the number of students, and new schools should be built when necessary, just as the number of mosques in a neighborhood should be determined according to the population and the number of congregations.

Table 1. Universities in Türkiye before 2000

NO	CITY	Institution Name	YEAR	Y/N	QS Ranking
1.	İstanbul	Istanbul University	1933	N	711-720
2.	ANKARA	Police Academy	1937	N	1501+
3.	İstanbul	Istanbul Technical University	1944	Y	=404
4.	ANKARA	Ankara University	1946	Y	901-950
5.	İzmir	Ege University	1955	Y	1001-1200
6.	Trabzon	Karadeniz Technical University	1955	Y	1501+
7.	Erzurum	Ataturk University	1957	Y	1401+
8.	ANKARA	Middle East Technical University	1959	Y	=336
9.	ANKARA	Hacettepe University	1967	Y	761-770
10.	İstanbul	Boğaziçi University	1971	Y	=514
11.	ADANA	Cukurova University	1973	Y	1401+
12.	Diyarbakır	Dicle University	1973	Y	1501+
13.	Sivas	Sivas Cumhuriyet University	1974	Y	1501+
14.	Bursa	Bursa Uludağ University	1975	Y	1501+
15.	Elazığ	Fırat University	1975	Y	1501+
16.	Konya	Selcuk University	1975	Y	1501+
17.	Samsun	Ondokuz May University	1975	Y	1501+
18.	Malatya	Inonu University	1975	Y	1501+
19.	Kaşeri	Erciyes University	1978	Y	1201-1400
20.	ANKARA	Gazi University	1982	Y	1001-1200
21.	Antalya	Akdeniz University	1982	Y	1401+
22.	Edirne	Trakya University	1982	Y	1501+
23.	Eskişehir	Anadolu University	1982	N	1201-1400
24.	İstanbul	Marmara University	1982	N	1201-1400
25.	İstanbul	Mimar Sinan Fine Arts University	1982	N	1501+
26.	İstanbul	Yıldız Technical University	1982	Y	951-1000
27.	İzmir	Dokuz Eylül University	1982	Y	1201-1400
28.	Van	Van Yüzüncü Yıl University	1982	Y	1501+
29.	ANKARA	İhsan Doğramacı Bilkent University	1984	Y	1501+
30.	Gaziantep	Gaziantep University	1987	Y	1501+
31.	Afyonkarahisar	Afyon Kocatepe University	1992	Y	1501+
32.	Aydın	Aydın Adnan Menderes University	1992	Y	1501+
33.	Balıkesir	Balıkesir University	1992	Y	1501+
34.	Bolu	Bolu Abant İzzet Baysal University	1992	Y	1501+
35.	Çanakkale	Çanakkale Onsekiz Mart University	1992	Y	1501+
36.	Denizli	Pamukkale University	1992	Y	1501+
37.	Hatay	Hatay Mustafa Kemal University	1992	Y	1501+
38.	İsparta	Süleyman Demirel University	1992	Y	1201-1400
39.	İstanbul	Galatasaray University	1992	Y	1501+
40.	İzmir	İzmir Institute of Technology	1992	Y	1201-1400
41.	K.Maraş	K.Maraş Sütçü İmam University	1992	Y	1501+
42.	Kars	Kafkas University	1992	Y	1501+
43.	Kırkkale	Kırkkale University	1992	Y	1501+
44.	Kocaeli	Kocaeli University	1992	Y	1501+
45.	Kütahya	Kütahya Dumlupınar University	1992	Y	1501+
46.	Manisa	Manisa Celal Bayar University	1992	Y	1501+
47.	Mersin	Mersin University	1992	Y	1501+
48.	Muğla	Muğla Sıtkı Koçman University	1992	Y	1501+
49.	Niğde	Niğde Ömer Halisdemir University	1992	Y	1501+
50.	Sakarya	Sakarya University	1992	Y	1401+
51.	Şanlıurfa	Harran University	1992	Y	1501+
52.	Tokat	Tokat Gaziosmanpaşa University	1992	Y	1501+
53.	Zonguldak	Zonguldak Bülent Ecevit University	1992	Y	1501+
54.	Eskişehir	Eskişehir Osmangazi University	1993	Y	1501+
55.	İstanbul	Koç University	1993	Y	=431
56.	ANKARA	Baskent University	1994	Y	1501+
57.	İstanbul	İsık University	1996	Y	1501+
58.	İstanbul	İstanbul Bilgi University	1996	Y	1201-1400
59.	İstanbul	Sabancı University	1996	Y	1501+
60.	İstanbul	Yeditepe University	1996	Y	1501+
61.	ANKARA	Atilim University	1997	Y	1501+
62.	ANKARA	Cankaya University	1997	Y	1501+
63.	İstanbul	Beykent University	1997	Y	1501+
64.	İstanbul	Doğus University	1997	Y	1501+
65.	İstanbul	İstanbul Kültür University	1997	Y	1501+
66.	İstanbul	Kadir Has University	1997	Y	1501+
67.	İstanbul	Maltepe University	1997	Y	1501+
68.	Mersin	Çağ University	1997	N	1501+
69.	İstanbul	Bahçeşehir University	1998	Y	1501+
70.	İstanbul	Golden Horn University	1998	Y	1501+
71.	ANKARA	Ufuk University	1999	N	1501+
72.	İstanbul	İstanbul Okan University	1999	Y	1501+

