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Salih Murat Uzdilek's 1931 Report on Türkiye's Educational System: "What is the State of Technical Training and Higher Education Institutions in Our Country?"

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Article Type: Review Article
Received Date: 05.09.2023
Accepted Date: 12.03.2024
Published Date: 31.03.2024
Plagiarism: This article has been reviewed by at least two referees and scanned via a plagiarism software
Doi: 10.29329/tayjournal.2024.625.01

Citation: Birbudak, T. S., & Belenli, T. (2024). Salih Murat Uzdilek's 1931 report on Turkey's educational system: "What is the state of technical training and higher education institutions in our country?". *Türk Akademik Yayınlar Dergisi (TAY Journal), 8*(1), 1-31.

Abstract

Salih Murat Uzdilek is one of the leading educators and scientists of the early years of the Republic of Türkiye. After his military service in the Ottoman Empire, he worked as a physics and mathematics teacher in different educational institutions during the Republican years and as an academic at the Higher School of Engineering (today's Istanbul Technical University) for over 40 years. While a faculty member at the Higher School of Engineering, he went to Europe to conduct research and returned home at the end of March 1931. Salih Murat Bey was assigned by the Higher School of Engineering and the Ministry of Nafia and traveled to some European countries, where he visited technical schools, universities and some high schools and made observations. Salih Murat Bey wrote a technical report on his impressions and findings and submitted it to the relevant authorities. The report is in the Presidency of the Republic of Türkiye, Directorate of State Archives. It is registered in the Republican Archives of the Presidency under the Prime Ministry General Directorate of Offical Affairs Fond (30-10-0-0) with the sequence number 141-10-5. The report, which is the subject of this study, is about the general education system, the technical education system and especially mathematics and physics education in Türkiye. He identified the developments in the field of science in the world at the time he wrote the report and discussed in detail Türkiye's shortcomings in this field and what needed to be done to correct them.

Keywords: Republic of Türkiye, Salih Murat Uzdilek, technical education, report, history of education.

Introduction

The last period of the Ottoman Empire was dominated by efforts of innovation to fulfill the requirements of the age in the field of education, as in every field. In a decree issued in 1845, Sultan Abdülmecid declared that "education is necessary for everyone in terms of religion and the world and that it is essential for the people to receive education" (Berkes, 1998, p.173). During this period, it was decided to centralize education, organize the existing schools in a Western-style, and increase the number of schools (Hayta & Ünal, 2014, p.141). The Tanzimat reform era (1839-1876) was a period in which Western-style education methods were adopted in education. In this period, important decisions were taken regarding primary, secondary, higher education, vocational, and technical education. The new schools opened aimed to train qualified civil servants who would carry out the desired reforms in the country (Baytal, 2000, p.31). In these years, vocational and technical schools such as Darülmuallimin (teacher's school), Agricultural School, Forestry School, and Industrial School were opened (Şahin, 2015, pp.57-63). The first attempt to establish Darülfünun, the first Ottoman University in the Western sense, was also made in these years (Ünal, 2012, p.190).

The decisions taken in the Tanzimat reform era but not put into practice started to be realized during the reign of Sultan Abdülhamid II (1876-1909). Vocational and technical education institutions spread throughout the country and contributed significantly to the modernization and economic development of the Ottoman Empire. Industrialization was seen as a prerequisite for economic development, and industrial schools were opened throughout the country during this period (Koçyiğit, 2019, pp.49-55). During the reign of Sultan Abdülhamid II, vocational and technical education institutions were diversified, and schools were opened for different fields such as mining, civil engineering, commerce, agriculture, sericulture, and customs (Birbudak, 2012, pp.213-214).

The Second Constitutional Monarchy period (1908-1920) was a period in which technical education institutions, the foundations of which were laid during the Tanzimat reform era and developed during the reign of Abdülhamid II, were shaped in line with the conditions of the new century. The period, on the other hand, will be a period in which all these accumulations will be used in the peaceful environment provided by the newly established state. All these efforts bore fruit in the Republic of Türkiye, where education was seen as the basis of development and modernization. Since the establishment of the Republic of Türkiye, technical education has been considered a vital industrialization and development tool. As in all other fields of education, the issue of nationalizing technical education was prioritized. Considering the opinions of foreign experts invited to the country between 1920 and 1940, the basic principles and concepts of technical education were established and essential planning and legal regulations were made (Duman, 2010, p.181). In addition to foreign experts, it is also known that distinguished scientists raised in this country submitted various reports on education policies and systems. One of these was Salih Murat Bey.

During his tenure as a physics lecturer at the "Yüksek Mühendis Mektebi" (Higher School of Engineering), Salih Murat Bey traveled to Europe and the Balkan countries in order to conduct scientific studies. In line with the impressions and information he gained from his trip, he prepared a report on the state of technical education and the general education system in Türkiye. The report is in the Presidency of the Republic of Türkiye, Directorate of State Archives. It is registered in the Republican Archives of the Presidency under the Prime Ministry General Directorate of Offical Affairs Fond (30-10-0-0) with the sequence number 141-10-5. The title of the report is "What is the State of Technical Training and Higher Education Institutions in Our Country?" ("Memleketimizde Teknik Terbiye ile Yüksek İlim Müessesleri Ne Haldedir?"). It is also stated that a copy of the report was presented to İsmet (İnönü) Pasha, the Prime Minister of the period, who was closely involved in educational issues (Presidency of the Republic of Turkey, Directorate of State Archives, Republican Archives of the Presidency [RAP], 1931, p.46). This study first provides biographical information about the life of Salih Murat Uzdilek, the report's author. Then, it presents the report's prominent findings, opinions, and recommendations without any commentary.

Ord. Prof. Salih Murat Uzdilek (February 6, 1891- December 4, 1967)

Salih Murat Uzdilek was born on February 6, 1891 in Samatya, Istanbul. His father was Şefik Bey from Crete, one of the mathematics instructors at the Bahriye Çarkçı Ameliyat Okulu (Naval Engineer Application School), and his mother was Saniye Hanım (Istanbul Technical University [ITU], 1958, p.13). He completed his primary education in Kasımpaşa and after attending secondary school at Kasımpaşa Deniz Rüşdiyesi (Kasımpaşa Naval Secondary School), he went to Heybeliada Bahriye Mektebi (Heybeliada Naval School) (Nebioğlu, 1962, p.651). He graduated from the Naval School in August 1908 with the rank of lieutenant. He served as an engineer on various ships of the Ottoman Navy (Mesudiye Battleship, Asar-ı Tevfik Battleship, Mecidiye Cruiser, Tir-i Müjgan Ferry, Aziziye Battleship) for two years after his graduation (ITU, 1958, p.13). In 1910-1911, Salih Murat Bey went to the Telgraf Mekteb-i Âlisi (Higher School of Telegraph), which provided education within the Ministry of Post, Telephone and Telegraph, and received training in theoretical electricity (Bahadır, 2001, p.98;

Kılınç, 2015, p.27). In 1912, with the decision taken by the Ministry of the Navy, it was decided to send Salih Murat to England for four years of training in the field of wireless-telegraph engineering at the Imperial College of Science and Technology in London and one year of study at the wireless-telegraph factory (Presidency of the Republic of Turkey, Directorate of State Archives, Ottoman Archives of the Presidency [OAP], 1912). Salih Murat Bey, who started his education in London, had the chance to study at the General Electric Company in Birmingham during the summer vacations (OAP, 1913). During his time abroad, in 1914, at a very young age, he presented a paper on the history of Turkish mathematics at an international logarithm conference held in Edinburgh, Scotland (Etker, 2007, p.55). The Ministry of Navy awarded him a commendation for his success in his education in London and his participation in the conference in Edinburgh (Bahadır, 2001, p.98).

Upon the outbreak of World War I, Salih Murat Bey returned to his country and started working as a physics teacher at the Heybeliada Naval War College (ITU, 1958, p.18). In October 1914, he was assigned to the radio-telegraph department at the Ministry of the Navy. In June 1915, he assumed the position of natural science instructor at the Naval School. In 1915, he was promoted to the rank of captain; in 1918, he was appointed as a physics teacher at the School of Engineering, and in 1921, he was assigned as a teacher of mathematics at the Naval School (ITU, 1958, p.13-14). Salih Murat Bey retired in October 1925 as senior captain due to ill health (RAP, 1925). After leaving the military, he continued lecturing at the School of Engineering and taught physics and higher mathematics at Robert College between 1926 and 1934. He also taught physics and higher mathematics at the Land Forces' Science Drill, Artillery and Transportation (Kara Kuvvetleri Fen Tatbikat, Topçu ve Nakliye Okulları) between 1927-1930, and mathematics at the İstanbul Sanat Okulu (Istanbul Art School) between 1926-1928 and 1929-1930 (ITU, 1958, p.14).

In 1918, he was assigned to the School of Engineering, restructured as the School of Higher Engineering in 1928 and Istanbul Technical University in 1944. During all these years, Salih Murat Bey assumed the role of the faculty member at the school. In 1944, he was appointed as a professor-in-ordinary to the physics chair of the Mechanical Engineering Faculty of Istanbul Technical University (Bahadır, 2001, p.99). Between 1956 and 1958, he served as the dean of the Faculty of Mining at the same university (İnönü & Bahadır, 2007, p.98; ITU, 2021). Uzdilek passed away on December 4, 1967 in Istanbul (Bahadır, 2001, p.99). He was married to Mrs. Selma and had three children, Ruhsar, Nermin and Ülkut (Nebioğlu, 1962, p.651).

Salih Murat Bey became one of the essential names of the Turkish scientific world during his lifetime, thanks to his education in Türkiye and abroad. He participated in many international scientific congresses during his academic career. He participated in international meetings organized in cities such as London, Amsterdam, Jerusalem, Milan, Rome, Madrid, Utrecht, Sofia and Karachi (ITU, 1960, pp. 7-8). Uzdilek, whose academic works were published in various issues of the Journal of Istanbul Technical University and the Turkish Physics Society Journal, also wrote articles on philosophy and astronomy in the Büyük Doğu Journal (Baltacıoğlu, 2018, p.177; Lostar, 2019, p.318; Okay, 1992, p.514). In addition, he played an essential role in establishing and diversifying scientific institutions in the country.

