



REPUBLIC OF TURKEY
MINISTRY OF NATIONAL
EDUCATION

October 2020



Vocational and Technical Education During the Covid-19 Pandemic





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VTE	Vocational and technical education
WHO	World Health Organization
IMF	International Monetary Fund
EBA	Education Information Network
ILO	International Labor Organization
UNESCO	United Nations Educational, Scientific and Cultural Organization
TurkStat	Turkish Statistical Institute
DGVET	Directorate General of Vocational and Technical Education
OECD	Organisation for Economic Cooperation and Development
MoNE	Ministry of National Education
TRT	Turkish Radio and Television Corporation



We welcome the support offered to the Covid-19 process by vocational high schools producing masks, sanitizing gels and overalls etc. throughout the process and thus, I would like to express my gratitude to the vocational high schools on behalf of me and my nation.

Recep Tayyip ERDOĞAN
President of the Republic of Turkey



Presentation

Education increases the level of income by improving the knowledge, skills and competences of individuals, thereby supporting economic development and plays the main role in ensuring social harmony and order. Vocational and technical education has the potential of enabling the development of the country in social and economic terms as it has a direct impact on the economy from an individual and community perspective. Vocational and technical education is a field of education that is subject to heated debate on a global scale due to its importance in the economic development of countries. Countries reconfigure, revise and transform vocational and technical education according to the current state and orientation of their economies.

On March 11, 2020, the World Health Organization declared COVID-19 a pandemic. To contain the spread of the virus, governments have taken a number of measures, including limiting public meetings, halting travel, delaying cultural and sports events, and closing schools. Countries are struggling with new situations caused by the ongoing COVID-19 outbreak around the world, with education administrators striving to meet students' educational needs through online platforms and distance learning solutions. Billions of students and millions of educators have been affected by the closure of schools and other restrictions introduced due to the pandemic. While vocational and technical education schools around the world have been generally suspended, vocational and technical education (VTE) has become more prominent in Turkey throughout the coronavirus pandemic. With its increased production capacity, VTE has become one of the main actors in meeting the needs of the community in these difficult days.

Within this period during which countries around the world are experiencing difficulties against the COVID-19 pandemic, vocational high schools continue to support the successful struggle of our country against the pandemic through their efforts. In availing myself of this opportunity, I would like to thank my colleagues, administrators, teachers, students, parents and everyone who has contributed to these studies.

ZİYA SELÇUK

Minister of National Education of the Republic of Turkey



1

Introduction

On January 7, 2020, the World Health Organization (WHO) announced that a respiratory disease emerging in Wuhan city of Hubei State in China towards the end of December 2019 was caused by a new type of coronavirus. The first death caused by the virus occurred in China from where the pandemic originated on January 11, 2020 and the first case outside China was diagnosed on January 13, 2020. With the spread of the disease to many countries, the WHO declared a “global emergency” on January 30, 2020. Initially named as 2019-nCoV, this new virus was named as SARS-CoV-2 on February 11, 2020 and the disease was named as COVID-19. Following the spread of the disease worldwide, the WHO declared the situation a global pandemic on March 11, 2020 (Turkish Academy of Sciences, 2020).

According to the WHO data, the total number of COV-ID-19 cases in the world was 41,332,899 and the number of deaths was 1,132,879 as of October 23, 2020 (World Health Organization (WHO), 2020a; WHO, 2020b). The breakdown of cases by region is given in Table 1.

TABLE 1

TOTAL NUMBER OF CASES BY REGION

Regions	Number Of Cases
America	19.174.454
Europe	8.576.945
Eastern Mediterranean	2.860.523
South East Asia	8.744.934
Western Pacific	698.991
Africa	1.276.311
Total	41.332.899

Source: <https://covid19.who.int/>

With the increasing number of cases, governments have taken a number of measures to prevent the spread of the pandemic and increase the capacity of the healthcare system. Non-therapeutic methods vary by country but can generally be listed as keeping social distance, closing borders, shutting down schools, and isolating symptomatic individuals and those in contact with them. It is critical whether these interventions fulfill the desired effect to contain the pandemic given their considerable socio-economic costs (Flaxman, Mishra and Gandy, 2020; World Economic Forum (WEF), 2020).

The COVID-19 outbreak is above all a public health issue and the mitigation of its impact largely depends on the

discovery of a vaccine or other drugs by scientists and pharmaceutical companies to prevent or treat COVID-19 infections. The best estimates for the development of a vaccine point to six months later, that is, September 2020. The pandemic is changing social, economic and political life. The restrictions caused by the social distancing rule severely affect businesses and jobs by reducing economic supply and demand. This impact is harder on the most vulnerable groups in countries with the weakest healthcare infrastructures (Fernando, Reimers and Schleicher, 2020a).

The COVID-19 outbreak is a public health crisis but, coupled with a global recession, it has the potential of changing politics and power in the entire world. According to some, the pandemic will change the world forever. For example, a new phase in globalization will begin where the state and nationalism will become stronger and supply chain production strategies will be altered. Potential economic threats and opportunities for the post-pandemic world are summarized in Table 2 (Açık-göz and Günay, 2020).

Governments are struggling with new situations caused by the ongoing COVID-19 outbreak around the world, with education administrators striving to meet students' educational needs through online platforms and distance learning solutions. Billions of students and millions of educators have been affected by the closure of schools and other restrictions introduced due to the pandemic (Özer, 2020). Many countries face a dilemma between closing public schools, private schools and universities in order to reduce contact and protect people's health and keeping businesses open to keep the jobs of people and prevent economic problems. The short term interruption in education is also felt by many families around the world (Burgess and Sievertsen, 2020).

The COVID-19 outbreak threatens the progress of education with two major shocks worldwide: (1) the closure of schools at all levels and (2) the economic stagnation caused by control measures. Without major efforts to contain their impacts, the shock of school closures would lead to loss of learning, increasing declines and higher inequality, and the economic shock would increase the damage by reducing demand and supply of education as it harms households. However, if countries act quickly to support continuous learning, they can reduce the damage and even transform recovery into new opportunities (World Bank, 2020).

As of the end of April 2020, schools in 180 countries were closed and 85% of students worldwide remained out of school. Impacts of school closures and global stagnation have the potential of causing long-term costs for

TABLE 2

POTENTIAL ECONOMIC THREATS AND OPPORTUNITIES FOR THE POST-PANDEMIC

Threats

- Long-term contraction
- Bankruptcies and higher unemployment rate
- Inadequate supply chain
- Fluctuations in oil prices
- A considerable drop in consumer spending and business investments
- Banking crisis
- Major public deficits
- Further travel restrictions
- Further customs restrictions
- Food inflation
- More failed countries
- Trade policies

Opportunities

- Greater workforce protection
- New working conditions
- New supply chain mechanisms
- More online shopping
- Further digitalization
- Emergence of new trade mechanisms
- Change in spending habits
- Greater hygiene and safety rather than more profit
- Helping each other
- Multilateralism
- Public awareness of a clean environment
- New and smart technologies
- Efficient and cost-effective meetings



education. The IMF forecasts that the global economy will shrink by 3 percent in 2020, which is a much bigger reduction when compared to the global financial crisis of 2008-09.

This shock will bear serious consequences for both governments and households and will also affect both education and education providers (World Bank, 2020).

The closure of schools has caused an unprecedented education crisis worldwide, including for VTE. VET providers have been forced to close their facilities and proceed with distance learning due to the pandemic. While practical training can be offered as distance training for general subject, theoretical learning and certain fields, the practical training solely dependent on the equipment available in training centers has been interrupted. Workplace closures have also disrupted all types of formal, non-formal and informal training within impacted firms (United Nations Educational, Scientific and Cultural Organization (UNESCO), 2020a).

But it is also possible to counteract these shocks and turn the crisis into an opportunity. The first step is to successfully deal with school closures by maintaining health and safety and doing all they can to prevent students' loss of learning by using distance learning. At the same time, countries need plan how to reopen schools. This means preventing school drop-out, ensuring healthy school conditions and using new techniques to support rapid learning improvement in key areas after pupils have returned to school. Mistakes of pre-COVID-19 systems should not be repeated but instead, countries should move toward the systems developed for all students and accelerated learning (World Bank, 2020).



2

Impact of the Covid-19 Pandemic on Education Systems

Education systems around the world are working to respond to the COVID-19 outbreak. The data shows that 180 countries across the world have closed all schools to stop the spread of the virus, with nearly 900 million people affected by it. In 11 countries, there are local school closures in certain cities and regions. This data changes on a daily basis (The Organisation for Economic Co-operation and Development (OECD), 2020a; UNESCO 2020b).

The COVID-19 pandemic has caused several challenges not only for public health but in many other areas of activity, including education. The need to control the spread of the pandemic has led many governments to implement measures limiting physical proximity. In most cases, this has restricted students and teachers from attending school as they normally would. Maintaining the continuity of education during the outbreak has been challenging all over the world. Educational outcomes are closely related to the duration of education and how these education periods are used. In almost all countries, there are regulations regarding the number of education hours that must be allocated in an academic year. These are often envisaged as the minimum hours of courses a school must offer. Matching sources with students' needs and making the best use of time are the main goals of a sound education policy. The first way to assess the impact of the outbreak on education is to estimate the amount of teaching time lost (OECD, 2020b).

Students of the participating countries within a study conducted by OECD spent 30 teaching days at home in average and stated, at the time of the survey, they were likely to stay out of school for 15 teaching days in addition. In total, students are expected to spend 40-45 teaching days at home. This corresponds to about two months of school work. Assuming an average of 799 compulsory teaching hours per year in primary education and 919 compulsory teaching hours per year at secondary level among OECD countries, it can be said that students have spent a significant portion of their expected learning time at home (OECD 2020b.). Table 3 presents the status of some countries opening and closing schools to education during the COVID-19 process. (<https://en.unesco.org/covid19/educationresponse>)

TABLE 3

OPENING AND CLOSING DATES FOR SCHOOLS BY COUNTRY

NAME OF THE COUNTRY	DATE OF CLOSING FOR SCHOOLS	DATE OF OPENING FOR SCHOOLS
USA	The Los Angeles and New England School District Administrations announced the decision to close schools on March 16, 2020 while other district administrations announced such decisions around this time.	It was announced that schools in the states of Virginia, Los Angeles, New York, D.C., Texas and Massachusetts would be closed for the remainder of the academic year. It was decided that schools in Maryland and Washington states would be closed until the 15th of May.
Germany	Schools were closed on March 16, 2020 in all states.	To be prepared for diploma exams as of 04 May 2020 starting from primary, secondary and high school seniors Classes were opened gradually. All schools were opened as of 10 August.
People's Republic of China	Education was suspended in all schools across the country as of February 21, 2020.	As of April 15, 2020, the schools were opened in districts. It has been reported that as of October 10, all schools will be opened.
France	Schools were closed across the entire country on March 16, 2020. Day-care department at nurseries and pre-schools for the children of healthcare professionals are open.	Preschool, primary and secondary education as of May 11, 2020 institutions gradually started face-to-face education. All schools have been opened as of 25 May 2020.
Italy	Schools were closed as of March 4, 2020.	As of September 14, all schools have been opened.
Finland	As of March 18, 2020, middle schools, high schools and universities were closed. Elementary schools are partially open. Home care is recommended for families although nurseries remain open.	As of August 13, all schools have been opened.
Canada	As of March 14, 2020, a holiday was announced for schools in districts.	As of 8 September 2020, the schools have been partially opened.
UK	Schools were closed across the entire country on March 16, 2020. Schools are kept open for the children of healthcare, security personnel etc.	Schools have been partially opened as of June 1, and fully opened as of September 1, 2020.
Spain	While schools were closed in districts as of the 11th of March, all schools were closed across the country as of March 16, 2020.	As of June 1, 2020, schools have been partially opened.
Korea	Postponing the opening of the 1st Semester by 5 weeks, the Ministry of Education initiated distance education as of April 9, 2020.	The schools have been partially opened as of May 25, 2020, and have been fully opened as of June 8, 2020.
Turkey	On March 12, 2020, schools were closed across the country.	The schools have been partially opened as of September 21, 2020.

Countries that have closed their schools are pursuing innovative technological solutions to deliver quality teaching and learning. For example, France has created the digital platform “Ma classe à la maison” (my classroom at home). Using a computer, tablet or mobile phone, students whose schools have been closed can access an individual account offering four-week courses the pedagogical content of which has been verified. Japan has a platform supporting the digital learning opportunities that private sector companies offer for free for students confined to their homes. Turkey has been expanding the capacity of its Education Information Network platform since the 2011-2012 academic year and continues to offer distance education without any interruption. Students can access this platform on mobile platforms, tablet and computer. In addition, various television channels of the platform are broadcasting at national level (Özer, 2020).

Public-private partnerships are growing in many countries, including working with national telecommunications providers to provide free access to broadband for educational purposes. In addition, major platforms such as Google and Microsoft are working to help expand their digital tool offerings for both education and business. As more schools are closed, special attention must be paid to the most vulnerable individuals, not only physically but also academically and psychologically. In the short term, the first solution is to use more of what is already available, rather than creating entirely new services. In the medium run, many innovations will continue to emerge as the interventions of the country improve. It is particularly inspiring to see entirely new forms of

practice that go beyond replacing physical schools with digital analogues (OECD, 2020b).

During this uncertain period, two issues gain importance. Firstly, schools in many countries will continue to remain closed, and numerous technological solutions will emerge that continue to deliver quality education. However, it must be remembered that school closures have profound effects not only on students, but also on entire communities. These include stress and anxiety, impacts on nutrition for students dependent on free breakfast or lunch programs, and reduced economic productivity as individuals are asked to isolate themselves. Secondly, all solutions should be designed in a way to prevent the deepening of educational and social inequality. As systems move massively to e-learning, digital separation in digital devices and skill levels gains more weight. For example, advantaged families are more likely to have parents with high levels of digital skills that can support the learning of children who cannot attend school. Students from less well-off families are less likely to have this support, which means they are at risk of being left behind. In the meantime, special attention must be paid to the most vulnerable individuals, not just physically but academically and psychologically (OECD, 2020c).