Table 2. Universities opened in Türkiye after 2000

NO	CITY	Institution Name	YEAR	Y/N	NO	CITY	Institution Name	YEAR	Y/N
1.	İstanbul	Istanbul Commerce University	2001	Y	67.	İstanbul	Bezmiâlem Vakıf University	2010	N
2.	İzmir	Izmir University of Economics	2001	Y	68.	İstanbul	Fatih Sultan Mehmet University	2010	Y
3.	İzmir	Yasar University	2001	Y	69.	İstanbul	Istanbul 29 May University	2010	N
4.	ANKARA	TOBB University of Economics and Technol	2003	Y	70.	İstanbul	Istanbul Gedik University	2010	Y
5.	Adıyaman	Adıyaman University	2006	Y	71.	İstanbul	Istanbul Sabahattin Zaim University	2010	Y
6.	Aksaray	Aksaray University	2006	Y	72.	İzmir	Izmir Kâtip Çelebi University	2010	Y
7.	Amasya	Amasya University	2006	Y	73.	Kayseri	Abdullah Gul University	2010	Y
8.	Burdur	Burdur Mehmet Akif Ersoy University	2006	Y	74.	Konya	Necmettin Erbakan University	2010	Y
9.	Çorum	Hitit University	2006	Y	75.	Trabzon	Eurasia University	2010	Y
10.	Düzce	Duzce University	2006	Y	76.	ADANA	Alparslan Turkish University of Science and Techn	2011	Y
11.	Erzincan	Erzincan Binali Yıldırım University	2006	Y	77.	ANKARA	Turkish Aeronautical Association University	2011	Y
12.	Giresun	Giresun University	2006	Y	78.	Antalya	Alanya University	2011	Y
13.	İstanbul	Demiroglu Science University	2006	N	79.	İstanbul	Istanbul Gelisim University	2011	Y
14.	Kastamonu	Kastamonu University	2006	Y	80.	İstanbul	Uskudar University	2011	Y
15.	Kırşehir	Kırşehir Ahi Evran University	2006	Y	81.	İstanbul	MEF University	2012	Y
16.	Ordu	Ordu University	2006	N	82.	ANKARA	Ankara Social Sciences University	2013	N
17.	Rize	Recep Tayyip Erdoğan University	2006	Y	83.	ANKARA	Yüksek İhtisas University	2013	N
18.	Tekirdağ	Tekirdag Namik Kemal University	2006	Y	84.	Gaziantep	Sanko University	2013	N
19.	Uşak	Usak University	2006	Y	85.	İstanbul	Istanbul Esenyurt University	2013	Y
20.	Yozgat	Yozgat Bozok University	2006	Y	86.	Konya	Konya Food and Agriculture University	2013	Y
21.	Ağrı	Agri Ibrahim Chechen University	2007	N	87.	İstanbul	Biruni University	2014	Y
22.	Artvin	Artvin Coruh University	2007	Y	88.	Kocaeli	Gebze Technical University	2014	Y
23.	Batman	Batman University	2007	Y	89.	Antalya	Alanya Alaaddin Keykubat University	2015	N
24.	Bilecik	Bilecik Şeyh Edebali University	2007	Y	90.	Antalya	Belek University	2015	Y
25.	Bingöl	Bingöl University	2007	Y	91.	Balıkesir	Bandirma 17 Eylül University	2015	Y
26.	Bitlis	Bitlis Eren University	2007	Y	92.	Hatay	Iskenderun Technical University	2015	Y
27.	Çankırı	Çankırı Karatekin University	2007	Y	93.	İstanbul	University of Health Sciences	2015	N
28.	İstanbul	Acibadem University	2007	Y	94.	İstanbul	Ibn Haldun University	2015	N
29.	İstanbul	Istanbul Arel University	2007	Y	95.	İstanbul	Istanbul Rumeli University	2015	Y
30.	İstanbul	Istanbul Aydın University	2007	Y	96.	İstanbul	Istinye University	2015	Y
31.	İstanbul	Ozyegin University	2007	Y	97.	Ankara	Gendarmerie and Coast Guard Academy (Military)	2016	N
32.	Karabük	Karabük University	2007	Y	98.	İstanbul	National Defense University (Military)	2016	N
33.	Karaman	Karamanoglu Mehmetbey University	2007	Y	99.	İstanbul	Fenerbahçe University	2016	Y
34.	Kırklareli	Kırklareli University	2007	Y	100.	İstanbul	Beykoz University	2016	Y
35.	Kilis	Kilis 7 Aralık University	2007	Y	101.	İstanbul	Istanbul Kent University	2016	N