Salih Murat Bey (ITU, 1958, p.15), who became a member of the London Physics Society in 1913 during his education in England, played an essential role in establishing scientific associations in our country. He was among the founders of the Turkish Mathematical Society founded in 1948 (TMS, 2023) and the Turkish Physical Society founded in 1950 (Turkish Pyhsics Society [TPS], 1950).

Another mission of Salih Murat Uzdilek, perhaps as important as his scientific work, is that he pioneered popular science studies in Türkiye. He, who wrote articles in Science World Magazine (Fen Alemi Mecmuası), the first popular science magazine of the Republican period between 1925 and 1926 (Bahadır, 2001, p.79), was also the founder and editor of Nature World Magazine (Tabiat Alemi Mecmuası), which entered the popular science literature in the same period. Published for 14 issues between December 1925 and February 1927, this journal featured articles on basic sciences, history and philosophy of science, a significant portion of which were written by Salih Murat Bey himself (Bahadır, 2001, p.98; Kadıoğlu, 2015, p.35; Kadıoğlu, 2016, pp.61-62; Küçük, 2017, p.269). In addition, since the 1930s, he gave lectures in many places, especially in public houses, and participated in hundreds of programs on Ankara and Istanbul radios (ITU, 1958, p.15). From January 1931, Salih Murat Bey wrote a column with short scientific information titled Do You Know This? in The Vakit (newspaper), one of the leading press organs of the period (Vakit, 1931a, p.1). Likewise, he wrote articles on scientific issues in The Yeni Sabah (newspaper), which started to be published in 1938 (Topçuoğlu, 2013, p.17). His popular science articles published in newspapers are over a thousand (ITU, 1958, p.15).

Music is another field in which Salih Murat Uzdilek's intellectual accumulation is seen. In addition to his academic activities, Salih Murat Bey also carried out critical studies in the field of music and conducted studies on the sound system of Turkish music. As a result of his work with Hüseyin Saadettin Arel and Suphi Ezgi, the "Arel-Ezgi-Uzdilek system" emerged (Özcan & Çetinkaya, 2020, p.260). This system, which determines the nature of the pitches in the sound system in Turkish music, is characterized as a study that has emerged due to intensive research going back many years (Sürelsan, 1995, p.51). He has published numerous articles on musical subjects in various magazines (Perde-Sahne, Türk Musiki, Yeni Musiki, Akademi Fikir Hareketleri Magazines) (Özcan, 2020, p.264). Uzdilek was also one of the founding members of the Istanbul Philharmonic Society (İstanbul Filarmoni Derneği), established in Istanbul in 1945 (Istanbul Philharmonic Society, IPS 2023).

Salih Murat Bey's works that we can identify are listed below:

Books;

Tecrübi ve Ameli Hendese (Experimental and Applied Mathematics), Tüccarzade İbrahim Hilmi Printing House, İstanbul:1914. (3 books have been published for different levels of education).

Malumat-ı Fenniye (Science Education), Matbaa-i Hayriye, İstanbul: 1918. (for Naval Schools).

Sınai Hendese (Industrial Math), Industrial School Printing House, İstanbul: 1926.

Yeni Fizik: Mihanik ve Havass-ı Madde (New Physics: Mechanics and Properties of Substance), Industrial School Printing House, İstanbul: 1927.

Resimli Kolay Hesap Defteri (Illustrated Easy Math Notebook), Marifet Printing House, İstanbul: 1932. (5 separate volumes were published from first to fifth grade).

Umumi Fizik (General Physics), Higher School of Engineering Printing House, İstanbul: 1933. (4 volumes).

Fen Bilgisinin Faydaları (Benefits of Science Education), Ahmet Sait Printing House, İstanbul: 1938.

İlim ve Musiki ve Türk Musikisi Üzerinde Etütler (Science and Music and Studies on Turkish Music), Cumhuriyet Printing House, İstanbul: 1944.

Değişen Dünyanın Sırları (Secrets of a Changing World), Sinan Printing House, İstanbul: 1947.

Geometrik Optik (Geometric Optics), Istanbul Technical University Printing House, İstanbul: 1958.

Tarih-i Riyaziyat (History of Mathematics)[*]

* This work is one of the 128 works written for the work titled "Turkish History's Main Lines", which was initiated by Mustafa Kemal Atatürk to write a large corpus of history, and most likely remained as a manuscript and was not published (Eyice, 1968, p.525). However, İnönü and Bahadır state that Salih Murat Bey's Tarih-i Riyaziyat was published in 1909 (İnönü & Bahadır, 2007, p.98).

Translated Books;

Bernard Lister Worsnop, *Yüksek Pratik Fizik (Advanced Practical Physics),* Şirket-i Mürettibiye Printing House, İstanbul: 1945.

James Jeans, *Esrarlı Kainat (The Mysterious Universe),* Ministry of National Education Press, İstanbul: 1947.

Floyd Karker Richtmyer – Earl Hesse Kennard, *Modern Fiziğe Giriş (Introduction to Modern Physics),* Istanbul Technical University Library Press, İstanbul: 1954. (With Nusret Küçükoğlu).

Francis Weston Sears, *Fizik Prensipleri (Principles of Physics),* Istanbul Technical University Library Press, İstanbul: 1955. (With Nusret Küçükoğlu).

Amerikan Makine Mühendisleri Derneği, *Nükleer İlim ve Teknoloji Terimleri Sözlüğü (A Glossary of Terms in Nuclear Science and Technology),* Berksoy Printing House, İstanbul: 1963. (With Fahir Yeniçay).

Ryabov Yury, *Gök Mekanikliği (Celestial Mechanics),* İstanbul University Science Faculty Press, İstanbul: 1967.

Salih Murat Bey's Views on the Turkish Education System: " What Is The State Of Technical Training And Higher Education Institutions In Our Country?"

At the beginning of 1931, Salih Murat Bey went on a trip to examine European physics laboratories and returned home at the end of March. According to Vakit, which reported his return to the country on its front page, Salih Murat Bey visited the physics laboratories of universities and engineering schools in Sofia, Bucharest, Budapest, Vienna, Milan, Turin, Rome, Naples and Athens, and stated that all of these laboratories worked according to Anglo-Saxon principles. During his trip, Salih Murat Bey visited several high schools and factories producing devices for the field of physics. He stated that he had written a technical report of his impressions and findings, which he would submit to the relevant authorities. (Vakit, 1931b, p.1-2). Salih Murat Bey makes similar statements in his report. In this report, Salih Murat Bey stated that he left Istanbul on January 13, 1931 and traveled to Sofia, Bucharest, Budapest, Vienna, Venice, Milan, Turin, Rome, Naples and Athens and returned to Istanbul on March 17, 1931 (RAP, 1931, p.27).

Salih Murat Bey's report titled "What is the State of Technical Training and Higher Education Institutions in Our Country?", written after his trip, consists of two main sections. One part of the report is titled "My Observations Concerning My Investigative Travel in the Balkan Countries and Central Europe" and includes his observations on the education system in Europe. The section discussed in this study includes opinions and statements on the education system in ITÜ, which also constitutes the main title of the report. In this section, the developments/stages in the field of technical education in Türkiye are analyzed comparatively. This report aims to ensure that these issues are discussed and debated, to upgrade Türkiye's technical education system, and to bring it closer to similar institutions in the West (RAP, 1931, p.1). Uzdilek's opinions and points of interest in his report, which is the subject of this study, are as follows:

Salih Murat Bey begins his report by stating that technical education in Türkiye is "more or less backward" compared to other countries regarding the status of technical education and higher education institutions in Türkiye and the stages technical education has gone through in Türkiye. Salih Murat Bey criticized the organization and system, not the individuals, and stated that Türkiye was "scientifically poor". The history of technical education in Türkiye in the Western style began during the reign of Selim III with the opening of the Mühendishane-i Berrî-i Hümâyûn (Land Engineering School) in the Golden Horn in 1795. Emphasizing that in every part of the world, the country's defense takes precedence over all other matters, Salih Murat Bey stated that the first engineering schools were military in other countries. At this point, Salih Murat Bey compared the opening of this school with the "Ecole des Ponts et Chaussées", the oldest engineering school in France, and stated that Mühendishane-i Berrî-i Hümâyûn was opened half a century later. However, after the French Revolution (1798), it was decided to develop military engineering schools in France, and as a result of the studies carried out, in 1794, a school called "Ecole des Travaux Publics" was opened in the center. Schools called "Ecole Centrale" and then "Ecole Polytechnique" with more limited purposes were opened in the provinces (RAP, 1931, p.1).

According to Salih Murat Bey's statement, Mühendishane-i Berrî-i Hümâyûn benefited from the education staff of the Bahriye Mühendis Mektebi (Naval Engineering School). The shipyard of the Naval Engineering School, located in Kasımpaşa and called "Haddehane", housed a wheelwright school, where experts brought from England provided training. The school's theoretical and practical courses followed the system of small technical schools in countries such as England, Germany and the United States, and the “British master-apprentice learning style” was adopted. The engineering schools, which had a disorganized appearance for a while, were reorganized in 1878 with the appointment of Vidinli Tevfik Pasha, a mathematician who served as ambassador to the United States, as the school's director. In this school, which was opened based on the "Ecole Polytechnique" in France, vocational courses such as construction, railway, telegraph, telephone and bridge were taught and projects were carried out to train military engineers. In 1883, a Mülkiye Engineering School (Mülkiye Mühendis Mektebi) was attached to this school, and in 1910, this school was separated from the military school and transferred to the Nafia Bakanlığı (Ministry of Public Works). Shortly before World War I, the Haddehane and during the war, the Engineer School were abolished, and the Mülkiye Engineering School was transformed into the Higher Engineer School with a law published in 1928 as a counterpart to the polytechnic schools in Europe. Schools similar to the industrial schools in France were opened in Istanbul, Izmir, Konya and Kastamonu. Based on this information, Salih Murat Bey stated that the technical education system in Türkiye was more senior than in many European countries. However, according to Salih Murat Bey, this determination is valid for military schools. This is because Mülkiye Engineering School was opened relatively later than its counterparts in Europe. Nevertheless, when we go back 60-70 years and compare it with Europe, it can be said that the scientific situation was in favor of Türkiye. As evidence for this, Salih Murat Bey lists the exhibition of steam-powered machines at an exhibition held in Istanbul in 1824, the publication of monthly journals by a society called Cemiyet-i İlmiye-i Osmaniye (Ottoman Scientific Society), the making of primary education compulsory five years earlier than in England, and finally the opening of Dârülfünûn (The University) (RAP, 1931, p.2).