The OECD report by M. Reimers and Andreas Schleicher established a 25-item checklist to guide the development of an educational strategy that can be used by regional, national or local education authorities or the leaders of education networks during the pandemic (Fernando et al., 2020b).

Checklist for Education Measures Regarding the COVID-19 Outbreak

- Establish a task force or steering committee that will have responsibility to develop and implement the education response to the COVID-19 pandemic. To the extent possible ensure those in the task force represent different constituents in the education system or school network and bring important and diverse perspectives to the task force during their activities. For example, various departments, curriculum, teacher education, information technology, teacher representatives, parent representatives, students, representatives of industry when relevant.
- Develop a schedule and means of frequent and regular communication among task force members, during the period when social distancing will be in effect.
- Define the principles which will guide the strategy. For example: protecting the health of students and staff, ensuring academic learning and providing emotional support to students and faculty. These principles will provide focus for the initiatives to be undertaken and will help prioritize time and other limited resources.
- Establish mechanisms of coordination with public health authorities so that education actions are in synch and help advance public health goals and strategies. For example, educating students, parents, teachers and staff on the necessity for social distancing.
- Re-prioritize curriculum goals given the reality that the mechanisms of delivery are disruptive. Define what should be learned during the period of social distancing.
- Identify the feasibility of pursuing options to recover learning time once the social distancing period is over, for example, an intensive review period during the break prior to the start of the new academic year.
- Identify means of education delivery. When feasible, those should include online learning, as it provides the greatest versatility and opportunity for interaction. If not all students have devices and connectivity, look for ways to provide them to those students

- Explore partnerships with the private sector and the community in securing the resources to provide those devices and connectivity.
- Clearly define roles and expectations for teachers to effectively steer and support students' learning in the new situation, through direct instruction where possible or guidance for self-directed learning.
- Create a website to communicate with teachers, students and parents about curriculum goals, strategies and suggested activities and additional resources.
- If an online education strategy is not feasible, develop alternative means of delivery, they could include TV programs, if a partnership with television stations is feasible, podcasts, radio broadcasts, and learning packets either in digital form or on paper. Explore partnerships with community organizations and the private sector to deliver those.
- Ensure adequate support for the most vulnerable students and families during the implementation of the alternative education plan.
- Enhance the communication and collaboration among students to foster mutual learning and wellbeing.
- Create a mechanism of just in time professional development for teachers and for parents to be able to support learners in the new modality of instruction. Create modalities that foster teacher collaboration and professional communities and that increase teacher autonomy.
- Define appropriate mechanisms of student assessment during the exigency.
- Define appropriate mechanisms for promotion and graduation.
- As needed, revise regulatory framework in ways that make online education and other modalities feasible, and in ways that support teacher autonomy and collaboration. This includes providing school day credit for days taught in alternative education plans.
- Each school should develop a plan for continuity of operations. As a way to support them, education authorities can provide curated examples of plans in other schools.
- When the school provides meals to students, develop alternative means of distribution of food to students and their families.
- When the school provides other social services, such as mental health supports, develop alternative forms of provision.
- Schools should develop a system of communication with each student, and a form of checking-in daily with each student. Perhaps in the form of texts from teachers if parents have access to mobile phones.
- Schools should develop mechanisms of daily checking in with teachers and school staff.
- Schools should provide guidance to students and families about the safe use of screen time and online tools to preserve student well-being and mental health as well as provide protection from online threats to minors.
- Identify other school networks or systems and create forms of regular communications with them to share information about your needs and approaches to solve them, and to learn from them as a way to foster rapid improvement in delivering education in the new modalities.
- Ensure that school leaders get the financial, logistical and moral support they need to succeed.
- Develop a communications plan. Map key constituencies, and key messages to support the execution of the education strategy during the exigency, and ensure those are effectively communicated through various channels.



2.1. Impacts of the Covid-19 Outbreak on the Vocational Education System

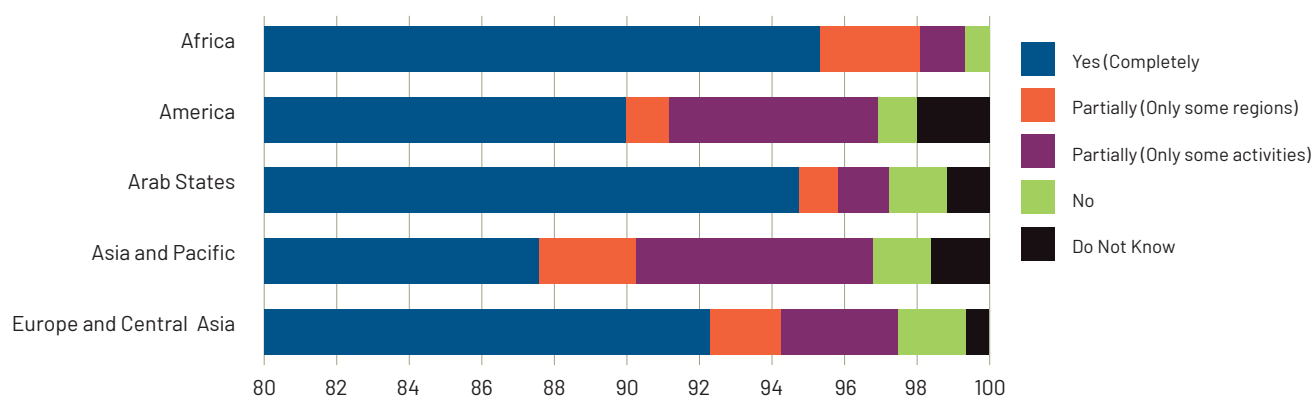


Education provides economic growth through increasing income in the national economy, more equitable distribution of income and accelerating the economic development of society. Vocational and Technical Education has the potential of enabling the development of the country socially and economically due to its direct impact on the economy individually and socially (Ministry of National Education (MoNE), 2018; Bozgeyikli, 2019). Vocational and technical education is a field of education that is subject to heated debate on a global scale due to its importance in the economic development of countries. Countries reconfigure, revise and transform vocational and technical education according to the current state and orientation of their economies (Özer, 2018).

According to the preliminary results of a recent joint study by ILO – UNESCO – World Bank, the Covid-19 crisis has caused major interruptions as schools, universities and vocational education institutions have been closed and work based learning such as apprenticeship and internship has been disrupted. Prior to the outbreak, approximately 496 million young people were attending high schools, post-high school non-higher education institutions and higher education institutions. Most of them are currently experiencing significant disruption. About 98 percent of respondents in all regions within the said survey stated that vocational education schools and training centers were closed completely or partially, exams and other assessments were cancelled or postponed (International Labour Organization (ILO), 2020; ILO, 2020b).

CHART 1

Has your country shut down vocational education schools and training centers as a precaution against the COVID-19 outbreak? (percentage of respondents)



Source: ILO-UNESCO-World Bank Joint Survey on the Provision of TVET During the COVID-19 Crisis.

Crisis caused by the global Covid-19 pandemic has resulted in sudden and unprecedented pressures on governments and industries around the world and continues to affect nearly all sectors. However, VTE systems are uniquely affected by how they provide VTE services in the context of existing social distancing and travel constraints, but also by how they are forced to predict and adapt. Ongoing bans in many countries have interrupted learning both at workplaces and in the classroom and have been disruptive particularly for work based learning, including systems used to assess apprenticeship training and skills and grant qualifications as a re-

sult. This poses serious challenges for VTE teachers, instructors and students in the short term while a stronger and more flexible VTE system can be established at the end of the pandemic if right choices are made today. In particular, if the measures are in place for a long time, the complete closure of education and training institutions may force learning providers to adopt systematic and technological innovations that would improve the use of remote learning and distance or alternative assessments (OECD, 2020d; World Bank 2019; McKinsey & Company, 2020).

Apart from very few exceptions, schools around the world are closed, which affects nearly 1.6 billion students (over 90% of total number of students enrolled) from preschool education to higher education (UNESCO, 2020c). Throughout the crisis, many countries have quickly created or adapted digital platforms to replace school-based learning. However, work based learning programmes, including apprenticeship training, are often much more difficult to remotely deliver and assess. In the context of bans, social distancing and travel restrictions, the main challenge for existing VTE students, including apprentices, is that they must be trained in classrooms, school workshops or workplaces. In some professional fields, theory can be taught and learned online, but practical aspects cannot be effectively covered due to the lack of access to tools, materials, equipment and machinery. This causes significant disruption in vocational and technical education (OECD, 2020d).

A forecast of economic stagnation spreading across the world and the fact that it has already begun in some countries are causing certain difficulties in sectors such as hospitality, tourism, aviation and entertainment ser-

vices, where demand has reached historical lows. In the world, due to the uncertainty over whether the formal VTE programme can be effectively implemented and students' access to work based learning, a reduction is expected in VTE enrolments (and, accordingly, apprenticeships) for the next school year. VTE systems need an urgent support package to strengthen their capacity to respond to these current challenges as well as to effectively adapt and respond to both expected and unforeseen changes in labour market requirements (OECD, 2020d).

Many countries support VTE providers for the use of distance learning tools wherever possible to ensure the continuity of learning, and provide online courses free of charge. Although distance education cannot completely replace face-to-face education in VTE, it may help to keep students busy and make progress in their studies. Countries are investing in VTE skills to reduce future skills shortages and minimize the shock of the crisis. The measures taken by the countries are given in Table 4.

TABLE 4

MEASURES TAKEN BY VARIOUS COUNTRIES TOWARDS VTE DURING THE

COUNTRY	Measure
France	It offers online VTE courses over a three-month period, including the core curriculum of vocational schools and the main training courses for vocational qualifications.
South Korea	In addition to the 300 courses already available, it has provided a virtual training platform - Smart Training Platform (STEP) - that allows learning providers to upload course content. This is supported by subsidies and quality assurance mechanisms. It allows for the extension of period or a flexible training period.
Netherlands	It has organized face-to-face VTE in small groups for students who do not have sufficient digital resources. Furthermore, VTE students at the secondary level can be admitted to higher VTE programs even if they cannot succeed in one or two courses or complete workplace training due to the crisis.
United Kingdom	It provides a dedicated COVID-19 online education resource that is freely accessible to all.
Spain	By expanding the job placement calendar, shortening the workplace training component, or integrating the component in other ways, it has offered flexibility regarding the workplace training component of VTE programs.
Australia	As a part of its economic response to COVID-19, it supports small enterprises for keeping their apprentices and interns by way of granting a new salary subsidy (50% of their salaries for up to 9 months from January to September 2020).
Sweden	Through the crisis package for employment and transition, it has set out plans to provide additional support for vocational education and training, including distance education providers at higher VTE.
USA	Youth Apprenticeship Readiness grants (\$ 42.5 million), which were planned before the crisis but announced in April 2020, have been introduced.
Turkey	Majority of the students of the vocational training centers offering work based vocational training in Turkey continued to have their skills training in their respective enterprises. Students receiving vocational training have been offered academic and vocational training on EBA and TRT channels and face-to-face training started as of October 5, 2020.

The biggest concern of the countries today is, for good reason, to find how to overcome the crisis. However, the decisions made today may have long-term consequences, so policy-makers should also ask themselves how VTE systems can be improved through these decisions,

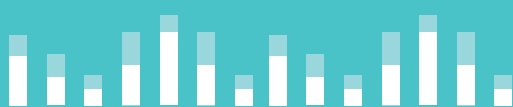
and should ultimately come out of the crisis stronger, more sensitive and more resilient than ever. If they have the capacity to do so, countries should take the opportunity to review their VTE systems and follow up on how they respond to the current situation.



In this context, countries and VTE systems must:

- Establish relations with both local and national employers and stakeholders by considering that each sector is affected by the pandemic in a different way.
- Start planning changes in the labour market, which may be accelerated due to the crisis, especially including digitalization. Vocational education and training systems will focus more on the professions requiring a higher level of autonomy, planning, team work, communication and customer services given that the professions encompassing routine tasks of acquiring skills that are more resilient to automation due to increasing levels of automation are transformed, restructured or completely lost.
- Financial assistance should be offered to vocational education and training systems and students to enable them to receive training in future-oriented sectors and professions that are critical for long-term economic recovery.
- Digital, distance offerings must be in use by discovering options for innovative, digital pedagogic approaches such as simulators, augmented/virtual reality or artificial intelligence. Vocational education and training systems should benefit from increased funding that may be available in their own country in order to build infrastructure that can be used in the long term.

- Policies and regulations aimed at granting micro-identity certificates and digital badges must be examined to reward the progress made through the distance offering of vocational education and training with qualifications in a timely and effective manner.
- It must be ensured that VTE programmes offer opportunities to learn skills such as digital, basic and socio-emotional skills. Such transferable, basic skills can help economies recover faster by helping workers make an easier transition to other sectors or jobs in the wake of a crisis. Time of staying at home is an important opportunity to expand the offerings of such skills, which can be easily taught and learned to a certain degree.
- Particular attention should be paid to vulnerable groups, including at-risk youth, laid-off workers, immigrants and those without any internet access. These groups frequently served by the VTE system are particularly vulnerable to crises. While many workers and groups are at risk of falling behind as the labour market improves, close attention should be paid to inclusion and equality in all areas of the VTE system.
- A special focus must be placed on efforts of VTE teachers and instructors to keep and develop a qualified workforce. VTE teachers may also need high-quality digital skills. This crisis may provide an opportunity for the development of these skills in the workforce if the measures specified above are taken.