36.	Mardin	Mardin Artuklu University	2007	Y	102.	İstanbul	Istanbul Topkapı University	2016	Y
37.	Muş	Mus Alparslan University	2007	Y	103.	İzmir	Izmir Bakircay University	2016	Y
38.	Nevşehir	Nevşehir Hacı Bektaş Veli University	2007	Y	104.	İzmir	Izmir Democracy University	2016	Y
39.	Osmaniye	Osmaniye Korkut Ata University	2007	Y	105.	ANKARA	Ankara University of Music and Fine Arts	2017	N
40.	Siirt	Siirt University	2007	Y	106.	ANKARA	Ostim Technical University	2017	Y
41.	Sinop	Sinop University	2007	Y	107.	İstanbul	Turkish-Japanese University of Science and Techno	2017	N
42.	Ardahan	Ardahan University	2008	Y	108.	Nevşehir	Cappadocia University	2017	Y
43.	Bartın	Bartın University	2008	Y	109.	Afyon	Afyonkarahisar University of Health Sciences	2018	N
44.	Bayburt	Bayburt University	2008	Y	110.	ANKARA	Ankara Hacı Bayram Veli University	2018	N
45.	Gaziantep	Hasan Kalyoncu University	2008	Y	111.	ANKARA	Ankara Medipol University	2018	Y
46.	Gümüşhane	Gumushane University	2008	Y	112.	ANKARA	Lokman Hekim University	2018	N
47.	Hakkâri	Hakkari University	2008	Y	113.	Eskişehir	Eskişehir Technical University	2018	Y
48.	İğdir	İğdir University	2008	Y	114.	Gaziantep	Gaziantep Islamic University of Science and Techno	2018	Y
49.	İstanbul	Altınbas University	2008	Y	115.	Isparta	Isparta University of Applied Sciences	2018	N
50.	İstanbul	Piri Reis University	2008	Y	116.	İstanbul	Istanbul University-Cerrahpasa	2018	Y
51.	Şırnak	Şırnak University	2008	Y	117.	İstanbul	Istanbul Atlas University	2018	Y
52.	Tunceli	Munzur University	2008	Y	118.	İstanbul	Istanbul Health and Technology University	2018	Y
53.	Yalova	Yalova University	2008	Y	119.	İzmir	Izmir Tinaztepe University	2018	N
54.	ANKARA	TED University	2009	Y	120.	K.Maraş	Kahramanmaraş Istiklal University	2018	Y
55.	İstanbul	Nisantasi University	2009	Y	121.	Kayseri	Kayseri University	2018	Y
56.	İstanbul	Istanbul Medipol University	2009	Y	122.	Konya	Konya Technical University	2018	Y
57.	İstanbul	Yeni Yüzyıl University	2009	Y	123.	Kütahya	Kutahya University of Health Sciences	2018	Y
58.	Kayseri	Nuh Naci Yazgan University	2009	Y	124.	Malatya	Malatya Turgut Özal University	2018	Y
59.	Konya	KTO Karatay University	2009	Y	125.	Mersin	Tarsus University	2018	Y
60.	Mersin	Toros University	2009	Y	126.	Sakarya	Sakarya University of Applied Sciences	2018	N
61.	ANKARA	Ankara Yıldırım Beyazıt University	2010	Y	127.	Samsun	Samsun University	2018	Y
62.	Antalya	Antalya Science University	2010	Y	128.	Sivas	Sivas University of Science and Technology	2018	Y
63.	Bursa	Bursa Technical University	2010	Y	129.	Trabzon	Trabzon University	2018	N
64.	Erzurum	Erzurum Technical University	2010	Y	130.	İstanbul	Istanbul Galata University	2019	N
65.	İstanbul	Istanbul Medeniyet University	2010	Y	131.	ANKARA	Ankara Science University	2020	Y
66.	İstanbul	Turkish-German University	2010	Y	132.	Kocaeli	Kocaeli University of Health and Technology	2020	Y
					133.	Bursa	Mudanya University	2022	Y

¹Note: The "Y/N" column indicates whether the universities in question have engineering faculties. ²Note: The 2024 edition of the QS World University Ranking lists Istanbul Aydın University and Gebze Technical University in the 1201-1400 range, while all other universities are ranked above 1500.