Regarding why these well-established institutions lagged behind their Western counterparts, Salih Murat Bey cites the many wars and internal rebellions. However, he also believes that scientific flaws should be addressed. He makes the following assessment in his report regarding scientific flaws: "The most important reason for our lagging behind in technical affairs is the lack of system and the fact that our education system has never been considered and established as a whole". Existing institutions did not make progress after their establishment. We have been indifferent to the laboratory system developed in the West after 1850. On the other hand, the schools that trained students for higher education were not rehabilitated and graduates of higher education schools did not receive the value they deserved in society. Those who realized that the country needed a few engineers moved away from this field and the school's enrollment gradually decreased. According to Uzdilek; by 1931, the reasons for the increase in the number of students at the Higher School of Engineering were the fact that the school was a boarding school and the increasing importance given to the railway and reconstruction policy in the country. (RAP, 1931, p.3).

According to Salih Murat Bey, the reasons for the differentiation between Türkiye and the West in the field of technical education are as follows;

1. Failure to prepare a suitable position for the graduates of higher science schools in society and lack of emphasis on expertise,

2. Not following the developments in the West step by step and always leaving the institutions at the foundation stage,

3. Failure to rehabilitate primary schools and to connect these schools to technical and science education institutions,

4. Lack of emphasis on the laboratory system, hence the inability to provide students with the ability to creativity,

5. Lack of specialized institutions that play an essential role in technical education in the country,

6. Copying Western examples in scientific institutions, not adapting them to the country's conditions, or not nationalizing these institutions (RAP, 1931, pp.3-4).

Salih Murat Bey's last point is based on his observation that the schools should be adapted to the current situation of Türkiye and its students. According to Uzdilek; for example, many students graduating from the Mülkiye Engineering School worked in jobs outside the field of engineering -until a railway policy was initiated in the country-. This was also the case for students graduating from the Agricultural School. The Industrial School, which Midhat Pasha opened as an intermediate industrial school with the aim of training master apprentices for the country, was transformed into a Mülkiye Engineering School as a result of changing the curriculum over time and making it more theoretical. This school, which admitted primary school graduates, broke the moral strength of the students due to heavy courses such as mechanics, strength and hydraulics. The admission of students with deficient levels in the entrance exams to the school leads to the expulsion of these students who cannot keep up with the program in the long term. At this point, he suggests that the theoretical part of education should be designed according to the level of the student, taking into account the situation of the student admitted to the school. If the current program was insisted on, he suggested that a preparatory class should be opened at the school or that students should be divided into two parts and given theoretical or practical training according to their abilities (RAP, 1931, p.4). According to Salih Murat Bey, the main problem here was the fact that the secondary industrial schools were trying to train engineers, despite the fact that they were considered as a school that trained artisans and journeymen who were between engineers and laborers. The institution that trained engineers in the country was the Mülkiye Engineering School, and a few engineers were studying abroad. (RAP, 1931, p.5).

One of the educational institutions mentioned by Salih Murat Bey in his report was the Haddehane. The Haddehane's situation shows that although it did not provide better theoretical knowledge than the Industrial School, most of the mechanics used in the Hejaz railway graduated from this school. In the past, excellent ships were built in the shipyards of Haddehane, whose practical training was quite good. However, the fact that this school lagged

behind the theoretical knowledge of the time, despite its success in practical education, brought the end of the institution. On the other hand, in the years leading up to the Constitutional Period, the fact that the Haddehane provided purely practical training while the Naval School provided theoretical training led to the emergence of two different ecoles that did not understand each other's language (RAP, 1931, p.5).

The report lists the institutions providing higher technical and science education in Türkiye as follows.: 1. Mülkiye Engineering (Higher) School of Engineering, 2. Dârülfünûn Faculty of Science, 3. Electromechanics Institute, which was included in the Faculty of Science, 4. The school opened in Zonguldak under the name of Mining Engineer School and later transformed into Industrial Engineer School. There were also specialized schools such as the Forestry School, which trained forest engineers, and the Telegraph School, which trained telegraph engineers. In addition to the engineering schools, there is also a Conductor School, an intermediate technical school. The most significant deficiency of the Higher School of Engineering is that it lags behind in the laboratory system required by modern technical developments. Therefore, the quality of education provided by this school is also theoretical. While other engineering fields such as mechanical, electrical, marine and chemical engineering had richer laboratories until the beginning of the 20th century, engineering laboratories have also developed recently. Those knowledgeable in this field realized the importance that the equivalent schools in the West attached to hands-on training and transformed the school into the "Higher School of Engineering". At the time this report was written, this school was still in the establishment phase. The laboratories and necessary departments were not yet completed. Salih Murat Bey considered the hours of physics and chemistry courses at the school were insufficient. According to him, the Electromechanics Institute at the Dârülfünûn was not in a position to complete these deficiencies. Under the conditions of the time, it was considered impossible to provide high school graduates with electrical and mechanical engineering education in four years. (RAP, 1931, p.6). Salih Murat Bey draws attention to the fact that even the British engineering schools, whose theoretical training was quite good, only provided training in one of these engineering disciplines for three years. From this point of view, looking at the institute's program, it can be seen that the specialization courses are too superficial and insufficient for engineering education. The teaching staff to teach these specialization courses is also very limited. It was also found that the professors teaching courses were teaching courses outside their specialization. Salih Murat Bey thinks that the statement that the institute expects from its graduates at the end of 3 years of education; "to be able to set up all the projects of a mechanical and electrical installation and to have full experience in the use of machinery" is an exaggerated expectation that is not under the engineering understanding in the West. According to Salih Murat, it is unrealistic to expect such a difficult wish from such a short-term education. It was observed that the theoretical education of this school, whose program was taken from the Nancy School of Engineering, was weak and the laboratories for practical training were inadequate and incomplete. Despite all these deficiencies, in the year this report was written, graduates of this school were given the title of engineer. Mentioning that Italian engineering schools such as Milano and Torino have a 5-year education, Salih Murat Bey draws attention to the fact that high school education in Italy is entirely different from that in Türkiye. In Italy, students who finish primary school and attend high school are divided into two

branches: classical and science education. The engineering education of high school graduates who receive science education lasts five years. On the other hand, the laboratories of the Electromechanics Institute in Türkiye could not be compared with the laboratories of schools such as Milan and Budapest and could not even be compared with those in Bucharest (RAP, 1931, p.7).

Salih Murat Bey thought such a disorganized state of engineering schools was detrimental to the national economy. For example, there is only one engineering school in the Netherlands, one of the most advanced countries in Europe. Therefore, considering the financial means of Türkiye, the difficulty of establishing separate laboratories in these three separate institutions is apparent. Moreover, according to Salih Murat Bey, there is no need for three separate institutions to train engineers in Türkiye, where the need for engineers is not so great. A merger of these three institutions, as in the polytechnic example, would be more economical and efficient. If necessary, this unified school can be divided into branches such as telegraph, telephone, wireless, chemical and marine engineering. If this is realized, there will be no need to send students abroad. The money spent on education abroad could be used for materials, labor and technical works. At this point, Salih Murat Bey states that the Japanese saw the first steamer sixty years ago and learned shipbuilding by bringing educators and experts from Europe on the one hand and sending students abroad on the other. He states that the Japanese started shipbuilding by establishing their staff and even surpassed the ships of other countries in speed trials (RAP, 1931, p.8).

According to Salih Murat, although these works were started earlier in Türkiye, progress has yet to be achieved because adequate staff could not be formed and the technical part could not work harmoniously like an orchestra. The technical education system has two characteristics: international and national. The characteristics of international education are the same everywhere, while the characteristics of national education are related to adapting the education system to the needs of the country. Each country has more or less nationalized its education system according to its characteristics. For example, in Egypt, the projects and applications given in the third and fourth year of engineering education are shaped according to the geographical conditions, economic conditions and needs of Egypt. Salih Murat Bey states that Türkiye has not been successful in nationalizing its technical education system. According to him, another reason for the problems in technical and science education in Türkiye is that most teachers must be more committed to their schools. Teachers are not people who devote their time to the development and progress of the school but are like " itinerant " teachers whose contact with the school is limited to a few hours. Some of them are even busy with other jobs outside the school. The education system should be flexible and variable to adapt to other countries' contemporary needs, discoveries and developments. Salih Murat Bey states that this is one of the main reasons for the difference between the West and Türkiye. Although the Dârülfünûn was "a scientific institution consisting of faculties of law, medicine, literature, science, theology, pharmacy and dentistry for the advancement of higher education", it was not able to provide a high level of education since students were admitted from high schools. According to the regulations of the Faculty of Science, courses at the faculty were divided into specialization areas for those who wanted to teach in high schools and for those who wanted to gain expertise in a specific field of science (RAP, 1931, p.9). Salih Murat Bey defended the

idea, which is still valid today, that the training of teachers and scientists should be different. According to him, the university was not an institution opened only to train teachers and should be engaged in serving the development of higher education in the country. However, its program was not suitable for this. The courses in the program should be synthesized with the pedagogy courses in the Higher Teacher School if teachers are to be trained. Another shortcoming of the program was the lack of physics and chemistry courses for students who would become mathematics teachers (RAP, 1931, p.10). Salih Murat Bey also claims that there are some mistakes in the programs of the physics and chemistry departments. According to him, the Faculty of Science's mathematics, physics and chemistry departments did not fit a university's definition. On the other hand, Dârülfünûn can work for the development and progress of higher education by conducting scientific research and studies. On the other hand, scientific research should not only involve transferring research in the West but new studies should be carried out by working with the methods followed there. The studies should be primarily on subjects of interest to Türkiye (RAP, 1931, p.11). However, the physics laboratories of the Dârülfünûn were not suitable for this purpose. Salih Murat Bey repeatedly emphasized the importance of scientific research by quoting Bragg, one of the Nobel Prize-winning scientists of England, as saying "The religion of the scientist in this century is scientific research". According to him, another deficiency is the absence of a "History of Science" course at Dârülfünûn. However, the best means to understand and explain the value of science and its benefits to society would be to teach this course. Salih Murat Bey reinforces the importance of the history of science and its teaching with the following question: "Is it Napoleon's victories that have served today's civilization the most? Or the electrons of J. J. Thomson?". Although there were applied, theoretical and mathematical sub-branches of physics courses in European universities, applied and mathematical physics courses were not included in Dârülfünûn. Therefore, Salih Murat Bey thought that the mathematics and physics departments of Dârülfünûn, rather than being a mature institution, remained at the foundation stage and could not catch up with the advances of the era (RAP, 1931, p.12).