3

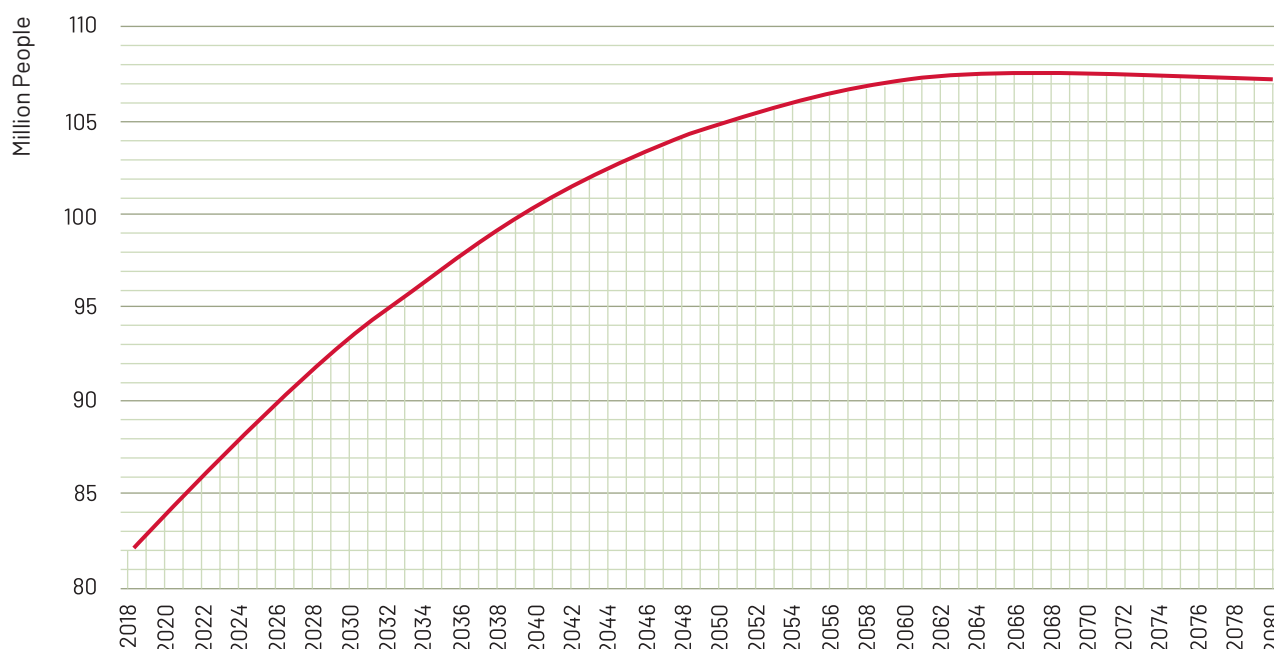
Country Information

3.1. Demographics and Employment

The area of Turkey is 785,347 km². Turkey is administratively divided into 81 provinces and geographically into 7 regions. According to the results of the address-based population registration system, the population of Turkey is 83,154,997 people as of December 31, 2019. According to the population projection published by the Turkish Statistical Institute (TurkStat), the population of Turkey is projected to be approximately 87 million people in 2023, 100 million in 2040 and be on the rise until 2069 (Chart 2). Proportion of the population in the 15-64 age group defined as working age in 2019 was 67.8% while the proportion of the population in the 0-14 age group defined as child age group was 23.1% and the proportion of the population aged 65 and above was 9.1% (Turkish Statistical Institute (TurkStat) 2020).

CHART 2

POPULATION PROJECTION



Source: TurkStat, Population Projections, 2018-2080

In terms of vocational and technical education, the population projection by age groups constitutes remarkable data. Population change in this group is important, especially because the population between 15-64 years defined as working age population is the target group of both formal and non-formal vocational and technical education. In this context, according to TurkStat's population projections, the population of the 15-64 age group, including the population at secondary education and higher education age level and employees, will increase until 2060, but its share in the total population will de-

crease (Table 5). Boasting with a demographic window of opportunity according to its population projections, Turkey will continue to have a young population in the long run by considering its projected population changes. Due to the presence of this young population, it can be suggested that formal and non-formal vocational and technical education will continue to be important in the long term.

TABLE 5

POPULATION PROJECTION BY AGE GROUPS

Age Group	Population					Rate (%)				
	2018	2023	2040	2060	2080	2018	2023	2040	2060	2080
Total	81.867.223	86.907.367	100.331.233	107.095.998	107.100.904	100,0	100,0	100,0	100,0	100,0
0-14	19.203.792	19.601.384	19.333.893	18.126.086	16.813.783	23,5	22,6	19,3	16,9	15,7
15-64	55.500.077	58.438.033	64.623.369	64.727.126	62.873.761	67,8	67,2	64,4	60,4	58,7
65 +	7.163.354	8.867.951	16.373.971	24.242.787	27.413.359	8,7	10,2	16,3	22,6	25,6

Source: TurkStat, Population Projections, 2018-2080

TABLE 6

LABOR FORCE DATA BY EDUCATION LEVEL

Education Level	Labor Force Participation Rate	Rate of Employment
Illiterate	14,5	12,6
Those with a degree below high school	44,7	38,5
High School	50,8	42,5
Vocational or technical high school	62,4	53,1
Higher education	76,3	67,3

Source: TurkStat, Labor Force Statistics, February 2020.

In February 2020, the number of unemployed people among those aged 15 and above in Turkey stood at 13.6% year-on-year. The number of employed persons was 43.1% in February 2020 year-on-year (TurkStat, 2020).

An analysis of labor force statistics published by the Turkish Statistical Institute (TurkStat) (Table 6) shows that those receiving vocational and technical education at

secondary education level prove to be advantageous in terms of labor force participation and employment. In addition, although the labor force participation rate of vocational and technical secondary school graduates is higher, unemployment rates are lower than those in other education levels. When labor force statistics are examined retrospectively, it is observed that this situation follows a similar course.

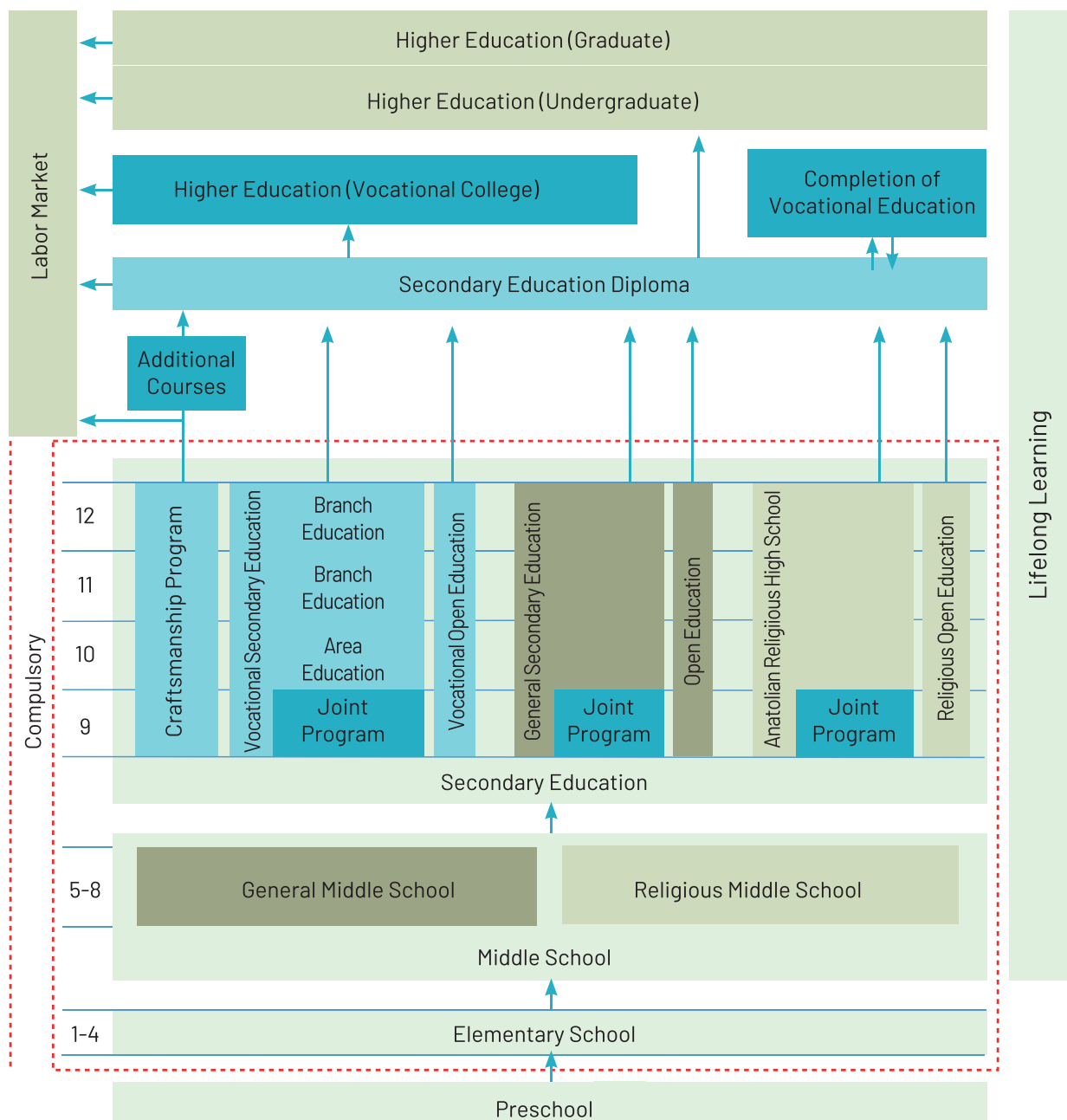
3.2. Turkish Education System

Starting from the 2011-2012 academic year, the compulsory education period in Turkey was raised to 12 years in a way to cover the secondary education level and it now covers the primary (elementary and middle school) and secondary education levels. The first tier is arranged as

four-year elementary school (1, 2, 3 and 4th grades), the second tier as four-year middle school (5, 6, 7 and 8th grades) and the third tier as four-year secondary school (9, 10, 11 and 12th grades)(Figure 1)

FIGURE 1

TURKISH EDUCATION SYSTEM



Students who complete the first tier attend middle schools or religious vocational middle schools. According to the practice introduced starting from the 2018-2019 academic year, students who complete middle school will be placed in the secondary education institutions preferred thereby based on the address-based registration system. Graduates from the secondary ed-

ucation schools can be a part of labor force and attend higher education programs depending on the results of the Higher Education Institutions Entrance Exam (YKS). Graduates of vocational and technical secondary schools receive additional points if they choose a program within their field for transfer to vocational higher education schools.

3.3. Vocational and Technical Secondary

VTE aims to train innovative, entrepreneurial, productive and competent workforce with national and international professional qualifications, professional ethics and professional values in cooperation with social and economic sectors. Vocational and technical secondary education is offered through public and private schools. The period of formal vocational and technical education is 4 years. Vocational open education high schools have

been established for meeting the needs of vocational education for the individuals who have left formal education or would like to acquire an alternative profession following the compulsory education age. Vocational and technical secondary education consists of vocational and technical Anatolian high schools, multi-program high schools and vocational training centers implementing various programs (Figure 2).

FIGURE 2

TYPES OF VOCATIONAL AND TECHNICAL SECONDARY SCHOOLS

Vocational and Technical Anatolian High School	Multi-Program Anatolian High School	Vocational Training Centers
Anatolian Vocational Program	Anatolian Vocational Program	Craftsmanship Program
Anatolian Technical Program	Anatolian Technical Program	
Craftsmanship Program	Craftsmanship Program	
	Anatolian High School Program	
	Anatolian Religious Vocational High School	

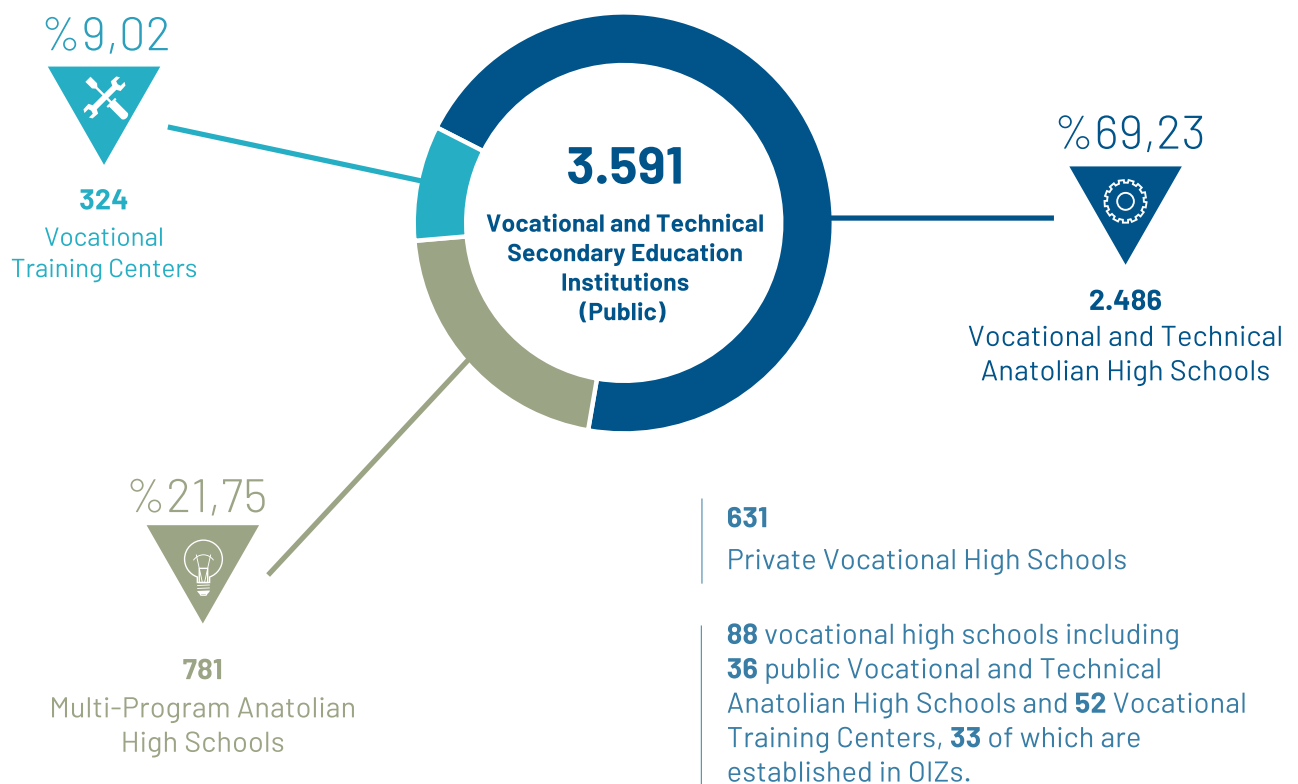


3.3.1. Statistics of Vocational and Technical Secondary Education

Total number of vocational and technical secondary education institutions in Turkey is 3,591. Out of such institutions, 2,486 (69.23%) are vocational and technical Anatolian high schools, 781 (21.75%) are multi-program Anatolian high schools and 324 (9.02%) are vocational training centers. (Figure 3) As of the 2019-2020 academic year, there are 1,421,704 students involved in formal education within vocational and technical secondary education institutions affiliated to DGVET. Out of 866,428 boys (60.94%) - 555,276 girls (39.06%), 1,114,621 of the students study in Vocational and Technical Anatolian High Schools, 127,963 in vocational training centers and 179,120 in Multi-Program Anatolian High Schools.