It has been argued that the university program should be one of the most sensitive areas of state planning, given that universities represent the leading educational and training institutions of a state. The university program, the units within it, and the professions needed by the state should be planned together, which I refer to as the optimal form of planning. Rather than proposing the immediate establishment of mining faculties, it would be more prudent to first determine the appropriate mining policies and to provide the requisite training for miners. In parallel with the analysis of Türkiye's universities mentioned above, our geosciences engineering programs have proliferated in an unplanned and unprogrammed manner. Although there are exceptions, such as the opening of Petroleum and Natural Gas Engineering Faculties at Iskenderun Technical University or Batman University, and faculties that have been opened and put into operation - within a program - based on the needs and foundations of the region, we are faced with a picture in which the number of quotas and the number of students settled in general is constantly decreasing. 53% of universities with earth sciences faculties programs could not admit any students in 2023. The universities that had quotas but were able to place students were able to fill 76% of these quotas. The reason for the increase in this rate was again due to the fact that well-established universities admitted students with 100% occupancy. In other words, the old ones continued to be good, while the new ones could not find a place in the preference rankings. To summarize, 39 of the 74 faculties with earth science engineering programs have passed the year, while only 11 faculties have been able to reach the number of students deserving to be a class and start their education without any problems.

A review of historical data reveals that, ten years ago, the number of quotas and students enrolled had more than doubled. In the current decade, 52 new universities have been established in Türkiye. In addition to being unable to fill the student quota, the universities were unable to train sufficient numbers of qualified academics. This deficiency in quality is also evident in the academic structure. A similar phenomenon has occurred in the academic community. Graduates of earth sciences departments at major universities have left the country to pursue their professions in Africa or Australia or elsewhere in the world, rather than accept the academic opportunities offered to them. This is due to the fact that the earth sciences departments have reached a point where they are no longer preferred in student recruitment.

Table 3. Geosciences Engineering quotas and placements in 2023

2023	TOTAL NUMBER OF FACULTIES	FACULTIES NOT RECEIVING QUOTAS	NUMBER OF FACULTIES FILLING ALL QUOTAS	THE RATIO OF FACULTIES NOT RECEIVING QUOTAS %	TOTAL NUMBER OF PLACES AT QUOTA FACULTIES	TOTAL NUMBER OF STUDENTS PLACED IN FACULTIES WITH QUOTA	PLACEMENT RATIO %
GEOLOGY	33	23	6	70%	293	236	81%
GEOPHISICS	11	5	2	45%	136	85	63%
MINERAL PROCESSING	1	0	1	0%	41	41	100%
MINES	24	11	5	46%	403	291	72%
PETROLEUM	5	0	3	0%	160	136	85%
TOTAL	74	39	17	53%	1033	789	76%

Table 4. 2013 Geosciences Engineering quotas and placements.

2013	TOTAL NUMBER OF PLACES AT QUOTA FACULTIES	TOTAL NUMBER OF STUDENTS PLACED IN FACULTIES WITH QUOTA	PLACEMENT RATIO %
GEOLOGY	1157	820	71%
GEOPHISICS	403	255	63%
MINERAL PROCESSING	30	30	100%
MINES	877	584	67%
PETROLEUM	145	145	100%
TOTAL	2612	1834	70%

Table 5. Comparison between the year 13/23

2013-2023	TOTAL NUMBER OF PLACES AT QUOTA FACULTIES RATIO	TOTAL NUMBER OF STUDENTS PLACED IN FACULTIES WITH QUOTA RATIO
GEOLOGY	-75%	-71%
GEOPHISICS	-66%	-67%
MINERAL PROCESSING	37%	37%
MINES	-54%	-50%
PETROLEUM	10%	-6%
TOTAL	-60%	-57%

Table 6. Presents the general status of Geosciences Engineering in 2023.