According to Salih Murat Bey, another area for improvement is the need for an academy or society in Türkiye for specialized fields such as mathematics and physics. However, in academies and societies, experts tell their interlocutors about the new things they have learned in their fields and benefit from them by discussing new research. According to Salih Murat Bey's statement, in the West, everyone specializes in a narrow field. Academies and societies serve to unify these specializations. The fields of physics and mathematics have become so broad that it is almost impossible to specialize in both fields. However, this is still being attempted in Türkiye, so knowledge remains superficial. In this respect, the physics and mathematics departments of the Dârülfünûn seem to be highly backward compared to those in Athens and Sofia. This situation cannot be explained only by the insufficiency of high school graduates. A preparatory section should be added to the Dârülfünûn and general mathematics, general physics and general chemistry courses should be taught (RAP, 1931, p.12). Salih Murat Bey thinks that the inefficiency of the Faculty of Science can be understood by looking at the number of students. In Athens in 1930/31, the number of students studying physics and mathematics exceeded 450; in Sofia University in 1929/1930, 441 students were enrolled. The number of students in Türkiye was not even 1/40th of these. However, Türkiye's population is

two times that of Greece and three times that of Bulgaria. According to Salih Murat Bey, this small number of students is an anomaly that needs to be investigated. On the other hand, the amount of money spent on training students is relatively high. Therefore, these institutions have been opened to protect national honor. According to Salih Murat Bey, the issue of sending students to Europe played an important role. Salih Murat Bey states that students had been sent to Europe since the Constitutional Era, and he thinks that this practice did not work due to "lack of a program". According to him, sending students to the West hindered the progress of Turkish institutions. A significant portion of the education budget was spent on these students. If the success rate of higher education in Türkiye is considered to be 50%, it can be assumed that the success rate of students going to Europe is below 50% due to reasons such as difficult remote control, difficulties with foreign languages, and climatic conditions. Therefore, according to Salih Murat Bey's calculation, it would be more profitable if some of the budget spent on sending students to Europe was spent on developing national institutions (RAP, 1931, p.13).

According to Salih Murat Bey, one of the reasons for the weaknesses of higher education is the incoherence of the education system. According to Salih Murat Bey, Türkiye has never had an education system and program that considers all institutions and connects them. At one time, the reform of primary schools was considered, but middle and high schools were left untouched, and vocational high schools were not considered. At another time, the improvement of high schools was considered, but others were neglected. When considering establishing a new education system, the "general culture ideal" was brought to the forefront, but the efficient use of the country's natural resources was neglected. Salih Murat Bey believes that in the 20th century, the purpose of acquiring culture was to obtain proper knowledge. At this point, economics and science have become inseparable. Economists now agree that geographical conditions and technical knowledge are the factors that dominate the economy. Geographical resources endow a country with natural wealth. Making these resources useful for the country is possible through technical education. Here, the money spent on imports can be given as an example. The money sent out of the country through imports is for labor and technical knowledge rather than the materials used. As technical knowledge increases in the West, new products emerge, and their importation causes losses to the Turkish economy (RAP, 1931, p.13). If the technical knowledge of these new products is not imported, expenditures will increase. Not only automobiles but also tires and other materials would go abroad. Giving similar examples for radio, which had an important place in social life when the report was written, Salih Murat Bey emphasized that the Russians had included radio lessons in the primary school curriculum. According to him, it is obvious that discoveries will continue. Therefore, the entire education system must be organized according to these innovations and techniques (RAP, 1931, p.14).

After these criticisms of science education in higher education, Salih Murat Bey moves on to the technical education institutions at the secondary and high school levels. According to him, the role of high schools in society is divided into three: 1. to train civil servants for government offices, 2. to train civil servants for banks and commercial institutions, 3. to prepare students for higher education. The type of knowledge required from high school graduates in these three fields differs (RAP, 1931, p.14). According to him, it is necessary to

provide students with specialized knowledge in addition to the standard general culture in high school. Western countries renew their education programs and methods according to the developments in industry and technology. In fact, one of the most critical issues in the West during this period was the secondary and high school curricula. Salih Murat Bey points out that each country takes measures according to its own needs. These issues are within the field of interest of scientific and specialized societies. Since there were no such organizations in Türkiye, the Ministry of National Education was in charge of this task. The program prepared by the Ministry is announced by regulation and becomes valid. However, there is a lack of teachers and educational materials to follow this program. Looking at the mathematics and science education in secondary schools and high schools, it can be seen that the high school system is divided into two branches: science and literature branches in the 11th grade. According to him, there is not much difference between the programs of these two branches, and a difference of one year is not enough for specialization. The syllabuses taught in these schools are like translations of other countries' syllabuses. School books are also translated. Physics is taught for five years in secondary education (two in middle and three in high school). Due to the lack of experimental equipment, teaching uses blackboard and white chalk. In his opinion, the physics course given in secondary sch ool should be wholly experimental and practical so that a student who cannot continue to high school can use the knowledge acquired in secondary school for the rest of his/her life (RAP, 1931, p.15).

In this case, Salih Murat Bey believes that it is necessary to determine the social role of secondary education in Türkiye and rethink the physics and mathematics programs of high schools. He stated that as a result of the education given in high schools, the student's mind is turned into a "customs warehouse": The image is like what one sees when going to a customs warehouse, a crate of sugar cubes next to a car, a sack of flour on the other side, a crate of galoshes on the other side. In Türkiye, the student's mind is filled like a compartment with much maths, physics and chemistry information, but these are unrelated and connected (RAP, 1931, p.16).

According to him, The Higher School of Engineering is known for the success of its theoretical education, and the students who attend here are among the best high school graduates. Nevertheless, 20% of them are ideal. After graduating from high school, students have the following options in front of them: Higher School of Engineering, Faculty of Medicine, Faculty of Law, Faculty of Political Sciences. In general, students apply to all of them and attend the school they are accepted to. According to him, it is clear that high school students do not receive an education that helps them to recognize themselves and make choices. On the other hand, although the student profile required by these higher education institutions is different, they have all undergone the same education and have acquired the knowledge they do not need in the field they will specialize in. For example, the mathematics course is divided into sub-branches such as calculus, algebra, geometry and trigonometry. Different teachers teach these courses. In the Anglo-Saxon education system, these subjects are unified, and the textbooks are written so that the details are removed and the main subjects that need to be known are given priority. According to Salih Murat Bey, adopting this method would save time and increase the student's ability to think In Türkiye, on the other hand, mathematics and physics

textbooks consist of thousands of pages, and since most of them are written in a heavy language, they tire the students and put them in a labyrinth (RAP, 1931, p.16).

Salih Murat Bey's observations on the situation of teachers are as follows: The number of teachers is already low, and among the existing teachers there are some who are too weak to follow these programs. In France, where Türkiye has adapted high school programs, high school and higher education teachers are at the same level and receive the same salary. Both types of teachers are university graduates; one is more skilled in teaching and the other in research; one is a teacher and the other a scientist (RAP, 1931, p.17).

At this point, Salih Murat Bey concluded this part of his report in which he criticized the education system in general and the technical education system and programs in particular in Türkiye and explained the suggestions he deemed necessary for the improvement of the existing negativities;

1. The education system is similar to a factory; the basic principles applied by the factory are also applied to the education system. Goods entering the factory for a job pass through various stages and turn into products. The product is controlled and directed to the next stage at each stage. During the control, missing or wrong parts are detected and removed. If this is not the case, the employees of the next stage will spend time and effort in vain. The education system is similar to this. Primary education takes the raw material and passes it to other higher education institutions. At this stage, the missing or incomplete parts are sorted out through examinations and used for other tasks. Therefore, the first thing to do is to make primary school students useful to society. If society's technical, scientific and material needs are well identified, higher education programs can be designed accordingly. If the stage of setting targets is completed, the issue of raising primary school graduates accordingly remains. It is essential to make programs within the framework of available means. On the other hand, it is necessary for efficiency that programs be flexible and vary according to regions.

2. It is not good to have students of various levels and abilities study in a uniform high school and say, "This is what you will all learn". All countries agree that a single system needs to be corrected. Putting students with different levels and abilities through the same education system is like trying to take a bullock cart, an automobile, a train and an airplane to the same destination simultaneously. In the 20th century, the basic principle of education was to educate each student to be maximally efficient according to his/her ability. Secondary schools should be abolished and replaced by small high schools. After five or six years of primary education, students should be taught general mathematics (RAP, 1931, p.17), experimental physics, chemistry and natural sciences in these four-year high schools. Three-year special high schools should be built for talented students, and these high schools should consist of literature or philosophy, science, language and commerce branches. The most successful teachers should be gathered in these high schools and the science departments should be equipped with the wealthiest educational materials. The number of high schools can be determined according to the number of teachers and materials available.

3. Vocational schools should be opened in certain parts of Türkiye and programs should be created in these schools according to the region's needs. For example, schools could be

opened in Adana for weaving and Izmir for the agriculture and industry of olives, grapes and figs. Before the opening of these schools, the teaching staff should be completed (RAP, 1931, p.18).

4. Education programs and systems should be unified and based on the plurality method. The aim of this is not the centralization of schools but the linking of vocational and general education schools.