FIGURE 3

NUMBERS OF VOCATIONAL AND TECHNICAL SECONDARY SCHOOLS



Education in **55 areas** and **203 branches**

Share of VTE
in secondary education **%34**



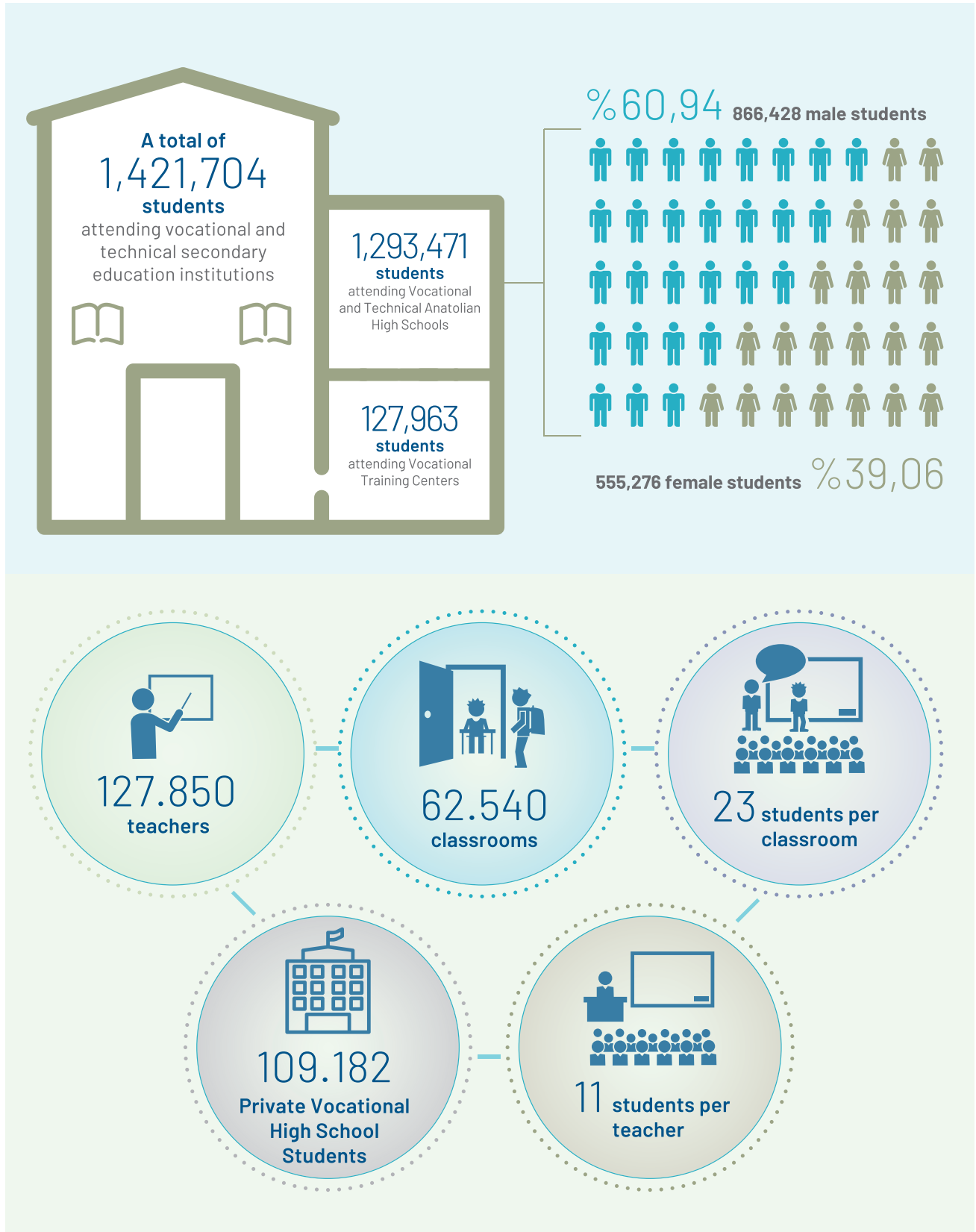
2020 Budget
(Investment, Equipment
and Current)

TRY 15.9 Billion

FIGURE 4

VOCATIONAL AND TECHNICAL SECONDARY EDUCATION IN FIGURES

IN 2019-2020 ACADEMIC YEAR



3.3.2. Number of Students, Teachers and Schools by Years

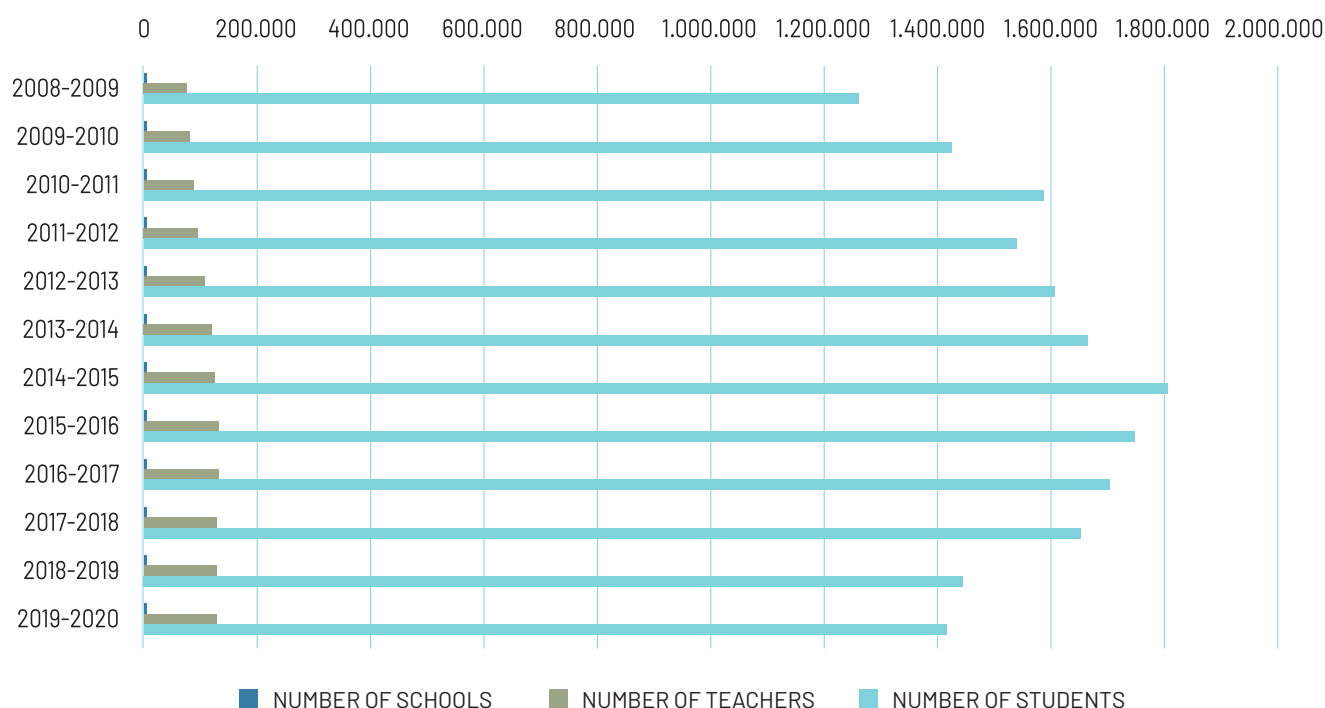
The number of students and graduates in vocational and technical secondary education institutions are important indicators of the demand for this field. The number of teachers and schools/institutions provides information regarding efficiency within vocational and technical education and the steps taken for improving the quality of education. Change in the numbers of students, teachers and schools in vocational and technical secondary education over the years is shown in Chart 3. As shown in Chart 3, there were upward and downward changes within the ten-year period from the 2008-2009 school year to the 2018-2019 school year in terms of the number of students. Despite the increase observed between 2008-2009 and 2014-2015, the number of students started to decrease from 2014-2015 and declined to the lowest level of the last five years in 2018-2019.

A continuous rise in the number of teachers in the ten-year period is considered as an important factor that improves the quality of education in vocational and technical education institutions. Chart 3 shows that the proportion of students per teacher was around 17 in vocational and technical secondary education schools during the 2008-2009 school year while this rate decreased to approximately 11. Therefore, teacher-student interaction has increased vocational and technical secondary education institutions over the years and students have been offered more qualified education.

Through Chart 3, the change in the number of schools over the years can be grouped as before and after 2014-2015. Increase in the number of schools started in 2008-2009 and reached its highest level in 2013-2014, but the structure and types of schools were changed by the regulation introduced in this year.

CHART 3

NUMBER OF SCHOOLS, TEACHERS AND STUDENTS BY YEARS



Source: MoNE data

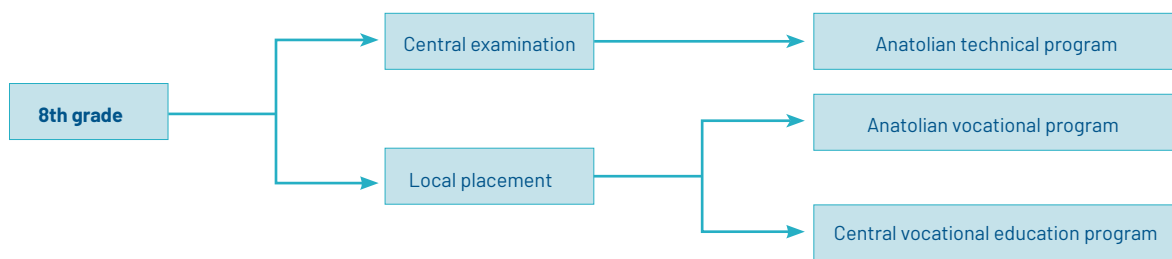
3.3.3. School enrollment, area and branch selection

Students who complete the middle school tier may choose vocational and technical secondary education institutions located in the education zones where they reside according to the education zone and exam-free local placement system. Students placed under the local placement system attend "Anatolian vocational pro-

gram" or the "craftsmanship program" implemented at vocational training centers. Students who want to be placed in "Anatolian technical programs" may be placed in these programs depending on the results of central examination. All vocational and technical secondary education programs can be simultaneously opened at a vocational and technical Anatolian high school. In multi-program high schools, both general secondary education and vocational secondary education programs are implemented.

FIGURE 5

CONDITIONS OF PLACEMENT IN VOCATIONAL AND TECHNICAL SECONDARY EDUCATION PROGRAMS

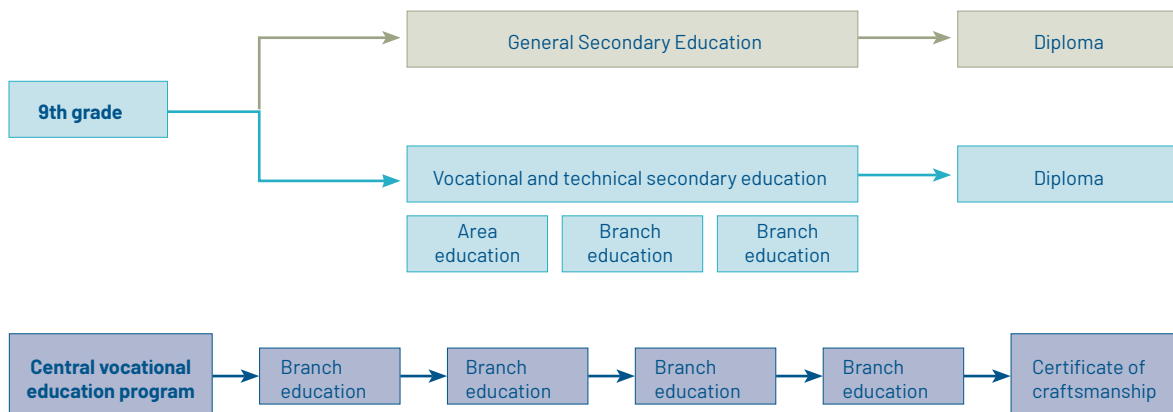


Vocational and technical secondary education programs and general secondary education programs other than the craftsmanship program are common at the 9th grade. Students that will attend Anatolian vocational programs at the 10th grade choose their respective area at the end of the 9th grade. Students that will attend Anatolian technical programs at the 10th grade start studying in the area in which they are placed according

to the results of the central examination taken thereby at the end of the 8th grade. 11 and 12th graders continue to study in the branch preferred thereby within the area they are studying. According to the new program gradually introduced starting from the 2020-2021 academic year, students will transfer to areas at the 9th grade while they will start studying in their respective branch under the area chosen thereby at the 10th grade.