DIVISIONS	Institution Name	ACADEMICS				STUDENTS	QUOTA 2023	PLACED 2023	PLACED %	BASE SCOR
		PROF.	ASS.PRF	DR.LECT	TOT					
MINERAL PROCESSING	1. ISTANBUL TECHNICAL UNIVERSITY	8	2	3	13	360	41	41	100%	398,7
GEOPHISICS	2. ANKARA UNIVERSITY (ENG)	6	1	3	10	47	21	21	100%	324,9
GEOPHISICS	3. DOKUZ EYLÜL UNIVERSITY	7	6	4	17	74	21	5	24%	308,9
GEOPHISICS	4. ISTANBUL TECHNICAL UNIVERSITY	7	4	2	13	325	41	41	100%	402,0
GEOPHISICS	5. ISTANBUL UNIVERSITY-CERRAHPAŞA	9	4	7	20	134	21	16	76%	307,8
GEOPHISICS	6. KARADENİZ TECHNICAL UNIVERSITY	5	4	6	15	23	16	0	0%	
GEOPHISICS	7. KOCAELİ UNIVERSITY	4	3	3	10	40	16	2	13%	310,5
		38	22	25	85	643	136	85	63%	
GEOLOGY	8. ANKARA UNIVERSITY (ENG)	11	2	2	15	152	41	41	100%	332,9
GEOLOGY	9. ÇUKUROVA UNIVERSITY	9	3	1	13	58	26	5	19%	308,3
GEOLOGY	10. DOKUZ EYLÜL UNIVERSITY	14	8	4	26	165	20	20	100%	308,0
GEOLOGY	11. FIRAT UNIVERSITY	9	2	7	18	61	14	0	0%	
GEOLOGY	12. HACETTEPE UNIVERSITY	16	6	5	27	363	52	52	100%	351,8
GEOLOGY	13. ISTANBUL TECHNICAL UNIVERSITY	20	4	9	33	412	41	41	100%	411,0
GEOLOGY	14. ISTANBUL UNIVERSITY-CERRAHPAŞA	9	1	6	16	201	31	31	100%	310,0
GEOLOGY	15. KARADENİZ TECHNICAL UNIVERSITY	15	1	8	24	78	16	4	25%	309,2
GEOLOGY	16. NİĞDE ÖMER HALİSDEMİR UNIVERSITY	3	2	7	12	28	11	1	9%	369,0
GEOLOGY	17. MIDDLE EAST TECHNICAL UNIVERSITY (ENG)	9	4	2	15	457	41	41	100%	455,0
		115	33	51	199	1975	293	236	81%	
MINES	18. AFYON KOCATEPE UNIVERSITY	4	4	2	10	75	11	4	36%	312,4
MINES	19. ÇUKUROVA UNIVERSITY	7	1	3	11	57	26	9	35%	310,4
MINES	20. DOKUZ EYLÜL UNIVERSITY	17	8	3	28	338	41	41	100%	318,5
MINES	21. ESKİŞEHİR OSMANGAZI UNIVERSITY	13	4	5	22	202	31	31	100%	319,2
MINES	22. HACETTEPE UNIVERSITY (ENG)	9	7	6	22	356	52	52	100%	378,2
MINES	23. İNÖNÜ UNIVERSITY	4	3	0	7	33	39	3	8%	312,6
MINES	24. ISTANBUL TECHNICAL UNIVERSITY	8	4	1	13	399	52	52	100%	422,6
MINES	25. ISTANBUL UNIVERSITY-CERRAHPAŞA	6	2	4	12	276	41	38	93%	307,7
MINES	26. KARADENİZ TECHNICAL UNIVERSITY	11	5	0	16	118	21	11	52%	308,6
MINES	27. MUĞLA SITKI KOÇMAN UNIVERSITY (ENG)	3	4	0	7	60	21	6	29%	312,3
MINES	28. NİĞDE ÖMER HALİSDEMİR UNIVERSITY	2	4	2	8	19	11	0	0%	0,0
MINES	29. MIDDLE EAST TECHNICAL UNIVERSITY (ENG)	3	1	2	6	439	41	41	100%	460,7
MINES	30. ZONGULDAK BÜLENT ECEVİT UNIVERSITY	3	1	3	7	93	16	3	19%	308,5
		90	48	31	169	2465	403	291	72%	
PETROLEUM - NAT.GAS	31. BATMAN UNIVERSITY (ENG)	2	2	5	9	17	21	12	57%	308,5
PETROLEUM - NAT.GAS	32. İSKENDERUN TECHNICAL UNIVERSITY	4	0	2	6	93	26	11	42%	310,6
PETROLEUM - NAT.GAS	33. ISTANBUL TECHNICAL UNIVERSITY (ENG)	2	3	5	10	375	41	41	100%	451,0
PETROLEUM - NAT.GAS	34. İZMİR KATİP ÇELEBİ UNIVERSITY	2	0	3	5	228	31	31	100%	347,0
PETROLEUM - NAT.GAS	35. MIDDLE EAST TECHNICAL UNIVERSITY (ENG)	7	7	7	21	446	41	41	100%	470,0
		17	12	22	51	1159	160	136	85%	

3. A comparison of the global ranking of universities and the ranking of Turkish universities in the field of geosciences.

It is evident that the challenges associated with the expansion of our existing faculties and the establishment of new faculties in earth sciences warrant serious consideration. However, it is also crucial to recognize the remarkable growth of our earth sciences departments in the Republic of Türkiye and the impressive global position of our successful universities.