5. In higher education, the Faculty of Science and engineering schools should be merged and a Science Institute should be established within the Dârülfünûn. Scientific and economic reasons necessitate this. The ability of higher education institutions to become authentic and creative institutions depends on the richness of their staff and physical facilities. For this purpose, rich laboratories should be established and young people should be enabled to benefit from them. Since Türkiye's economic situation prevented the opening of many rich laboratories or schools, none of the existing schools could become fully equipped science institutions (RAP, 1931, p.19). If the labor and money spent on these could be gathered at one point, a wealthy institution could be created. The benefits of such an institution for Türkiye can be listed under the following headings:

a. As laboratories and educational materials will coexist, the institution will be a source of science.

b. In this institution, other than the classical program, flexible programs can be followed and different courses can be opened according to the progress of contemporary scientific developments. For example, higher education courses such as telephone, telegraph, radio and radio engineering, optical engineering, aeronautical engineering, mining engineering, electrical engineering, and secondary education courses such as electrician, mason and pipe maker can be opened.

c. The scientific needs of various institutions of the State can be met here.

d. A large "measurement department" could be established here. Thus, all kinds of measuring instruments can be inspected and stamped, from thermometers, meters, kilograms and grocery scales to water, electricity and gas clocks. In addition, the State would also benefit from these operations.

e. In this institution, young people were quickly trained and the number of people working in science and science in the country increased rapidly.

f. Scientific conferences can be organized in this institution. Scientists can come together in this institution.

g. The existence of such an institution would save Türkiye from the need to send students to Europe and, thus, from the financial burden.

h. A rich science library can be established in the institution. The point to be considered here is that such an institution should not be left at the foundation stage. The 2-3 million liras required for establishing the institution could be found in various ways. or the University of Thessaloniki in Greece, a small customs duty is levied on goods entering the port of Thessaloniki. Other examples have used lotteries and donations.

6. Until recently, physics and chemistry have not been given importance in Türkiye. Physics and chemistry classes not only teach the laws of nature but also help solve everyday problems. Another essential benefit of physics and chemistry is that they raise students' awareness about health from an early age. This is one of the most significant differences between the West and Türkiye. In this period, when economic thoughts gained importance, it was necessary to give importance to the health issue (RAP, 1931, p.20).

7. One of the reasons that reduces the efficiency of higher education and high schools is the lack of teacher continuity. In most Western schools, teachers are permanent. If teachers are permanent, their contact with the school increases and schools become more efficient.

8. In order to deal with all these issues High Education Council, similar to the High Economic Council, can be established and the first principles can be determined here.

Salih Murat Bey stated that he had analyzed various countries' education systems and statistics while writing these lines. The programs and education systems of technical institutions in various countries are included in the second part of the report.

Ethical Permits of Research:

In this study, all the rules specified to be followed within the scope of "Higher Education Institutions Scientific Research and Publication Ethics Directive" were complied with. None of the actions specified under the heading "Actions Contrary to Scientific Research and Publication Ethics", which is the second part of the directive, have been taken.

Ethics Committee Permission Information:

This study is within the scope of activities that do not require ethical permission.

Discussion and Conclusion

Science and scientific research have started to play a much more critical role in the 20th century. In this century, discoveries are no longer the result of personal efforts or coincidences but of scientific research, planning and adaptation of education systems and labor. Scientific progress is also achieved in this way. Salih Murat Bey, Professor of Physics at the Higher School of Engineering, prepared a report on the general situation of technical education and institutions in Türkiye as a result of the observations he had made during his scientific visits to Europe and the Balkan countries; he identified the developments in the field of science in the world in the 20th century and put forward Türkiye's deficiencies in this field and what needed to be done to correct them. Although the report consists of opinions and recommendations on technical education, it also includes opinions and recommendations on the understanding of science in Türkiye, the methodology of scientific research and the general education system. These findings and recommendations (for example, the importance of vocational technical education, modernizing curricula, organizing educational content according to the needs and demands of the country, sending students abroad for education, ensuring specialization in education, ensuring effective and efficient use of resources, increasing teacher competencies) are still valid for today's world and Türkiye, and similar issues are still being discussed. Therefore, this report is still relevant today.

Looking at the general criticisms in the report, the following criticisms come to the fore: inefficiency of the studies carried out in the field of education, wasted time, the incoherence of the education system, the fact that most of the scientific institutions are not based on the needs but on the efforts to be similar to the exemplary institutions and to appear superior, the fact that the institutions have been left in a static state since their establishment and not provided with a flexible structure, the fact that the technical education system in Türkiye and, concerning this, the general education system is not stable and modern. Criticisms regarding technical education can be summarised as inadequate financial resources and inefficient use of existing facilities. According to Salih Murat Bey, it is wrong that the schools providing technical education and training engineers need to be more organized. Moreover, Türkiye needed fewer engineers than it was thought, but intermediate staff. The most significant deficiency of the schools providing engineering education is that practical training is insufficient, and the education remains mostly in theory. However, scientific discovery and progress can only be achieved through experimentation and laboratory research. In addition, another reason for the problems in technical and science education in Türkiye is that most of the teachers need to devote their time to the development and progress of the school and their contact with the school is limited.

Salih Murat Bey's recommendations in his report are vital and noteworthy. According to him, technical education and scientific research should be treated as a "national issue". If the regulation of the technical education system is handled as a national issue, progress in agriculture and industrialization can be achieved by using the country's natural resources efficiently. Thus, the national power required in war and peace will be obtained. In addition, Türkiye will gain wealth and prosperity. Countries that attach importance to technical education have made important discoveries by employing physics, chemistry experts and engineers in laboratories during wartime and have made progress by adapting these discoveries to the needs of civilian life in times of peace.

According to Salih Murat Bey, who also mentions the place of the technical education system in society and its connection with economic welfare in his report, trying to change the education system based solely on central bureaucracy or personal or regional initiatives does not benefit society. Centralized planning would be appropriate at this point, provided that regional needs and natural resources are used efficiently.

The use of scientific studies, which should be seen as a national interest, for the development of industrial institutions is only possible by including specially trained experts in this field. Scientists who will be trained within national institutions will not only work for national interests but will also be able to save the resources spent on sending students abroad (to Europe), which is very costly for Türkiye.

"Scientific research" should not be neglected in these national institutions, which are recommended to be established for higher education and technical education and must be continued. Otherwise, the institutions and the education system will remain frozen in the state they were in when they were first established. However, it is essential to progress and be flexible in accordance with the developments, needs and spirit of time and space.

Another suggestion is about the issue of specialization in the fields of science. In the 20th century, it was almost impossible to specialize in more than one field. In Türkiye, however, this is still being tried to be done and every aspect of science is being learned and taught. For this reason, knowledge in education remains superficial. The principle of specialization in a narrow field should be adopted for both institutions and individuals. Attention should be paid to this issue both in the studies carried out in institutions and the education given to students. High organizations such as the Yüksek Maarif Meclisi (High Education Council), where the information obtained in different fields of expertise is brought together and discussed, should be established.

When we look at the developments in Türkiye after Salih Murat Bey's evaluation and criticisms in 1931, we see that in the short term, a university reform was carried out in the country, and a general directorate was established to develop technical education. In 1933, the General Directorate of Vocational and Technical Education was established for schools providing secondary education (Ministry of National Education (MoNE), 2021). In 1936, the main policies of technical education were prepared with the "Plan for the Development of Vocational Education", which forms the basis of today's vocational and technical education. According to this plan, it was planned to open apprentice schools, evening art schools, technician schools, and engineer schools (Doğan, 1983, pp. 171-176). In 1942, the "Law on the Opening of Vocational and Technical Schools and Expansion of the Existing ones" was adopted, and efforts were made to expand vocational and technical education in the country (Coşkun, 1998, p.238). Kartal states that vocational and technical education in the country could only be accelerated after the "3rd National Education Council" held in 1946 (Kartal, 2018, p.202). However, it is not possible to say that the University Reform of 1933 was an event in which Salih Murat Bey's dreams were realized. Although the university was restructured with this reform, changes were made mainly in the teaching staff (Arslan, 2010, p.239).

It is also possible to talk about medium-term developments in bringing together academic circles, another issue Salih Murat Bey addressed in his report. Considering that The Scientific and Technological Research Council of Turkiye [TUBITAK], one of the most important scientific institutions of the country, was established in 1963 and that the efforts initiated in 1960 to establish the Turkish Academy of Sciences [TUBA] were only finalized in 1993 (Birbudak, 2022, p.750), it can be said that Salih Murat Bey's observations and suggestions for the establishment of autonomous scientific institutions were realized quite late. As a result, it is still not possible to say that the issues of technical education at the secondary and higher education levels have been fully resolved, and an ideal system has been established.

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BIOGRAPHICAL NOTES

Contribution Rate of Researchers

Author 1: 50%

Author 2: 50%

Conflict Statement

There is no material or individual organic connection with the people or institutions involved in the research and there is no conflict of interest in the research.

Salih Murat Uzdilek'in Türkiyenin Eğitim Sistemine Dair 1931 Tarihli Raporu: "Memleketimizde Teknik Terbiye ile Yüksek İlim Müesseseleri Ne Haldedir?"

Özet

Salih Murat Uzdilek, Türkiye Cumhuriyeti'nin ilk yıllarının önde gelen eğitimci ve bilim insanlarından biridir. Osmanlı Devleti zamanında başlayan askerlik hayatının ardından Cumhuriyet yıllarında farklı eğitim kurumlarında fizik ve matematik öğretmenlikleriyle birlikte 40 yıldan uzun süre Yüksek Mühendis Mektebi'nde (sonrasında İstanbul Teknik Üniversitesi) akademisyen olarak görev yapmıştır. Kendisi Yüksek Mühendis Okulunda öğretim üyesi iken, Avrupa'da incelemelerde bulunmak üzere bir seyahate çıkmış, 1931 yılı Mart ayı sonlarında yurda geri dönmüştür. Yüksek Mühendis Mektebi ve Nafia Vekâleti tarafından görevlendirilen Salih Murat Bey, bazı Avrupa ülkelerine giderek teknik eğitim veren okulları, üniversiteleri ve bazı liseleri ziyaret ederek gözlemlerde bulunmuştur. Salih Murat Bey, izlenim ve tespitlerine ait teknik bir rapor yazarak ilgili makamlara sunmuştur. Rapor bugün Türkiye Cumhuriyeti Cumhurbaşkanlığı Devlet Arşivleri Başkanlığı bünyesinde Cumhurbaşkanlığı Cumhuriyet Arşivi'nde Başbakanlık Devlet Arşivleri Genel Müdürlüğü Fonunda (30-10-0-0) 141-10-5 sıra numarası ile kayıtlıdır. Salih Murat Bey tarafından yazılan rapor aslında iki bölümden oluşmaktadır. Bu çalışmanın konusu olan rapor, Türkiye'de genel eğitim sistemi, teknik eğitim sistemi ve özellikle de matematik ve fizik eğitimi hakkındadır. Salih Murat Bey, raporun yazıldığı dönemde dünyada bilim sahasında yaşanan gelişmeleri tespit etmiş, Türkiye'nin bu konudaki eksiklerini ve bunların düzeltilmesi için yapılması gerekenleri ayrıntılı bir şekilde tartışmıştır.