FIGURE 6

AREA AND BRANCH EDUCATION



3.3.4. Skills training and internship in enterprises

Skills training or internship is put into practice in enterprises so as to ensure that students acquire and improve the professional knowledge, skills, attitudes and behaviors foreseen to be acquired through education programs, get to know the sector, adapt to the business life and get trained in actual production and service environment. Anatolian vocational program and craftsmanship program students are involved in skills training in enterprises while Anatolian technical program students serve their internship. Skills training in enterprises is offered during 4 years of education under the craftsmanship program while it is offered at the 12th grade for Anatolian vocational programs.

3.3.5. Education programs and graduation certificates

Education is offered in 55 areas and 203 branches in Anatolian vocational and technical programs. Education is offered in 27 areas and 142 branches in craftsmanship programs.

Competence-based modular education programs have been introduced in vocational and technical secondary education since the 2005-2006 academic year. Education programs regarding the areas and branches implemented in vocational and technical education schools and institutions are drawn up and updated by sector, university and area experts by considering national occupational standards and national qualifications. Vocational and technical education programs have been developed to provide a broad perspective and branch specialization by taking into account international classifications such as ISCED and FOET with the aim of ensuring national and international comparability.

3.3.6. Rights, Certificates And Titles Granted To Graduates

All vocational and technical education graduates are granted the title of technician. Additional points are awarded to

the graduates who would like to study in their respective fields depending on the results of the examination for transition from vocational and technical secondary education to vocational colleges. For higher education programs for which additional points are awarded upon graduation depending on the vocational areas studied, please visit <https://yokatlas.yok.gov.tr/>.

Within the scope of the protocol concluded with KOSGEB (Small and Medium Enterprises Development Organization), the graduates of vocational education opening their own workplaces are offered by KOSGEB a grant of TRY 50,000 and an interest-free loan of TRY 100,000.

Certificates And Titles Granted To Graduates

- Diploma in area and branch (MTAL))
- Certificate of craftsmanship and journeyman (MEMP)
- Title of technician
- Business license
- EUROPASS certificate
- A document indicating the modules, courses and credits taken and achieved

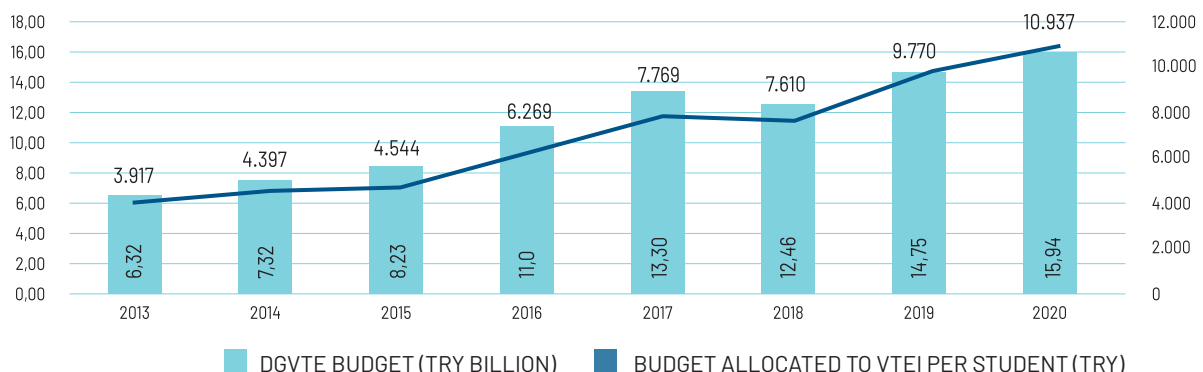
Certificate of qualified instructor: A certificate of qualified instructor is granted to those holding a certificate of craftsmanship or a business license and successfully completing the business pedagogy courses organized in Vocational Training Centers.

3.3.7. VTE Budget

Chart 4 shows the change in the total budget allocated to vocational and technical education institutions (VTEI) and the budget per student between 2013-2018. As shown in Chart 4, the total budget allocated to vocational and technical education was approximately TRY 6.32 billion in 2013 and reached TRY 15.9 billion in 2020. Budget per student for VTEI rose from TRY 3,916 in 2013 to TRY 10,707 in 2020. A rise by more than nearly two folds within six years regarding both the total budget and budget per student is of importance for improving the quality of vocational and technical education and emphasizing its significance.

CHART 4

VTE BUDGET BY YEARS





4

Studies Conducted in Vocational Secondary Education Prior to the COVID-19 Pandemic

The most important problem for vocational and technical education is the society's perspective on vocational education. Especially in recent years, vocational education has begun to be increasingly perceived as a type of education where students with low academic success study. This situation moves successful students away from vocational education. Another important problem is the insufficient involvement of the sector in vocational education processes. This situation brings to a halt the relationship between vocational education and employment, which constitute a continuation of each other, and there is a disconnection between the processes. Employment of vocational education graduates outside their areas is an important problem. Vocational and technical education is more expensive than other types of education due to its nature. However, a significant proportion of graduates in vocational education are employed outside their areas. This leads to inefficient use of public resources (Özer and Suna, 2019; MoNE, 2018b; MoNE, 2018c).

The creation of a system harmonized with 2023 goals is planned with the aims of changing the existing public perception of vocational and technical education; identifying the vocational interests and talents of students and guiding children and parents in this direction; reducing academic course intensity and updating the content of vocational courses; increasing on-the-job training opportunities for teachers; bringing the infrastructure and equipment of schools in line with the rapidly evolving and developing technologies through the use of national and international sectoral and public financial resources; prioritizing new graduates in employment and applying different wage policies for them; engaging industries more actively in vocational and technical education processes; enhancing the possibilities for cooperation with industry leaders; implementing projects that qualify as sectoral cooperation protocols and good practices at national and international levels; and granting graduates the opportunity of transition into higher education in their respective fields as part of an integrated structure.

Seven main goals are identified within the framework of the new roadmap developed based on the 2023 Education Vision. These goals are:

1. Increasing the value attributed to vocational and technical education
2. Increasing access to guidance and counseling in vocational and technical education

3. Developing new-generation curricula

4. Developing learning environments and human resources

5. Training vocational staff needed by businesspersons investing abroad

6. Strengthening the link between the education, employment and production in vocational education

7. Training qualified human resources needed by our local and national defense industry.

4.1. Activities performed under the vision document

ITU Vocational and Technical Anatolian High School Opened

Istanbul Technical University Vocational and Technical Anatolian High School (MTAL) was opened under the protocol of cooperation concluded with Istanbul Technical University. Foreign language-oriented education materials will be prepared at ITU MTAL, foreign language courses will be organized by or under the coordination of ITU School of Foreign Languages and in-service training will be offered to teachers. Being operational in 2019 education year, the school admitted students from the percentile of 1.26% for information technologies, from 2.47% for electric-electronic technologies and 5.52% for maritime area.



ASELSAN Vocational and Technical Anatolian High School Opened

ASELSAN Vocational and Technical Anatolian High School, which is the primary school for defense industry systems within Turkey's secondary education system, was established under the cooperation protocol signed with ASELSAN in order to contribute to the training of qualified labor force needed by the defense industry. The highest percentile of students placed into ASELSAN Vocational and Technical Anatolian High School, which became operational in the 2019-2020 education year, based on the points of central examination is 0.46%.

Vocational and Technical Anatolian High School of Traditional Turkish Arts Established

The Vocational and Technical Anatolian High School of Traditional Turkish Arts, which will offer education in this field, was established in Istanbul under the "Cooperation Protocol to Transfer Traditional Turkish Arts to Future Generations and to Keep Them Alive" signed with the Ministry of Culture and Tourism. The arts "Islamic Calligraphy", "Illuminated Manuscript", "Miniature", "Ceramic Glaze", "Paper Marbling", "Painting Decoration", "Paper Philigree" and "Bookbinding" are included in the education program so as to ensure that such traditional Turkish arts are kept alive and transferred to future generations.

Protocol of cooperation with TOBB (The Union of Chambers and Commodity Exchanges of Turkey) and TOBB University of Economics & Technology: "81 Vocational and Technical Anatolian High Schools in 81 provinces"

The protocol signed in February 2019 aims to establish workshops/laboratories in 81 vocational and technical

education institutions to be identified in 81 provinces and draw up education content, improve the social skills of the human resources needed by the sector such as the qualifications concerning language and occupational areas and critical/design-oriented thinking, enable students to serve their internship and skills training in actual production environments, grant scholarships to successful students and offer on-the-job training to teachers in cooperation with TOBB and TOBB ETU.

Protocol of Cooperation in Vocational Education with the Ministry of Culture and Tourism

The protocol concluded with the Ministry of Culture and Tourism aims to introduce a new and powerful system for meeting the needs of the tourism sector with qualified personnel capable of speaking a foreign language, holding high-level knowledge and skills in their respective fields and working in a customer-oriented fashion for the purposes of generating solutions for the qualified human resources problem experienced in the tourism sector. Depending on this protocol, it will be ensured that students will be able to receive skills training in actual production environments within the sector under the subprotocols signed with the leading hotels of our country, graduate by speaking at least two foreign languages, receive scholarships while studying, be employed upon graduation and our teachers will be able to improve their qualifications. The said protocol aims to reach a total of 200 schools including 39 schools in 2020, 50 schools in 2021, 50 schools in 2022 and 50 schools in 2023.

Vocational and Technical Education-Technopark Cooperation Network

The Cooperation Protocol on Improving Vocational and Technical Education with R&D Centers signed with





Istanbul University and Istanbul Technopark aims to strengthen R&D studies in vocational and technical education. Under the protocol, skills training and internship of vocational and technical education students will be offered in actual production environments in cooperation with the firms engaged in many fields such as informatics, electronics, software, biomedicine, biotechnology, machinery, energy, defense and automotive.

Vocational Education-Sector Cooperation is Expanding to Cover All Areas

178 cooperation protocols are in place with 205 institutions and organizations so as to strengthen the cooperation between vocational and technical education and sectors, improve the quality, strengthen the education infrastructure, increase opportunities for students regarding skills training and internship in enterprises, facilitate the employment of graduates, improve the knowledge and skills of employees in the relevant sectors and offer scholarships to students.

Vocational Training Centers Are Being Rendered Advantageous

The regulation introduced concerning vocational training centers provides that students can be awarded with a vocational high school diploma by completing their missing courses in open high schools and through face-to-face training in vocational training centers and make use of all the advantages offered to the graduates of vocational high schools.

Besides, within the scope of recognition of prior learning, the journeymanship and craftsmanship examinations organized for the certification of the occupational achievements previously acquired by individuals through formal or informal learning are now organized as e-examination in order for applicants to certify their occupational qualifications so as to use public resources

in an economic and efficient manner and to save time. In this way, the number of exams held throughout the year has been increased and those who want to certify their achievements have had easier access to these exams.

The Project “Students of Vocational High Schools Are Meeting Our Families” launched.

The project aims to offer information or support facilitating the lives of families and any pecuniary or non-pecuniary help making them delighted and happy as a community service by local means within a certain plan and project. Under the project, vocational and technical education students along with their teachers perform minor maintenance and repair work for the houses of poor persons or persons in need in the locality of their respective schools and repair their goods which are unusable or old in their houses or make small repairs requiring the replacement of some equipment. Up to now, 13,217 teachers and 39,197 students have performed minor repair, maintenance and repair work in the houses of 53,886 persons in need in the neighborhood/region where the school is located and have carried out information activities that facilitate their lives within this project.

My Profession, My Life Portal Is Open Now

Developed under the 2023 Education Vision of our ministry, “My Profession, My Life” (<https://meslegimhayatim.meb.gov.tr/>) portal is an important part of the activities carried out so as to contribute to the training of qualified labor force in the fields required by the business world, to improve the quality of vocational education and to ensure the execution of the link between education, employment and production on a sound basis. Acting as a guide for students, the portal ensures that many stakeholders such as students, teachers, parents, employers, job seekers and related institutions have the opportunity to meet on a common platform. enterprises and to facilitate the employment thereof in this respect.



In this way, revolving fund activities in our schools have been increased and our students have improved their professional skills in a production environment. Income from production in vocational and technical secondary education Institutions under revolving funds increased by 40% in 2019.

In addition, a product catalogue has been created for vocational and technical education institutions (<http://mtdose.meb.gov.tr>) so as to promote the products and services created in revolving-fund enterprises, offer access to those in need of such products and services and enable students to have opportunities for practicing more and improving their occupational skills.

The New Theme of Vocational Education Announced as Patent, Utility Model and Design.

Awareness of patent, utility model and design is raised in vocational and technical education so as to strengthen the relation between education, employment and production and the initiatives of all vocational and technical secondary education institutions in these areas are supported.