The tables below illustrate the university rankings of Turkish universities in Mining, Geology,

Geophysics and Petroleum in the QS World Ranking 2024. Upon analysis of the ten-year period, it becomes evident that our universities have undergone a series of changes. In the rankings determined by these organizations, our universities have either maintained or lost their positions over the years. These organizations utilize various criteria, including academic publications, citations, employment status of graduates, and quality standards, to evaluate universities. It is evident that these organizations are primarily focused on maintaining their current positions. Consider the achievements of Middle East Technical University, which is ranked 11th in the world in Petroleum and Natural Gas Engineering, and Istanbul Technical University, which is ranked in every department. As we will reiterate in our conclusions and recommendations, in addition to focusing on the academic careers and subsequent productivity of our graduates, it is essential to focus on the productivity and research and development capabilities of our current academics.

Table 7. University Rankings of Geosciences (QS World Rankings)

TOP 240 Universities GEOLOGY	NUMBER OF UNIVERSITIES OF COUNTRIES	Top 240 Universities GEOPHYSICS	NUMBER OF UNIVERSITIES OF COUNTRIES	Top 70 Universities Engineering - MINERAL & MINING	NUMBER OF UNIVERSITIES OF COUNTRIES	Top 160 Universities PETROLEUM Engineering	NUMBER OF UNIVERSITIES OF COUNTRIES
United States	62	United States	62	United States	14	United States	17
United Kingdom	27	United Kingdom	26	Australia	11	United Kingdom	13
China (Mainland)	17	Germany	18	Canada	6	Russia	10
Germany	17	China (Mainland)	14	India	6	India	8
Australia	13	France	13	United Kingdom	4	Australia	7
Canada	12	Australia	12	China (Mainland)	3	Malaysia	6
France	12	Canada	12	Türkiye	2	Brazil	5
Italy	9	Italy	9	Chile	2	Egypt	5
Japan	8	Japan	8	Germany	2	Canada	4
Netherlands	7	Netherlands	7	Italy	2	China (Mainland)	4
Switzerland	5	Switzerland	6	Japan	2	Germany	4
Hong Kong SAR	4	Hong Kong SAR	4	Malaysia	2	Iran, Islamic Republic of	4
New Zealand	4	New Zealand	4	Russia	2	Japan	4
Spain	4	Spain	4	South Africa	2	Pakistan	4
Sweden	4	Sweden	4	Other Countries	1	Türkiye	3
Belgium	3	Belgium	3			Colombia	3
Denmark	3	Denmark	3			Denmark	3
India	3	India	3			Italy	3
Norway	3	Norway	3			Lebanon	3
Chile	2	South Korea	3			Norway	3
Ireland	2	Chile	2			Saudi Arabia	3
South Africa	2	Greece	2			South Korea	3
South Korea	2	Ireland	2			Spain	3
Taiwan	2	Portugal	2			United Arab Emirates	3
Türkiye	1	Saudi Arabia	2			Ecuador	2
Other Countries	12	Taiwan	2			France	2
		Türkiye	1			Mexico	2
		Other Countries	11			Other Countries	26

Table 8. The university rankings for the departments of geology, geophysics, mining, and petroleum, and An analysis of Türkiye's status.

Top 240 Universities -GEOLOGY				Top 240 Universities - GEOPHYSICS			
2024	2023	Institution	Location	2024	2023	Institution	Location
1	1	ETH Zurich - Swiss Federal Institute of Technology	Switzerland	1	1	ETH Zurich - Swiss Federal Institute of Technology	Switzerland
2	2	Harvard University	United States	2	2=	Harvard University	United States
3	5	University of Oxford	United Kingdom	3	6	University of Oxford	United Kingdom
4	6	University of Cambridge	United Kingdom	4	4	University of Cambridge	United Kingdom
5	7	Massachusetts Institute of Technology (MIT)	United States	=5	2=	California Institute of Technology (Caltech)	United States
6	4	University of California, Berkeley (UCB)	United States	=5	7	Massachusetts Institute of Technology (MIT)	United States
7	3	California Institute of Technology (Caltech)	United States	=5	5	University of California, Berkeley (UCB)	United States
8	10	University of Washington	United States	8	8=	Columbia University	United States
9	8	Stanford University	United States	9	8=	Stanford University	United States
10	9	Columbia University	United States	10	10	University of Washington	United States
***	***	*****	*****	***	***	*****	*****
***	***	*****	*****	***	***	*****	*****
201-240		Istanbul Technical University	Türkiye	201-240		Istanbul Technical University	Türkiye
***	***	*****	*****	***	***	*****	*****
***	***	*****	*****	***	***	*****	*****