Anahtar Kelimeler: Türkiye Cumhuriyeti, Salih Murat Uzdilek, teknik eğitim, rapor, eğitim tarihi.

Giriş

Salih Murat Uzdilek, Türkiye Cumhuriyeti'nin ilk yıllarının önde gelen eğitimci ve bilim insanlarından biridir. Osmanlı Devleti zamanında başlayan askerlik hayatının ardından Cumhuriyet yıllarında farklı eğitim kurumlarında fizik ve matematik öğretmenlikleriyle birlikte 40 yıldan uzun süre Yüksek Mühendis Mektebi'nde (sonrasında İstanbul Teknik Üniversitesi) akademisyen olarak görev yapmıştır. Kendisi Yüksek Mühendis Okulunda öğretim üyesi iken, Avrupa'da incelemelerde bulunmak üzere bir seyahate çıkmış, 1931 yılı mart ayı sonlarında yurda geri dönmüştür. Salih Murat Bey, izlenim ve tespitlerine ait teknik bir rapor yazarak ilgililere teslim etmiştir. Bu ilgililerden bir tanesi de Türkiye Cumhuriyeti Başbakanı İsmet İnönü'dür. Salih Murat Bey tarafından yazılan rapor aslında iki bölümden oluşmaktadır. Bu çalışmanın konusu olan rapor ise, Türkiye'de genel eğitim sistemi, teknik eğitim sistemi ve özellikle de matematik ve fizik eğitimi hakkındadır. Söz konusu rapor her ne kadar Türkiye'deki teknik eğitim sistemi ve kurumların genel durumu hakkında olsa da Murat Bey raporu yazdığı dönemde dünyada ilim sahasında yaşanan gelişmeleri tespit etmiş, Türkiye'nin bu konudaki eksiklerini ve bunların düzeltilmesi için yapılması gerekenleri ayrıntılı bir şekilde ele almıştır.

Cumhuriyet öncesi dönemde Türkiye'de teknik eğitim alanına bakıldığında planlı bir politikanın olmadığı ve teknik eğitimin özellikle yerel girişimler ve valilerin inisiyatifiyle yürütüldüğü görülmektedir. Okullar yerel ihtiyaçlara göre açılmış olup bu alanda eğitim

programları, öğretmen, öğrenci ve fiziki özellikler açısından bakıldığında ortak bir standart oluşturulamadığı görülmektedir (Doğan, 1983). Türkiye Cumhuriyeti'nin kuruluşundan itibaren ise teknik eğitim, önemli bir sanayileşme ve kalkınma aracı olarak düşünülmüş ayrıca diğer bütün eğitim alanlarında olduğu gibi teknik eğitimin millileşmesi meselesine öncelik verilmiştir. 1920-1940 yılları arasında ülkeye davet edilen yabancı uzmanların da görüşleri dikkate alınarak teknik eğitimin temel ilke ve kavramları oluşturulmuş, önemli planlamalar ve yasal düzenlemeler yapılmıştır (Duman, 2010, s.181). Yabancı uzmanların yanı sıra bu ülkenin yetiştirdiği güzide bilim insanlarının da eğitim politikaları ve sistemi hakkında çeşitli raporlar sundukları bilinmektedir. Bunlardan bir tanesi de Salih Murat Bey'dir.

Ord. Prof. Salih Murat Uzdilek (6 Şubat 1891- 4 Aralık 1967)

Salih Murat Uzdilek, 6 Şubat 1891'de İstanbul Samatya'da dünyaya gelmiştir. Babası Bahriye Çarkçı Ameliyat Okulu matematik hocalarından Giritli Şefik Bey, annesi Saniye Hanımdır (İstanbul Teknik Üniversitesi [İTÜ]), 1958, s.13). İlköğrenimini Kasımpaşa'da tamamlamış, ortaokulu Kasımpaşa Deniz Rüşdiyesi'nde okuduktan sonra Heybeliada Bahriye Mektebi'ne gitmiştir (Nebioğlu, 1962, s.651). Bahriye Mektebi'nden Ağustos 1908'de teğmen rütbesiyle mezun olmuş, mezuniyetinin ardından iki yıl müddetle Osmanlı donanmasının çeşitli gemilerinde (Mesudiye Zırhlısı, Asar-ı Tevfik Zırhlısı, Mecidiye Kruvazörü, Tir-i Müjgan Vapuru, Aziziye Zırhlısı) mühendis olarak görev yapmıştır (İTÜ, 1958, s.13). 1910-1911 yıllarında Posta ve Telefon ve Telgraf Nezareti bünyesinde eğitim veren Telgraf Mekteb-i Alisi'ne giden Salih Murat Bey teorik elektrik alanında eğitim almıştır (Bahadır, 2001, s.98; Kılınç, 2015, s.27). 1912 yılında Bahriye Nezareti tarafından alınan kararla Salih Murat'ın dört senesi Londra'da bulunan Imperial College of Science and Technology'de telsiz-telgraf mühendisliği alanında eğitim ve bir sene de telsiz-telgraf fabrikasında incelemelerde bulunmak üzere İngiltere'ye gönderilmesine karar verilmiştir (Türkiye Cumhuriyeti Devlet Arşivleri Başkanlığı, Başkanlık Osmanlı Arşivi [BOA], 1912). Londra'ya giderek eğitimine başlayan Salih Murat Bey, eğitime ara verilen yaz tatillerinde Birmingham şehrinde bulunan General Electric Company'de incelemelerde bulunma şansı elde etmiştir (BOA, 1913).

Salih Murat Bey, gerek yurt içi ve gerekse yurt dışında almış olduğu eğitimler sayesinde yaşadığı dönemde Türk bilim dünyasının önemli isimlerinden biri olmuştur. Kendisi öğretim üyeliği yıllarında birçok uluslararası bilimsel kongreye katılmıştır. Farklı tarihlerde Londra, Amsterdam, Kudüs, Milano, Roma, Madrid, Utrecht, Sofya, Karaçi gibi şehirlerde tertip edilen uluslararası toplantılara iştirak etmiştir (İTÜ, 1960, s.7-8). Akademik çalışmaları İstanbul Teknik Üniversitesi Dergisi'nin ve Türkiye Fizik Cemiyeti Mecmuası'nın çeşitli sayılarında yayımlanan Uzdilek bu çalışmalarına ek olarak felsefe, astronomi konularında Büyük Doğu Dergisi'nde de yazılar yazmıştır (Baltacıoğlu, 2018, s.177; Lostar, 2019, s.318; Okay, 1992, s.514). Bununla birlikte ülkedeki bilimsel kurumların tesisi ve çeşitliliği açısından da önemli roller üstlenmiştir. Öyle ki, İngiltere'de eğitim aldığı dönemde, 1913 yılında, Londra Fizik Derneği'ne üye olan Salih Murat Bey (İTÜ, 1958, s.15), ülkemizdeki bilim derneklerinin kuruluş süreçlerinde önemli roller üstlenmiştir. Kendisi 1948 yılında kurulan Türk Matematik Derneği'nin ([TMD], 2023) ve 1950 yılında kurulan Türk Fizik Derneği'nin kurucuları arasında yer almaktadır ([TPS], 1950).

Salih Murat Uzdilek'in belki de bilimsel çalışmaları kadar mühim bir diğer misyonu ise Türkiye'de popüler bilim çalışmalarına öncülük etmiş olmasıdır. 1925-1926 yıllarında Cumhuriyet döneminin ilk popüler bilim dergisi olan Fen Alemi Mecmuası'nda yazılar kaleme alan Salih Murat Bey (Bahadır, 2001, s.79), aynı dönemde popüler bilim literatürüne giren Tabiat Alemi dergisinin de kurucusu ve editörüdür. 1925 yılı aralık ayından 1927 yılı şubat ayına kadar olan dönemde 14 sayı yayımlanan bu dergide önemli bir kısmı bizzat Salih Murat Bey tarafından kaleme alınan, temel bilimler, bilim tarihi ve felsefesi makalelerine yer verilmiştir (Bahadır, 2001, s.98; Kadıoğlu, 2015, s.35; Kadıoğlu, 2016, s.61-62; Küçük, 2017, s.269). Ayrıca 1930'lu yıllardan itibaren başta halkevleri olmak üzere pek çok yerde konferanslar vermiş, Ankara ve İstanbul radyolarında yüzlerce programa katılmıştır (İTÜ, 1958, s.15).

Salih Murat Bey'in Türk Eğitim Sistemi Dair Görüşleri: "Memleketimizde Teknik Terbiye ile Yüksek İlim Müesseseleri Ne Haldedir?"

1931 yılı başında Avrupa'daki fizik laboratuvarlarını incelemek üzere bir seyahate çıkan Salih Murat Bey, mart ayı sonlarında yurda geri dönmüştür. Ülkeye geri dönüşünü birinci sayfadan haber yapan Vakit Gazetesi'nin bildirdiğine göre Salih Murat Bey Sofya, Bükreş, Budapeşte, Viyana, Milano, Torino, Roma, Napoli ve Atina'da bulunan üniversite ve mühendis okullarının fizik laboratuvarlarını ziyaret etmiş, bunların tamamının Anglo-Sakson esaslarına göre çalıştığını ifade etmiştir. Seyahati sırasında birkaç lise ile fizik alanına yönelik cihazlar üreten fabrikaları da gezdiğini ifade eden Salih Murat Bey, izlenim ve tespitlerine ait teknik bir rapor yazdığını ve ilgililere teslim edeceğini belirtmiştir (Vakit, 1931b, s.1-2). Salih Murat Bey, kaleme almış olduğu raporunda da benzer ifadelere yer vermektedir. Raporunda; 13 Ocak 1931 günü İstanbul'dan hareket ettiğini ifade eden Salih Murat Bey, Sofya, Bükreş, Budapeşte, Viyana, Venedik, Milano, Torino, Roma, Napoli, Atina yoluyla seyahatini gerçekleştirmiş ve 17 Mart 1931 günü İstanbul'a geri dönmüştür (Türkiye Cumhuriyeti Devlet Arşivleri Başkanlığı, Başkanlık Cumhuriyet Arşivi [BCA], 1931, s.27).