Theme of the 2019-2020 academic year for vocational and technical education has been identified as “the year of patent, utility model, trademark and design” so as to transform the technical knowledge created in vocational and technical education institutions into patents and contribute to the economic and technological development of our country and the relevant activities are going on. A total of 29 applications regarding industrial property rights were filed from our schools between 2009 and 2019 (in 10 years). The process was initiated with the conclusion of the “Education Cooperation Protocol” between our ministry and the Turkish Patent and Trade-mark Office.

The current data collected for Turkey as a result of the intensive activities carried out by our Directorate General are given in Table 7

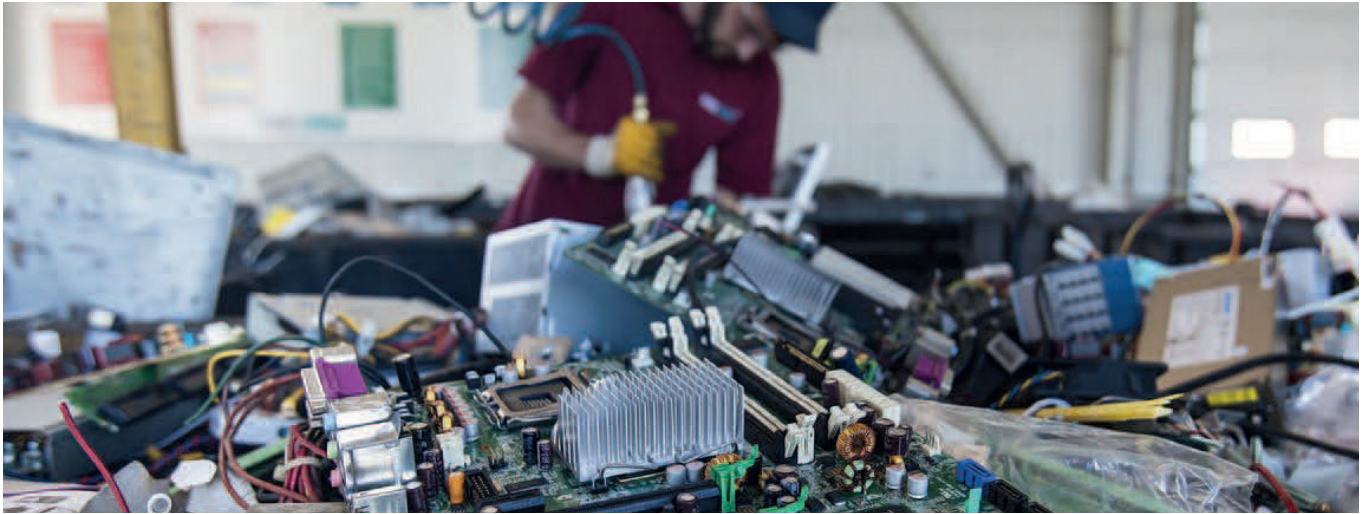
A Regulation Issued for the Opening of Private Vocational Training Centers

The regulation issued for enabling the private sector to train the qualified workforce required thereby allows for the opening of private vocational training centers. Thus, the leading representatives of the sector in particular including organized industrial zones can now train the qualified workforce required thereby through the vocational training centers to be opened thereby.

TABLE 7

MONITORING DATA FOR INDUSTRIAL PROPERTY RIGHTS

	Application Filed	Ongoing	Registered	Grand Total
Patent	106	11	103	220
Utility Model	194	8	268	470
Design	118	1	97	216
Trademark	87	10	7	104
Grand Total	505	30	475	1.010



Quality Assurance System Introduced in Vocational and Technical Education Institutions

The Directive of Quality Assurance for Vocational and Technical Education Institutions develops standards for all components from corporate management to human resources management, education-training process and cooperation with stakeholders and offers quality assurance for our education institutions. In this context, the vocational and technical Anatolian high schools affiliated to our Directorate General will conduct annual self-assessment and be subject to external evaluation at least once in every five years.

Studies Are Going On for the Use of “e-Content” in the Training of Areas and Branches Concerning Vocational and Technical Education.

E-contents are prepared for the achievements within the education programs of vocational and technical education areas and branches. In this respect, e-content type has been identified for 1,060 achievements identified regarding the 10th grade modules of 15 areas and 779 scenarios have been created for such achievements. Following the completion of “e-content” activities for 55 occupational areas, they will be presented on EBA platform for the use of all teachers and students.

On-The-Job Training Organized For Teachers’ Professional Development With the Sector

In-service trainings are organized in actual working environment in cooperation with the sector in order to improve the professional knowledge and skills of our teachers working in vocational and technical education institutions. Our of the area and laboratory teachers working in vocational and technical education institutions, the number of those receiving on-the-job and pro-

fessional development training rose from 2,290 in 2018 to 18,000 in 2019 by increasing at around 700%.

Interest in Vocational and Technical Education on the Rise

As a result of recent successful efforts to change the negative perception of vocational and technical education in the community, 78.79% of the students placed in vocational and technical Anatolian high schools based on the local placement results under the 2019 High School Transition System were placed in one of their top three preferences. 97.60% of the quotas of vocational and technical Anatolian high schools admitting students via central placement has been reached.

Transition of the Graduates of Vocational and Technical Education to Employment Monitored.

A “MoNE-TurkStat Working Group” composed of representatives from the relevant departments of our ministry and TurkStat has been created to supply the data to be required for developing data-based policies in vocational and technical education in cooperation with TurkStat for the purposes of monitoring and evaluating the employment status of the graduates of vocational and technical secondary education institutions in labor force market and their transition to higher education.

Curriculum is Being Updated

Programs in vocational and technical education have been revised to allow students to adapt more quickly to potential future changes in business life by offering to students broader skills rather than providing specific knowledge relevant to a profession. A number of important new practices have been introduced in this regard.

The most important work completed is the simplification of areas and branches. 55 areas and 203 branches for which education is currently offered have been simplified and turned into 47 areas and 109 branches. Throughout this study, some areas and branches have been closed and some have been combined while some other areas and branches have been transferred to vocational education programs by considering the characteristics of these areas and branches.

Another important aspect changed while updating the program is relevant to the courses taught. Students will start receiving occupational courses from the 9th grade under the new program. However, students will continue to take common courses with other types of schools.

An important change regarding the program of the 12th grade will enable 12th graders to take common courses as well as different academic courses for 31 hours a week in Anatolian technical program. 12th graders within Anatolian vocational program will be able to take common courses as well as vocational training in enterprises for 24 hours a week (3 days) and elective vocational courses and certificate courses for 7 hours. The same courses will be taken in both types of program during the first three years. If a successful student placed in Anatolian vocational program meets the academic achievement criteria in his/her senior year, s/he will be able to transfer to Anatolian technical program. A student in Anatolian technical program will also be able to switch to Anatolian

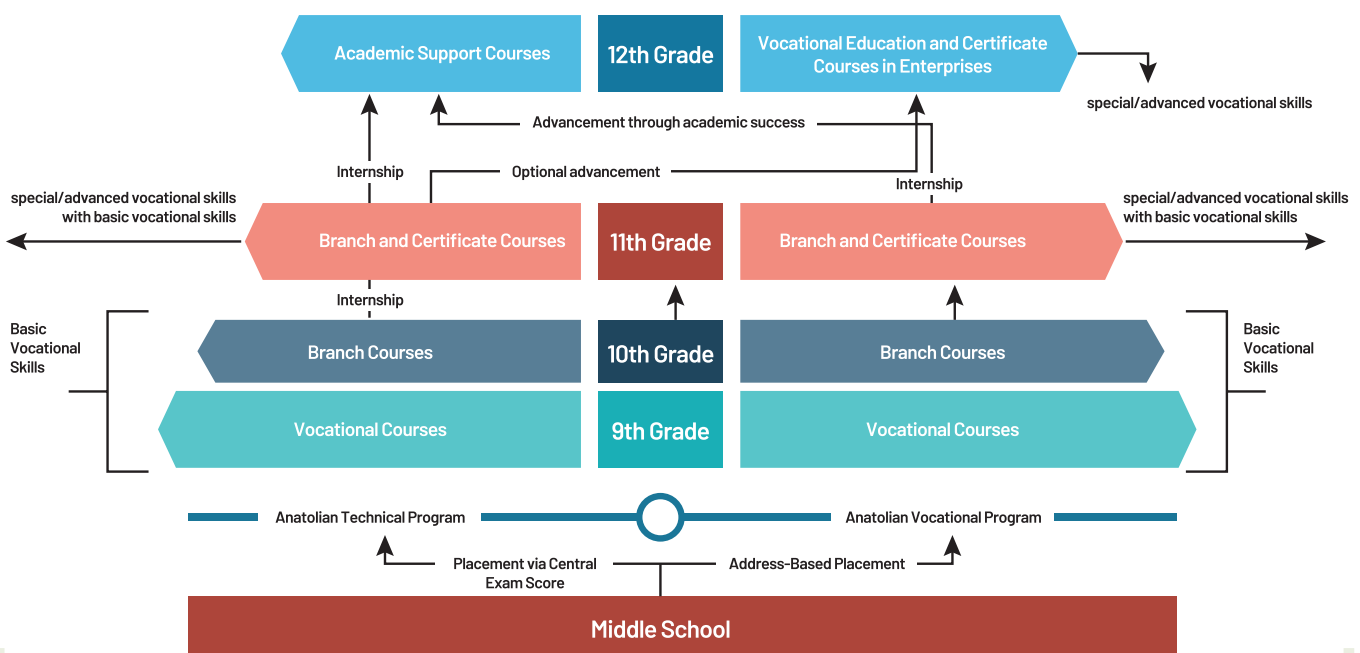
vocational program. Therefore, a flexible structure has been developed between the programs.

In addition, courses regarding the new skills that will improve employment opportunities in labor force market have been added into course schedules. Courses have been integrated into all areas and branches at 11 and 12th grades for the purpose of improving digital skills, which are indispensable for labor market and life, and these courses have been associated with the 'certificate of digital skills'. These courses aim to develop the skills of programming (block-based programming, artificial intelligence, robotics, game programming), digital design (web page creation, animation preparation) and social media (e-commerce, digital marketing, data analysis, and graphs). Content of this certificate, which aims to improve the digital skills of students, will be updated continuously to ensure the adaptation of graduates to the conditions of the labor market.

The work of update performed in line with such purposes has been identified and entered into force upon the publication of weekly course schedules by the Board of Education and Training in the Journal of Communiqués No. 2751 through the Resolution No. 9 of March 23, 2020. The new program structure that is updated is shown in Figure 7.

FIGURE 7

NEW PROGRAM STRUCTURE OF VTE



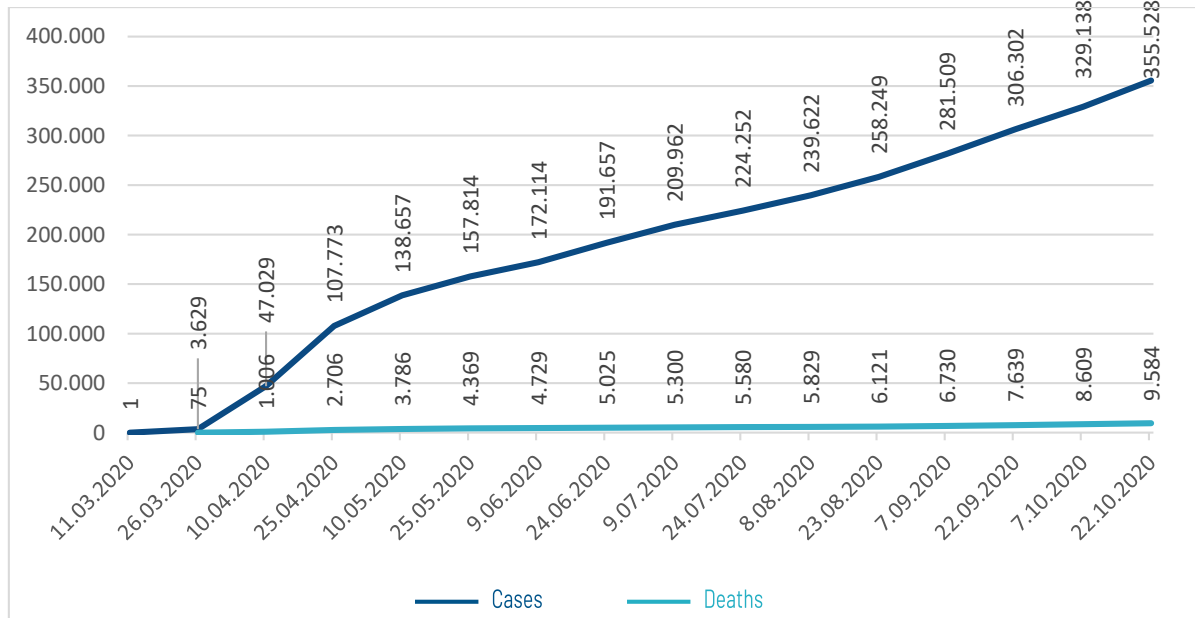


COVID-19 Studies in Turkey

The first Covid-19 case in Turkey was diagnosed on March 11, 2020 and the first person died of this disease on March 17, 2020. The total number of cases as of October 22, 2020 is 355.528 and the number of deaths stands at 9.584 (Chart 5).

CHART 5

THE PROCESS OF SPREAD REGARDING THE COVID-19 PANDEMIC IN TURKEY



<https://covid19.saglik.gov.tr/>

Turkey became one of the first countries to take measures when the Covid-19 pandemic broke out. Especially our citizens over the age of 65 and young people under the age of 20 posing the highest risk were taken under special protection. Decisions of the Ministry of Health and the Scientific Committee have been strictly enforced and our country has managed to keep the number of cases and deaths under those of developed countries such as the United States, France, Spain, Brazil and the United Kingdom.