Top 70 Universities - Engineering - Mineral & Mining				Top 160 Universities - Petroleum Engineering			
2024	2023	Institution	Location	2024	2023	Institution	Location
1	1	Colorado School of Mines	United States	1	1	University of Texas at Austin	United States
2	2	Curtin University	Australia	2	2	Stanford University	United States
3	4	The University of New South Wales (UNSW Sydney)	Australia	=3		Technical University of Denmark	Denmark
4	5	The University of Queensland	Australia	=3	3	Texas A&M University	United States
5	6	McGill University	Canada	5	4	King Fahd University of Petroleum & Minerals	Saudi Arabia
6	3	Saint-Petersburg Mining University	Russia	6	5	University of Alberta	Canada
7	7	The University of Western Australia	Australia	7	7	The University of Adelaide	Australia
8	9	King Fahd University of Petroleum & Minerals	Saudi Arabia	8	6	Imperial College London	United Kingdom
9	8	Universidad de Chile	Chile	9	13	The University of New South Wales (UNSW Sydney)	Australia
10	21	University of Toronto	Canada	10		The University of Tokyo	Japan
*****	*****	*****	*****	11	10	Middle East Technical University	Türkiye
51-70	51-70	Istanbul Technical University	Türkiye	*****	*****	*****	*****
51-70		Middle East Technical University	Türkiye	51-100	51-100	Bo aziçi University	Türkiye
*****	*****	*****	*****	51-100	45=	Istanbul Technical University	Türkiye
*****	*****	*****	*****	*****	*****	*****	*****

4. A Brief Overview of the Past Decade in the Turkish Republic.

A decade ago, we conducted a comparative analysis of the status of our universities and earth science engineering faculties. The objective of this analysis was to identify potential areas for improvement. In order to achieve the desired results, it is also necessary to examine the process by which these results were reached. In 2013, the unemployment rate in Türkiye was 9.7%, while inflation stood at 7.4%. In 2023, the unemployment rate remained at 9.4%, while inflation reached a staggering 64.77%. Over the past decade, the Republic of Türkiye has experienced a significant social upheaval (Gezi Park Events in 2013), a major coup attempt (FETO coup attempt on July 15, 2016), and a fundamental shift in the system of governance (transition to the Presidential System of Governance following the April 16, 2017 referendum and the June 24, 2018 transition to a partisan presidential system). It is evident that these three events had a profound impact on Turkish political history, both in terms of their causes and consequences. However, there is another commonality between them. This is the difficulty that young masses, whose brains are still developing and who are therefore unable to distinguish between truth and reality, face in making professional choices in the midst of a complex and uncertain world. Each event was observed not only in the year in which it occurred, but its consequences were felt in economic and political situations for many years. Türkiye, rightly or wrongly, has been evaluated based on the reality and effects of these events, which has resulted in unfavourable outcomes and perceptions in various fields, including education. The imbalance between supply and demand in earth sciences departments is consistent with this situation, but it has also been significantly affected by the negative publicity surrounding the related professional groups following the successive mining accidents. Furthermore, this phenomenon does not confirm the adage that there is no such thing as good or bad publicity. In the new mining areas, industry constituents that have been the subject of criticism from environmental groups have come to the forefront with projects rife with negligence and rent-seeking. Consequently, a number of legitimate mining operations have also been subject to criticism. In addition to the aforementioned political events, the Republic of Türkiye has also experienced two significant tragedies over the past decade. One of these is the Manisa/Soma mining accident, which resulted in the death of 301 miners and was described as "the biggest mining disaster in the history of the Republic". It is also a fact that this accident is one of the most important mining accidents in recent world history (Manisa/Soma, May 13, 2014). Another disaster, which occurred with such recent temporal proximity that its wounds are still bleeding, was the Kahramanmaraş earthquakes, which buried 50,000 people. Unfortunately, this earthquake also ranks as the deadliest disaster in our historical record (February 6-7, 2023).

5. Mining accidents in Türkiye and their effects on Geosciences Engineering Education

Türkiye has a reputation for mining accidents that are not generally regarded as positive. In particular, 301 miners lost their lives in the coal mine accident in Soma district of Manisa on May 13, 2014. The causes of this accident are still debated, and it has been recorded as the deadliest mining accident in the world in the 21st century. Although the number of accidents and related fatalities in mining has decreased in developed countries due to technological developments, increased occupational health and safety awareness, and the implementation of mining regulations, large-scale accidents in coal mines still occur, particularly in developing countries. As illustrated in Table VI, many years have passed since the world's most significant mining accidents, and countries have learned valuable lessons from major mining accidents.