Salih Murat Bey'in seyahatinin ardından kaleme aldığı "Memleketimizde Teknik Terbiye ile Yüksek İlim Müessesleri Ne Haldedir?" başlıklı raporu iki ana bölümden oluşmaktadır. Raporun bir bölümü "Balkan Memleketleri ile Merkezi Avrupa'da Yaptığım Tetkik Seyahatine İlişkin Müşahedelerim" başlığını taşımakta olup bu kısımda seyahati kapsamında Avrupa'daki eğitim sistematiği üzerine gözlemlerine yer vermektedir. Çalışmamızda ele alınan bölümde ise raporun ana başlığını da oluşturan Türkiye'deki eğitim sistemine dair görüş ve ifadeleri yer almaktadır. Bu bölümde karşılaştırmalı bir şekilde Türkiye'de teknik eğitim alanında yaşanan gelişmeler/aşamalar incelenmiştir. Bu raporu yazma amacı ise, bu konuların konuşulup tartışılmasını sağlayarak, Türkiye'nin teknik eğitim sistemini yükseltip Batıdaki benzer kurumlara yakınlaştırılmasını sağlamaktır (BCA, 1931, s.1).

Salih Murat Bey'e göre teknik eğitim alanında Türkiye ile Batı arasında yaşanan farklılaşmanın sebepleri şunlardır;

1. Yüksek fen mektepleri mezunlarına toplumda yer hazırlanmaması, uzmanlığa önem verilmemesi,

2. Batıdaki gelişmelerin adım adım takip edilmeyerek kurumların daima kuruluş aşamasında bırakılması,
3. İlköğretim seviyesindeki okulların ıslah edilmemesi, bu okulların teknik ve fen eğitimi veren kurumlara bağlanmaması,
4. Laboratuvar sistemine önem verilmemesi, dolayısıyla öğrenciye yaratıcılık kabiliyeti kazandırılamaması,
5. Ülkede teknik eğitimde önemli rol oynayan ihtisas kurumlarının mevcut olmaması,
6. İlmi kurumlarda Batıdaki örneklerin kopya edilmesi, ülkenin şartlarına uydurulmaması, bir başka deyişle, kurumların millileştirilmemesi (BCA, 1931, s.3-4).

Türkiye'de yüksek teknik ve fen eğitimi veren kurumları şöyle sıralamak mümkündür; 1. Mülkiye Mühendis Mektebi (Yüksek Mühendis Mektebi), 2. Dârülfünûnun Fen Fakültesi, 3. Fen Fakültesi kadrosuna dahil olan Elektromekanik Enstitüsü, 4. Zonguldak'ta önce Maden Mühendis Mektebi adıyla açılan sonra Sanayi Mühendis Mektebi'ne dönüştürülen okul. Bunların dışında orman mühendisi yetiştiren Orman Mektebi ile telgraf mühendisi yetiştiren Telgraf Mektebi gibi ihtisas okulları da mevcuttur. Mühendislik mekteplerinin dışında orta teknik mektebi niteliğinde bir de Kondüktör Mektebi vardır (BCA, 1931, s.6).

Mühendislik eğitimi veren okulların böylesine dağınık bir halde olması memleket ekonomisine de zarar vermektedir. Örneğin Avrupa'nın ileri memleketlerinden Felemenk'te bir tek mühendislik okulu bulunmaktadır. Dolayısıyla Türkiye'nin maddi imkanları düşünüldüğünde bu üç ayrı kuruma ayrı ayrı laboratuvar kurulmasının güçlüğü ortadadır. Ayrıca Salih Murat Bey'e göre, mühendis ihtiyacının çok fazla olmadığı Türkiye'de üç ayrı kurumun mühendis yetiştirmesine gerek de yoktur. Bu üç kurumun politeknik örneğindeki gibi birleştirilerek değiştirilmesi hem daha ekonomik hem de daha verimli olmasını sağlayabilir. Gerekirse bu birleşmiş okul telgraf, telefon, telsiz, kimya ve deniz mühendisliği gibi şubelere de ayrılabilir. Bu gerçekleşirse yurtdışına öğrenci göndermeye de gerek kalmayacak, dışarıya giden para malzeme, işçilik ve teknik işlerde kullanılabilecektir. (BCA, 1931, s.8).

Teknik eğitim sisteminin, uluslararası ve milli olmak üzere iki özelliği vardır. Uluslararası eğitimin özellikleri her yerde aynıdır, milli eğitimin özelliği ise eğitim sistemini memleketin ihtiyacına uyarlamakla ilgilidir. Her ülkenin eğitim sistemini kendi özelliklerine göre az ya da çok millileştirdiği görülmektedir. Türkiye'de teknik ve fen eğitiminde yaşanan sorunların bir sebebi de öğretmenlerin çoğunun okullarına bağlı olmamasıdır. Öğretmenler okulun gelişmesine, ilerlemesine vaktini ayıran kimseler olmayıp okulla teması birkaç saatle sınırlı olan "seyyar" öğretmenler gibidir. Hatta bir kısmı okul dışında başka işlerle bile meşgullerdir. Eğitim sistemi çağdaş ihtiyaçlara, yeni keşiflere, diğer memleketlerdeki gelişmelere uyum sağlayacak şekilde esnek ve değişken olabilmelidir. Batı ile aramızdaki farkın temel sebeplerinden bir tanesi budur.

Dârülfünûnun "Maarif-i aliyenin inkişaf ve terakkisine hadim hukuk, tıp, edebiyat, fünun, ilahiyat fakülteleriyle eczacı ve dişçi mekteplerinden müteşekkil bir müessese-i ilmiye" olmasına rağmen, liseden öğrenci alındığı için üst seviyede bir eğitim verilememektedir. Fen

Fakültesi talimatnamesine göre fakültede dersler liselerde öğretmenlik yapmak isteyenler ve belli bir bilim alanında uzmanlık kazanmak isteyenler için uzmanlık alanlarına ayrılmıştır (BCA, 1931, s.9). Murat Bey, burada günümüzde de geçerli olan öğretmen ve bilim insanı yetiştirme alanının eğitimlerinin farklı olması gerektiği fikrini savunmaktadır. Salih Murat Bey'e göre Dârülfünûn sadece öğretmen yetiştirmek için açılmış bir kurum değildir ve ülkedeki yükseköğretimin gelişmesine hizmet etmekle meşgul olmalıdır. Fakat programı buna uygun değildir. Programdaki dersler, eğer öğretmen yetiştirilmek isteniyorsa, Yüksek Muallim Mektebi'ndeki pedagoji dersleriyle sentezlenmelidir. Programın diğer bir eksikliği matematik öğretmeni olacak öğrencilerin programında fizik ve kimya derslerinin eksik olmasıdır (BCA, 1931, s.10).

Türkiye'de matematik, fizik gibi uzmanlık alanlarıyla ilgili bir akademi veya cemiyetin olmaması da bir diğer eksikliktir. Oysa akademi ve cemiyetlerde alanın uzmanları kendi alanlarında öğrendikleri yeni şeyleri muhataplarına anlatır ve bu yeni araştırmalar tartışılırsa alakadarlar bundan faydalanırlar. Batıda herkes dar bir alanda uzmanlaşmaya gitmiştir, bu akademi ve cemiyetler de bu uzmanlık alanlarını birleştirme vazifesi görürler. Artık fizik ve matematik alanları o kadar genişlemiştir ki, iki alanda birden uzmanlaşmak neredeyse imkânsızdır. Türkiye'de ise hâlâ bu yapılmaya çalışıldığından bilgiler yüzeysel kalmaktadır (BCA, 1931, s.12).

Türkiye, Meşrutiyet devrinden itibaren Avrupa'ya öğrenci göndermiştir. Salih Murat Bey, bu uygulamanın da "programsızlık" yüzünden işe yaramadığını düşünmektedir. Batıya öğrenci gönderilerek bir yandan da Türkiye'deki kurumların ilerlemesine set çekilmiş olunmaktadır. Eğitim bütçesinin önemli bir kısmı bu öğrencilere harcanmaktadır. Türkiye'deki yükseköğretimin başarısı %50 olarak kabul edilirse, Avrupa'ya giden öğrencilerin uzaktan kontrollerinin zor olması, yabancı dil konusunda yaşanan sıkıntılar, iklim şartları gibi sebeplerden dolayı başarı oranlarının %50'nin altında olduğu düşünülebilir. Dolayısıyla Salih Murat Bey'in yaptığı bu hesaba göre Avrupa'ya öğrenci göndermek için harcanan bütçenin bir kısmı milli kurumların gelişmesi için harcanırsa daha kârlı bir iş yapılmış olur.

Yükseköğretimin zaaflarının sebeplerinden bir tanesi de eğitim sisteminin ahenksizliğidir. Salih Murat Bey'e göre Türkiye'de hiçbir zaman bütün kurumlar düşünülerek ve birbirine bağlanacak şekilde bir eğitim sistemi ve programı yapılmamıştır. (BCA, 1931, s.13). Yükseköğretimin fen eğitimi hakkındaki bu eleştirilerden sonra sıra ortaokul ve lise derecelerindeki teknik eğitim kurumlarına gelmektedir. Salih Murat Bey, liselerin toplumdaki görevini üçe ayırmaktadır; 1. Devlet dairelerine memur yetiştirmek, 2. Banka ve ticari kurumlara memur yetiştirmek, 3. Yükseköğretime öğrenci hazırlamak. Bu üç alanının da lise mezunundan istediği bilgi şekli farklıdır (BCA, 1931, s.14).