Solidarity Social Support Groups and Solidarity Communication Centers composed of the members of non-governmental organizations, volunteer public personnel, AFAD (Disaster and Emergency Preparedness Presidency), police, gendarmerie, mukhtars and volunteers were established in provinces and districts under the coordination of governor's and district governor's offices as our citizens over the age of 65 as well as immunosuppressed citizens and citizens with chronic pulmonary disease, asthma, COPD, cardiovascular diseases, renal and hypertension disease, liver disease and citizens using immunosuppressants were locked down by restricting them from getting out of their residence, walk around areas such as parks and gardens and travelling by means of public transportation from March 22, 2020.

The first case in Turkey was diagnosed on March 11, 2020. Starting from this date, local measures were gradually taken across the country to prevent and mitigate the spread of the virus.

Measures/precautions taken after the first coronavirus case was diagnosed in the world and the first case was diagnosed in our country are given in Table 8 in chronological order.



TABLE 8

CHRONOLOGY OF MEASURES TAKEN IN TURKEY FOR THE PANDEMIC

Date	Development
December 12, 2019	The virus broke out in China on December 12,
December 31, 2019	2019 The first case was diagnosed in China
January 11, 2020	First death in China
January 30, 2020	The WHO declared an "international state of public health emergency" on January 30, 2020 regarding the outbreak of the new type coronavirus (Covid-19) emerging in China.
January 10, 2020	Coronavirus Science Committee was established under the Ministry of Health to combat COVID-19 disease in Turkey.
March 8, 2020	Disinfection was introduced in public places and public transport vehicles in some provinces
March 11, 2020	The first case in Turkey was diagnosed
March 12, 2020	Schools were closed.
March 14-18-24, 2020	Land border gates were closed.
March 14-15, 2020	Of 10,330 citizens who returned from umrah, 5,392 were quarantined in Ankara and 4,938 in Konya.
March 15, 2020	Comprehensive travel and transportation restrictions. Temporary closure of places where people come together. The last group of umrah travelers returned. They were placed under observation in dormitories.
March 16, 2020	Driving school exams were postponed
March 16, 2020	Places of entertainment such as bars, nightclubs, theatres, wedding halls etc. were closed
March 17, 2020	The World Health Organization declared the outbreak a pandemic.
March 17, 2020	The first death occurred in Turkey following the first Covid-19 case.
March 18, 2020	A TRY 100-billion package of economic measures was announced.
March 19, 2020	Football, basketball, handball and volleyball leagues were postponed.
March 22, 2020	Beauty parlors, male and female hairdressers were closed.
March 22, 2020	Public institutions switched to flexible working.
March 23, 2020	Distance education was initiated.
March 23-May 7, 2020	Guidance service was offered to 7 million students and 5.5 million parents by school guidance and psychological counselling services and guidance and research centers.
March 26, 2020	All sports events, picnics and the use of national parks were postponed.
March 30, 2020	A live classroom application that renders lessons interactive by eliminating the distance between teacher and student in distance education process was launched as a pilot application.
March 30, 2020	The donation campaign titled "National Solidarity Campaign" was launched.
April 1, 2020	It was announced that coronavirus cases were present across Turkey.
April 4, 2020	All domestic flights were suspended until April 20, 2020.
April 5, 2020	It was initiated to distribute free masks to the citizens aged between 20 and 65
April 8-19, 2020	A two-day curfew was imposed for the second time in 30 metropolitan provinces and Zonguldak province.
April 9, 2020	"Distance training" was also launched for teachers. It was announced that 125,000 teachers attended distance in-service training programs.
April 11-12, 2020	A two-day curfew regarding the Covid-19 pandemic was imposed for the first time in 30 metropolitan provinces and Zonguldak province
April 28, 2020	Turkish Airlines (THY) announced that all domestic and international flights would be suspended until May 28, 2020 in line with the measures taken due to the coronavirus pandemic
May 2, 2020	TRT EBA TV began broadcasting exclusively for students preparing for LGS and YKS exams.
June 1, 2020	Normal working system was introduced again by prioritizing the use of masks and the maintenance of social distance
01.09.2020	The 2020-2021 academic year started with the distance education method.
21.09.2020	Kindergartens and primary school 1st graders started face-to-face education in schools.
05.10.2020	VET schools started face-to-face training for practice courses.
12.10.2020	Village schools, primary schools, 8th graders and 12th graders started face-to-face education.

5.1. Studies Conducted in Vocational Secondary Education During to the Covid-19 Pandemic

Turkey's Ministry of National Education (MoNE) responded to the days of struggling with COVID-19 relatively faster than other countries. After the schools were closed, it immediately offered distance education support both over internet and on television for students having difficulty in access to internet. The course content needed for distance education was quickly created for all tiers and transferred to distance education platforms. While education at all tiers is carried out by distance education, the diversity of distance education continues to be increased every week. In subsequent days, television broadcasting was expanded to cover weekends and new broadcasting was initiated for supporting students preparing for the central exam for admission to high schools and for the exam of admission to higher education institutions at weekends. It was decided to proceed with this broadcasting during the summer months. A large number of psychosocial support packages were immediately developed and introduced for supporting students, parents and citizens in the field of special education and guidance.

A pool was created for course videos intended for the students attending vocational and technical education as distance education was introduced during the pandemic. Video content for the courses is selected by considering the opinions and recommendations of the respective area teachers in line with the criteria such as "the presence of critical steps between the achievements in areas and branches, the inclusion of achievements in the second semester of the academic year and the achievements supporting the acquisition of knowledge and skills via distance education". Course videos created for 10, 11 and 12th grades are produced and shot by the area teachers of journalism and radio-television at the workshops of vocational and technical Anatolian high schools. The courses are broadcast on TRT EBA TV High School channel during five weekdays based on the relevant schedule. Course videos are replayed on the same channel. Besides, they are also streamed on trtizle.com and eba.gov.tr.

While VTE institutions around the world were shut down for tackling with the pandemic, VTE institutions in Turkey gradually increased their production capacity and manufactured emergency medical supplies needed by the society throughout this process. VTE institutions were appreciated by all segments of the society and came to the fore in the national agenda. This positive perception is expected to be reflected in VTE schooling rates in the upcoming years. While VTE institutions in the world closed their doors, vo-

cational high schools in Turkey played a very important role, writing success stories throughout the COVID-19 outbreak with an incredible example of heroism and they never came to the fore at national level as much. With its increased production capacity, VTE has become one of the main actors in meeting the needs of the community in these challenging days and has shown that it is "a true friend".

Vocational education contributed to the fight against Covid-19 in two phases. The first phase consisted of the mass production of masks, sanitizers, face visors, disposable aprons and overalls immediately needed in the wake of the pandemic and the delivery thereof to the areas where they were needed the most. This phase has been very successful and such production is still going on. The second phase focused on the design and production of devices such as respirators and mask machines required for tackling with Covid-19. In order to be successful in the second phase, R&D centers were established under vocational and technical Anatolian high schools in provinces with strong infrastructure. Infrastructure of R&D centers was strengthened for the design and production of these products. Established in provinces such as Istanbul, Bursa, Tekirdağ, Ankara, Izmir, Konya, Mersin, Muğla and Hatay, these centers worked very hard. All products in question were manufactured in these centers. In this context, many products such as surgical mask machines, respirators, machines intended for producing masks fulfilling the N95 standard, video laryngoscope devices, intensive care beds, air filtration devices and sampling units were designed and produced. These products were distributed to relevant institutions and organizations, especially health-care organizations.

Production of medical equipment and supplies in vocational and technical schools in Turkey has also attracted international attention. In this respect, international news organizations reported that vocational schools were transformed into production bases. 50 types of occupational and technical surgical/medical masks were produced for tackling with Covid-19 and such masks were delivered to the areas demanding them including healthcare staff in particular. On the other hand, such centers started producing face visors and disposable aprons/overalls to protect healthcare staff, and within a month, they reached the monthly capacity of producing one million units per each product. Studies conducted by vocational high schools during the COVID-19 pandemic are presented in Table 9.



TABLE 9

STUDIES CONDUCTED BY VOCATIONAL HIGH SCHOOLS DURING THE COVID-19

Date	Development
March 9, 2020	26 vocational and technical Anatolian high schools designated as pilot schools in 8 provinces started producing sanitizers.
March 11, 2020	The number of vocational high schools producing sanitizers was increased to 38.
March 17, 2020	30 schools in 14 provinces started producing surgical masks.
March 18, 2020	The number of provinces to produce surgical masks increased to 21 and the number of schools to 37.
March 21, 2020	Vocational high schools started producing disposable aprons and overalls.
March 22, 2020	The number of vocational high schools producing surgical masks was increased to 50.
March 24, 2020	Free masks and sanitizing materials were distributed to the elderly and persons in need under the scope of the project "Vocational High Schools Are Meeting Families".
March 30, 2020	Students of Istanbul Technical University (ITU) Vocational and Technical Anatolian High School produced face visors for medical personnel with 3D printers.
March 30, 2020	Istanbul, Tekirdag, Bursa and Hatay were selected as pilot provinces for manufacturing full-automatic mask (surgical, N95) machines and the relevant activities were initiated.
April 1, 2020	10 R&D centers were established for vocational education.
April 4, 2020	The target of producing 2 million surgical masks was increased to 10 million.
April 9, 2020	Mass production began for producing 300,000 "face visors" a month.
April 9, 2020	The first N95 mask was produced at Gemerek Şehit Ahmet Karahan Vocational and Technical Anatolian High School in Sivas.
April 10, 2020	Istanbul Kağıthane Gültepe Vocational and Technical Anatolian High School was selected as a pilot school for creating face visor molds and mass producing 300,000 visors a month.
April 16, 2020	As a result of R&D studies, the first respirator was produced at the R&D workshops for Biomedical Device Technologies within Hatay Şehit Serkan Talan Vocational and Technical Anatolian High School.
April 17, 2020	A remote-controlled respirator was produced at the R&D workshop of Istanbul Kartal Şehit Öğretmen Hüseyin Ağırman Vocational and Technical Anatolian High School.
April 20, 2020	As a result of R&D studies, an N95 mask machine was produced at Tekirdağ Çerkezköy Turkish Textiles Foundation Vocational and Technical Anatolian High School.
April 22, 2020	An UVC Air Sterilization Device was manufactured by the Electrics – Electronics Technology area teachers of Istanbul Arnavutköy İbrahim Özyayın Vocational and Technical Anatolian High School.
April 24, 2020	At Sancaktepe Eyüp Sultan Vocational and Technical Anatolian High School, a 'Video Laryngoscope' device was produced by the occupational teachers also developing the software of video system.
April 26, 2020	At Mehmet Tuza Pakpen Vocational and Technical Anatolian High School, "Isolated Sampling Unit" that would significantly contribute to the protection and isolation of healthcare personnel against the virus was produced.
April 27, 2020	Air Disinfection Device and Infrared Thermometer were produced by Istanbul Maltepe Küçükyalı Vocational and Technical Anatolian High School and their software and hardware were also designed by the school.
April 27, 2020	Kağıthane Gültepe Vocational and Technical Anatolian High School started producing disposable forks, knives and spoons.
May 7, 2020	Contactless thermometer was designed and its first prototype was produced by Istanbul Mithatpaşa Vocational and Technical Anatolian High School and its software and hardware were also designed by the school.
May 14, 2020	A robot capable of performing automatic disinfection with ultraviolet (UV) rays in many indoor areas including hospital sections such as intensive care rooms, lift cabins and corridors was developed at Ankara Yenimahalle Şehit Mehmet Şengül Vocational and Technical Anatolian High School.
May 15, 2020	Both surgical mask machine and N95 mask machine were developed at Iskenderun Vocational and Technical Anatolian High School.
May 15, 2020	An ultraviolet surface and air disinfection device named "Efe" was developed at İzmir Buca Süleyman Şah Vocational and Technical Anatolian High School.
May 17, 2020	A fully-equipped intensive care bed was produced at Konya Vocational and Technical Anatolian High School.

TABLE 9

STUDIES CONDUCTED BY VOCATIONAL HIGH SCHOOLS DURING THE COVID-19

Date	Development
23.05.2020	20,000 surgical masks produced at Ali Osman Sönmez Vocational and Technical Anatolian High School were sent to neighboring country Bulgaria to be distributed to those in need.
30.05.2020	Portable Mechanical Breathing Device (Ventilator) was developed in Kocaeli - İzmit Vocational and Technical Anatolian High School.
23.05.2020	Vocational high schools started to produce masks and disinfectants across the country for students who will take the central exam within the scope of the High School Transition System (LGS).
09.06.2020	Ultrasonic stitched disposable masks with nose wires produced in Istanbul Gaziosmanpaşa Küçükköy Vocational and Technical Anatolian High School were exported to Czechia
17.06.2020	In İzmir Kemalpaşa Mopak Vocational and Technical Anatolian High School, a disinfectant device with sensors was produced to be used at building entrances within the scope of combating coronavirus (Covid-19).
23.06.2020	10 thousand masks produced by Pamukkale Osman Aydınlı Vocational and Technical Anatolian High School students were exported to the Netherlands.
27.06.2020	In Tokat Zile Vocational and Technical Anatolian High School, 3 teachers and 9 students produced a disinfectant device with sensors, designed by themselves.
08.07.2020	Adıyaman Vocational and Technical Anatolian High School teachers designed a "contactless" hand disinfectant device with programmable amount of disinfectant and number of users.
17.07.2020	İzmir Bayraklı Gazeteci Çetin Altan Vocational and Technical Anatolian High School teachers developed a smart door handle that can disinfect itself.
23.07.2020	MoNE established 30 R&D centers in 16 provinces to improve production capacity and further strengthen vocational education.
17.08.2020	Hürriyet Vocational and Technical Anatolian High School teachers in Bursa have developed a portable, non-contact fever measuring and disinfectant device to combat Covid-19.
01.09.2020	A "two-screen" thermometer prototype was developed by teachers and students at Bursa Hürriyet Vocational and Technical Anatolian High School.
09.09.2020	In Bursa Yunus Emre Vocational and Technical Anatolian High School, teachers and students voluntarily produce warning plates, disinfectant apparatus, mask logos..
16.09.2020	Production of hand disinfectant stands with foot pedals and a pump started at Şehit Sercan Production of hand disinfectant stand with foot pedal and pump started at Amasya Şehit Sercan Koç Multi-Program Anatolian High School.
21.09.2020	Faik Çelik Vocational and Technical Anatolian High School teachers and students met the warning and informative plate needs of 125 schools and institutions.
28.09.2020	Work based learning started in Vocational and Technical Anatolian High Schools
29.09.2020	A Disinfectant Tunnel System was established in Gaziantep - Servi Erdemoğlu Vocational and Technical Anatolian High School within the scope of the 'Clean My School Project'.
01.10.2020	İMKB Vocational and Technical Anatolian High School teachers developed three different types of disinfection units, as well as a heat-sensitive turnstile system and cabin.
05.10.2020	Face-to-face training started in Vocational and Technical Anatolian High Schools, Multi-Program Anatolian High Schools, Vocational Training Centers, Sports High Schools and Fine Arts High Schools.