Table 9. Most Fatal Mining Accidents in the World

THE MOST DEADLY MINING ACCIDENTS IN THE WORLD				
	YEAR	COUNTRY/ PLACE	DEATH TOLL	CAUSE
1.	1942	BENXIHU/CHINA	1549	EXPLOSION
2.	1906	COURRIERES/FRANCE	1099	EXPLOSION
3.	1914	KYUSHU/JAPAN	687	EXPLOSION
4.	1960	DATONG/CHINA	684	EXPLOSION
5.	1963	OMUTA/JAPAN	458	EXPLOSION
6.	1913	CAERPHILLY/UNITED KINGDOM	439	EXPLOSION
7.	1960	CLYDESDALE/SOUTH AFRICA	435	MIGRATION
8.	1972	WANKIE/ZIMBABWE	426	EXPLOSION
9.	1866	YORKSIRE/UNITED KINGDOM	388	EXPLOSION
10.	1965	DHANBAD/INDIA	375	EXPLOSION
11.	1975	CHASNALA/INDIA	372	EXPLOSION
12.	1907	MONONGAH/USA	362	EXPLOSION
13.	2014	SOMA/TÜRKİYE	301	BURNING
14.	1956	BOIS DU CAZIER/BELGIUM	267	BURNING
15.	1992	ZONGULDAK/TÜRKİYE	263	EXPLOSION

In countries with significant coal production (China 50.8%, Indonesia 9%, India 8% of the total world production), mining accidents are inevitable. In these countries, statistics are recorded as the number of deaths per 100 million tons of production. Between 2012 and 2023, 3200 people lost their lives in coal mine accidents in the People's Republic of China. A review of the last 10 years of mining accident statistics in Türkiye, which has a production of 0.4%, reveals that a total of 411 people lost their lives in mining accidents between 2013 and 2023.

The statistical data, when compared with the figures from other mining-producing countries around the globe, reveals a concerning trend in Türkiye. The mining accidents that occur in Türkiye are not only of a poor quality but also result in severe consequences.

Following the occurrence of fatal mining accidents, a negative public opinion about the sector is formed in Türkiye, as is the case in other countries. However, the impact of strong opposition discourses, regardless of their veracity, on public opinion is significantly more pronounced in Türkiye than in other countries. This is due to the fact that, despite the advent of the 21st century, a considerable number of mines continue to be operated using techniques and methods that date back a century.

The negative public opinion inevitably affects the preferences of university candidates, with many young people regarding the mining and underground sciences sector with trepidation. While it is challenging to demonstrate this determination with figures, feedback from students and prospective students in academic daily life corroborates this determination.

6. Conclusion and Recommendations

In our country, where lack of planning has become a dominant feature in every field, one of the most damaging consequences of this is observed in higher education and geoscience engineering education/training, which is a part of it. Universities that have been teaching in geosciences engineering disciplines for years are accepting students well below their capacity and are facing closure due to young people not choosing them.

Nowadays, it is seen that the opportunities available in geosciences engineering departments are gradually shrinking, the quality of education is decreasing, and the infrastructure opportunities are not adequately created. At this point, by directing the lens of state policies in this direction, central planning should be made, and education policies based on social needs, production, employment and lifelong education, and strengthening the country's science and technology competence should be implemented in universities. In this context, geoscience engineers should be trained in the quantity and quality required by the country. Studies should be carried out to improve the educational quality of existing departments.

In order to solve the unemployment problems of geoscience engineers, legal initiatives should be increasingly continued to provide employment by expanding the business areas that concern geoscience engineers. In an environment where unemployment is increasing, departments related to sub-branches of earth sciences engineering should not be opened.

Similarly, new geosciences engineering departments should not be opened, and existing ones should be provided with equal and sufficient opportunities. Course curricula in relevant departments should be rearranged according to changing needs, soil mechanics, occupational health and safety, computer applications in earth sciences and environment, etc. courses should be included in the curriculum as compulsory courses. In addition to all these, in order to purify the negative thoughts in the minds of the Turkish society, state support should be given to technological investments, and mines and earth sciences research should be brought to the standards of developed countries. In this sense, the state should be brought from a dimension where criticism is made a lot but solution suggestions are not emphasized, to a position where non-governmental organizations increase their activities and have a sufficient say for a solution-oriented struggle. The state should support these organizations with all its units, handle all the mentioned problems together with the committees formed by academic boards, and all responsible people should act with merit. In order to prevent accidents in mines, hundreds of articles written on these issues and dozens of solution projects should be examined, and state contributions should be increased with positive discrimination due to the impossibilities in their execution, although Tubitak (The Scientific and Technological Research Council of Türkiye) support has been received. It should be ensured that the referees appointed for the projects developed related to earth sciences should be from the branches appropriate to the project, and finally, if the issue is human life and employee life, commercialization concerns should be put aside and focus should be placed on the correct and reliable execution of the project.

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