Lisede öğrencilere ortak bir genel kültürden başka bir de uzmanlık bilgisi vermek gerekmektedir. Batılı ülkeler sanayi ve teknik alanında meydana gelen gelişmelere göre eğitim programlarını ve metotlarını yenilemektedirler. Öyle ki, bu dönemde Batının en önemli meselelerinden birisi ortaokul ve lise ders müfredatlarıdır. Her memleket kendi ihtiyacına göre tedbirler almaktadır. Bu konular bilim ve ihtisas cemiyetlerinin ilgi alanı içerisindedir. Türkiye'de ise bu tarz kurumlar bulunmadığından bu işi Milli Eğitim Bakanlığı yapmaktadır. Bakanlığın yaptığı program talimatnameyle ilan edilmekte ve geçerli hale gelmektedir. Fakat

bu programı takip edecek öğretmen kadrosu tam olmadığından ve eğitim materyallerinin de eksikliğinden verim alınamamaktadır. (BCA, 1931, s.15).

Bu durumda Türkiye'de ortaöğretimin toplumsal rolünü tayin etmek ve liselerin fizik ve matematik programlarını yeniden düşünmek gerekmektedir. Salih Murat Bey, liselerde verilen eğitim neticesinde öğrenci zihninin "gümrük antreposu"na çevrildiğini ifade etmiştir: görüntü bir gümrük antreposuna gidince görülen manzara gibidir, bir otomobil yanında bir sandık kesme şeker, öte yanda bir çuval un, beride bir sandık galoş. Türkiye'de öğrencinin zihni bir kompartıman gibi birçok matematik, fizik ve kimya bilgisi ile doldurulmakta fakat bunlar birbirleriyle ilişkilendirilip bağlanmamaktadır.

Yüksek Mühendis Mektebi, teorik eğitiminin başarısı ile bilinmektedir, buraya devam eden öğrenciler de lise mezunlarının iyilerindendir. Buna rağmen bunların %20'sinin ideal olduğu söylenebilir. Liseyi bitiren öğrencilerin önünde Yüksek Mühendis Mektebi, Tıp Fakültesi, Hukuk Fakültesi, Mülkiye Mektebi gibi seçenekler vardır. Genelde öğrenciler hepsine müracaat ederek kabul edildikleri okula devam ederler. Buradan anlaşılacağı gibi lise öğrencilerinin kendilerini tanımalarına ve tercihte bulunmalarına yardım eden bir eğitimden geçmedikleri açıktır. (BCA, 1931, s.16).

Öğretmenlerin durumuna gelince; öğretmen sayısı zaten az olmakla birlikte mevcut öğretmenlerin arasında bu programları takip etmekte zorlanacak kadar zayıf olanlar da mevcuttur. Türkiye'nin lise programlarını adapte ettiği Fransa'da lise ve yükseköğretim hocaları aynı seviyede olup aynı maaşı almaktadırlar. Her iki sınıf öğretmen de üniversite mezunu olup, biri öğretme diğeri araştırma işinde daha yeteneklidir, biri öğretmen diğeri bilim insanıdır.

Bu noktada Türkiye'deki genelde eğitim sistemi ve özelde teknik eğitim sistemi ve programları hakkındaki eleştirilerini sunduğu raporunun bu kısmını sonlandıran Salih Murat Bey, bu durumun ıslahı için gerek gördüğü önerileri açıklamıştır;

- Eğitim sistemi fabrikaya benzemektedir, fabrikanın uyguladığı temel prensipler eğitim sisteminde de uygulanmaktadır. Bir iş için fabrikaya giren eşya çeşitli aşamalardan geçerek ürüne dönüşür. Her aşamada ürün kontrol edilerek sonraki aşamaya yönlendirilir. Kontrol sırasında eksik ya da yanlış parçalar tespit edilip çıkarılır. Eğer böyle olmazsa sonraki aşamanın çalışanları boş yere emek verip zaman harcamış olurlar. Eğitim sistemi de buna benzemektedir. İlköğretim ham malzemeyi alıp diğer yüksek eğitim kurumlarına iletir. Bu aşamada sınavlarda eksik ya da noksan parçalar ayıklanıp başka işlerde kullanılırlar. Dolayısıyla yapılacak ilk iş ilkokullarda okuyan öğrencilerin topluma faydalı bir hale getirilmesidir. Diğer yandan programların esnek olması ve bölgelere göre değişmesi verimlilik için şarttır.
- Çeşitli seviye ve yeteneğe sahip öğrencileri tek tip bir lisede okutmak ve "hepiniz bunları öğreneceksiniz" demek iyi sonuçlar vermez. XX. Yüzyılda artık eğitimin temel prensibi, her öğrenciyi yeteneğine göre azami şekilde verimli olacak şekilde yetiştirmektir. (BCA, 1931, s.17).
- Türkiye'nin belli yerlerinde ilkokul ve liselere bağlanan meslek okulları açılmalı ve bu okullarda bölgenin ihtiyacına göre programlar oluşturulmalıdır. (BCA, 1931, s.18).

- Eğitim programları ve sistemi birlik içerisinde ve çokluk usulüne göre yapılmalıdır. Bunun amacı okulların tek elden yönetilmesi değil meslek okullarıyla ve genel eğitim veren okullar arasında bağlantı sağlamaktır.
- Yükseköğretimde Dârülfünûnun Fen Fakültesi ile mühendislik okulları birleştirilerek bir Fen Enstitüsü kurulmalıdır. (BCA, 1931, s.19).
- Türkiye'de yakın zamana kadar fizik ve kimyaya önem verilmemiştir. Fizik ve kimya tabiat kanunlarını öğretmelerinin yanı sıra gündelik hayata dair meselelerin çözümüne de yardımcı olurlar. Fizik ve kimyanın bir diğer önemli faydası da öğrencileri küçük yaştan itibaren sağlık konusunda bilinçlendirmeleridir. Batı ile Türkiye arasındaki en büyük farklardan bir tanesi de budur. (BCA, 1931, s.20).
- Yükseköğretimin ve liselerin verimini düşüren sebeplerden bir tanesi de öğretmen devamlılığının olmamasıdır. Batı okullarının çoğunda öğretmenler daimidir. Öğretmenler daimi olursa okulla temasları artar ve okullar daha verimli olur.
- Bütün bu bahsedilen konuların halledilebilmesi için Yüksek İktisat Meclisi'ne benzer bir Yüksek Maarif Meclisi kurulabilir ve ilk esaslar da burada tespit edilebilir.

Araştırmanın Etik İzinleri:

Bu çalışmada "Yükseköğretim Kurumları Bilimsel Araştırma ve Yayın Etiği Yönergesi" kapsamında uyulması gerektiği belirtilen tüm kurallara uyulmuştur. Yönergenin ikinci bölümü olan "Bilimsel Araştırma ve Yayın Etiğine Aykırı Eylemler" başlığı altında belirtilen eylemlerin hiçbiri gerçekleştirilmemiştir.

Etik Kurul İzin Bilgileri:

Bu çalışma etik açıdan izin gerektirmeyen faaliyetler kapsamındadır.

Tartışma ve Sonuç

Yüksek Mühendis Okulu Fizik Profesörü Salih Murat Bey, Avrupa ve Balkan ülkelerine yaptığı ilmi ziyaretlerle edindiği gözlemler neticesinde Türkiye'deki teknik eğitim ve kuruluşların genel durumu hakkında bir rapor hazırlamış; XX. yüzyılda bilim sahasında dünyada yaşanan gelişmeleri tespit ederek Türkiye'nin bu konudaki eksiklerini ve bunların düzeltilmesi için yapılması gerekenleri ortaya koymuştur. Rapor her ne kadar özelde teknik eğitime dair görüş ve önerilerden oluşsa da Türkiye'de bilim anlayışı, bilimsel araştırmalarının yöntemi ve genel eğitim sistemi hakkındaki görüş ve önerilere de yer vermiştir. Bu tespit ve önerilerin günümüz dünyası ve Türkiye için halen geçerli olduğunu ve benzer konuların halen tartışılmaya devam edildiğini görmek mümkündür. Dolayısıyla denilebilir ki, bu rapor günümüzde de güncelliğini korumaktadır.

Raporda yer alan genel eleştirilere bakıldığında; eğitim alanında yapılan çalışmaların verimsiz olması, boşa zaman harcanması, eğitim sisteminin ahenksizliği, bilim kurumlarının çoğunda ihtiyaca göre değil iktibas edilen kurumlara benzemek ve üstün görünmek çabasının ön planda olması, kurumların kuruluşundan itibaren durağan bir halde bırakılarak esnek bir yapıya kavuşturulmaması, Türkiye'de teknik eğitim sisteminin ve bununla ilgili olarak da aslında genel eğitim sisteminin istikrarlı ve çağdaş olmaması gibi eleştiriler ön plana

çıkmaktadır. Özel olarak teknik eğitime dair eleştiriler ise, bu sayılanlarla birlikte, maddi imkânların yetersizliği ve mevcut imkânların da verimli kullanılmaması şeklinde özetlenebilir.

Murat Bey'in raporunda yer verdiği öneriler kısmı ise oldukça önemli ve kayda değerdir. Ona göre, teknik eğitim ve bilimsel araştırmaları "milli bir mesele" olarak ele almak şarttır.

Milli menfaatler gereği olarak görülmesi gereken bilimsel çalışmaların, sanayi kurumlarının gelişmesi için kullanılabilmesi ise ancak bu alanda özel olarak yetiştirilmiş uzmanlara yer verilmesiyle mümkündür. Milli kurumlar bünyesinde yetiştirilecek bilim insanları hem milli menfaatler için çalışacaklar hem de böylece Türkiye için oldukça masraflı olan yurtdışına (Avrupa'ya) öğrenci gönderilerek dışarıya akıtılan kaynaklardan tasarruf edilebilecektir.

Yükseköğretim ve teknik eğitim konularıyla ilgili olarak kurulması tavsiye edilen bu milli kurumlarda "bilimsel araştırma" işleri ihmal edilmemeli, muhakkak devam ettirilmelidir.

Bir diğer öneri, ilim alanlarında uzmanlaşma meselesi hakkındadır. Hem kurumlar hem de bireyler için dar bir alanda uzmanlaşma prensibi benimsenerek hem kurumlarda yapılan çalışmalarda hem de öğrencilere verilen eğitimde bu hususa dikkat edilmeli, farklı uzmanlık alanlarında elde edilen bilgilerin bir araya getirilerek tartışıldığı "Yüksek Maarif Meclisi" gibi üst yapılanmalar meydana getirilmelidir.