5.1.1. Products produced by vocational high schools during the pandemic

Vocational high schools play an important role in Turkey's fight against the Covid-19 pandemic. Prior to the diagnosis of any case in the country, vocational high schools took the initiative for producing sanitizers for the disinfection of around 54,000 schools in 81 provinces. Upon the increasing impact of the pandemic, vocational high schools also increased their capacity and accelerated the production of products which were needed to fight the pandemic and whose supply was problematic. A

broad range of products from sanitizers to disposable overalls, surgical masks, face visors, respirators and N-95 masks were produced. Teachers, students and qualified instructors within vocational high schools are directly involved in production.

However, production processes are now executed by teachers and qualified instructors as a curfew was imposed on those under 20 on April 3, 2020. 2,224 students, 1,703 teachers and 154 qualified instructors were involved in the production processes.

FIGURE 8

PRODUCTS PRODUCED DURING THE PANDEMIC



Surface disinfectant

Under the Covid-19 measures, MoNE focused on production in vocational high schools for the hygiene, cleaning and disinfection of all schools. Firstly, 28 vocational and technical Anatolian high schools were designated for the production of hypochlorite-based surface cleaning products which were needed urgently. As a result of increasing need throughout the process, the number of schools was firstly increased to 44 and then to 100. Due to this production, around 54,000 schools in 81 provinc-

es were disinfected prior to the diagnosis of the first case in our country.

With the pandemic entering into our country's borders, the demand for disinfection agents increased. Our teachers and students at vocational high schools make any and all self-sacrifice to increase their production capacity and meet all disinfectant demands of the related institutions. To date, 6 million liters of surface disinfectant have been produced at a total of 100 schools.



Hand sanitizer and cologne

Hand cleaning is of great importance in the fight against the pandemic. However, with the spread of the pandemic, there were difficulties in supplying hand sanitizer and cologne and our citizens began experiencing difficulties in accessing these products. Especially following the problems experienced in the market regarding the supply of hand sanitizer and cologne, vocational high schools started producing hand sanitizer and cologne immediately upon obtaining necessary permits and a rapid R&D study. To this day, 500,000 liters of hand sanitizer were produced in 55 schools and 20,000 liters of cologne in 19 schools.



Mask

As the impact of the pandemic rose in our country and the entire world alike, the production of masks started gaining great importance. Currently, one of the most-needed products in the whole world is mask. In order to avoid any difficulty in the supply of masks, vocational education community acted rapidly to start producing masks from the initial moments of the pandemic. Mask production was initially started in 14 cities and 30 schools, but in line with the strong demand, this number was first increased to 37 schools in 21 cities, then to 50 schools in 30 cities, and then to 132 schools in 50 schools. Daily mask production capacity of schools was increased to around 1 million. Production is still going on for meeting the demand.



Disposable apron/overall

Hygiene is of great importance in the fight against the pandemic. The need for disposable products has increased, especially for healthcare professionals. The investments made in this context triggered the production of products such as disposable aprons and overalls especially for healthcare staff. Initially launched in 7 pilot schools, production was expanded to 20 schools as the demand increased in time. Up to now, vocational high schools have produced 1 million disposable aprons/overalls and these produced were delivered to healthcare professionals.



Face visor

Our schools completed their R&D activities and started producing face visors in order to contribute to the solution of problems experienced in the production of face visors that are of great importance especially for healthcare staff. Face visors are manufactured using both automatic production lines and 3-D (three-dimensional) printers. In addition, 3-D printers were also manufactured so as to increase the production of visors as a result of R&D studies. To date, more than 1 million face visors have been produced in 43 vocational high schools and delivered to healthcare professional. The production is still going on.

5.1.2. R&D studies conducted by vocational high schools during the pandemic

Vocational education contributed to the fight against Covid-19 in two phases. The first phase consisted of the mass production of masks, sanitizers, face visors, disposable aprons and overalls and the delivery thereof to the areas where they were needed the most. This phase has been very successful and such production is still going on.

The second phase focused on the design and production of devices such as respirators and mask machines required for tackling with Covid-19. In order to be successful in the second phase, R&D centers were established under vocational and technical Anatolian high schools in provinces with strong infrastructure. Infrastructure of R&D centers was strengthened for the design and production of these products. Established in provinces such as Istanbul, Bursa, Tekirdağ, Ankara, Izmir, Konya, Mersin, Muğla and Hatay, these centers worked very hard. All products in question were manufactured in these centers. In this context, many products such as surgical mask machines, respirators, machines intended for producing masks fulfilling the N95 standard, video laryngoscope devices, intensive care beds, air filtration devices and sampling units were designed and produced.

Respirator

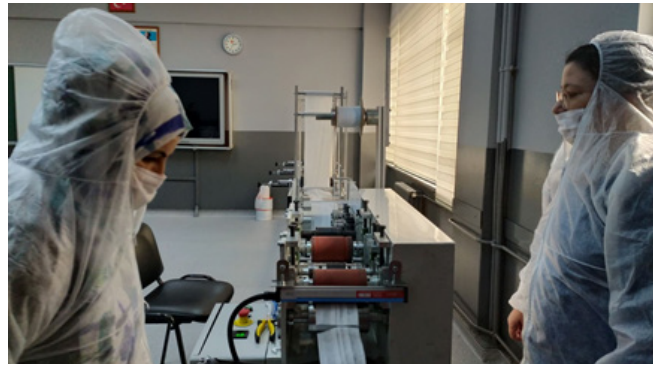
Vocational high schools were involved in intensive R&D work for the production of respirator which plays an important role in the treatment of Covid-19. Hatay and Istanbul were selected as pilot provinces for the production of respirator. The first respirator was produced at the R&D workshops for Biomedical Device Technologies within Hatay Şehit Serkan Talan Vocational and Technical Anatolian High School. Following the production of respirator at Hatay Şehit Serkan Talan Vocational and Technical Anatolian High School, a remote-controlled respirator intended for ambulances and field hospitals



was produced at Kartal Şehit Öğretmen Hüseyin Ağırman Vocational and Technical Anatolian High School.

Ultrasonic Surgical Mask Machine

As a result of the R&D studies conducted for the purpose of increasing the capacity of production regarding surgical masks assuming the most important role in the fight against the pandemic, Istanbul Küçükköy Vocational and Technical Anatolian High School, Konya Kılıçaslan IMKB Vocational High School and Hatay Iskenderun Vocational and Technical Anatolian High School managed to manufacture the Automatic Machine for Producing Triple-Layer Ultrasonic Surgical Masks With Nose Wire. Other vocational and technical Anatolian high schools started using these machines.



N95 Mask Machine

N95 masks prove to be indispensable especially for healthcare professionals in the fight against the pandemic. However, the production process of N95 masks is very difficult just like the supply thereof. However, R&D studies were initiated in vocational high schools and an N95 mask machine was produced at Tekirdağ Çerkezköy Turkish Textiles Foundation Vocational and Technical Anatolian High School. Following the expansion of the studies, an N95 mask machine was also produced at Hatay Iskenderun Vocational and Technical Anatolian High School. These new machines were delivered to the schools in other provinces.





Ultraviolet-C (UVC) Air Sterilization Device

A robot capable of performing automatic disinfection with ultraviolet (UV) rays in many indoor areas including hospital sections such as intensive care rooms, lift cabins and corridors was developed at Ankara Yenimahalle Şehit Mehmet Şengül Vocational and Technical Anatolian High School in the fight against the new type coronavirus (Covid-19).

Ozone Air Disinfection Device

Considering that coronavirus is transmitted by air, the disinfection of indoor air is of great importance. The ozone air disinfectant device produces ozone gas through the ozone cell thanks to the integrated high-frequency transformer while disinfection is provided by spraying this ozone into the air. The device whose ozone spraying duration and frequency of spraying can be controlled by the user is running at a voltage of 220 V AC. Ozone air disinfection devices can be used for disinfecting areas such as classrooms, hospitals, public institutions and offices in a short period of time. Software of the device which automatically shuts down at the end of the working session can be programmed depending on the requests of the user and it can be mass produced within a few weeks upon obtaining necessary permits. On the other hand, it is known that ozone gas, which is a colorless gas with a characteristic odor at room temperature is used as disinfectant in many areas and research shows that it eliminates fungal spores, microbes and odor particles in ambient air.



Contactless Infrared Thermometer

Developed by the teachers of Istanbul Küçükaly Vocational and Technical Anatolian High School, the thermometer device can measure the body temperature of individuals from a distance of 1-4 cm without any contact. Capable of measuring between 34 and 42.2 degrees as per medical standards, the device is equipped with a 1.3 inch OLED screen and audio warning system. Capable of keeping the last measured value in its memory, the device can measure around one thousand measurements with a 9V battery. Automatically shutting down if unused for 60 seconds, the device can be mass produced within a few weeks upon obtaining necessary permits and approvals. This device will make it easier to detect suspicious individuals by measuring the body temperatures of individuals in public areas and those mixed into the society in a contactless way.

Video Laryngoscope Device

A Video Laryngoscope device the software of which is completely local was developed in a very short period of time at Istanbul Sancaktepe Eyüp Sultan Vocational and Technical Anatolian High School so as to open the airway of intubated patients in tackling with Covid-19. The device is of importance as it allows for protected intervention by keeping the distance between a healthcare professional and patient and minimizing the risk of infection. Prototype of the device was developed both as a free-standing and portable case and designed in a way to allow for any and all interventions.





Isolated Sampling Unit

At Mehmet Tuza Pakpen Vocational and Technical Anatolian High School, "Isolated Sampling Unit" that would significantly contribute to the protection and isolation of healthcare personnel against the coronavirus was produced. As a result of R&D activities conducted by considering the guidance of healthcare professionals at every stage, a sampling unit ensuring complete isolation with the patient was developed. The outer unit was developed with a height of 2 meters and width of 1 meter and produced with a sigma profile and transparent, shatterproof plexiglass material. A sound system allowing for communication with the patient, a ventilation system equipped with a fan and an illumination system were mounted into the cabin. A box was placed in front of the cabin to place the samples. The cabin was designed so that it could also be used as a portable unit with a locked wheel system.



Sterilization in Mask Production via UV-C Conveyor System:

The system aims to sterilize the masks that must be used by patients or healthy individuals in the fight against Covid-19 prior to packaging and provide people with safe products. The masks produced by this device are sterilized by UV-C lamps from the bottom and top along the conveyor belt equipped with a closed system. In addition, upon request, other materials such as aprons, protective equipment, shields and protective goggles can be sterilized by passing them over the belt.

Remote-controlled and Timed UV-C Radiation Sterilization Device

Allowing for the disinfection of indoor environments where people come together such as schools, hospitals, banks, public institutions and factories, the device sterilizes the environment by transmitting UV-C rays to the environment via an UV-C bulb thereinside. The prototype uses a 30-Watt UV-C bulb to sterilize a room with an average size of 30 square meters. It is also possible to sterilize the environment in larger spaces by using light bulbs of various power levels. The device can be controlled in a wireless way via a mobile application and it can be programmed and scheduled through a keypad unit. Besides, the device is automatically turned off via a motion sensor so as to protect staff against hazardous ultraviolet rays when they enter into the environment where the device is on. If the moving person moves away from the environment, the device continues to work where it has left off.



Mobile UV-C Robot Sterilization

The UV-C Robot, an unmanned ground vehicle, disinfects the environments and surfaces touched by the patients diagnosed with the Covid-19 virus in hospitals and prevents the infection of healthcare professionals with the virus while treating patients. This process is an ideal task for the autonomous robot to prevent the spread of coronavirus and other viruses to hospitals by effectively sterilizing hospital environments using UV-C light. Spaces such as corridors, lift cabins, intensive care rooms and service rooms are automatically sterilized by the autonomous robot. Sterilization of all surfaces regardless of the shape and position of the surface is performed via robot arms at the desired angle. The robot's android software, PC software, touch screen software and electronic card software were developed by the area teachers.

Fully-Equipped Intensive Care Bed



The R&D team consisting of 20 teachers in different branches at Konya Vocational and Technical Anatolian High School produced a fully-equipped intensive care bed to support the fight against the new type coronavirus (Covid-19). The bed is equipped with 4 motors. The bed can be adjusted to different positions depending on the patient's condition.

Portable Mechanical Respirator (Ventilator)

As a result of R&D work lasting for 25 days, a working group of 8 people consisting of the Electrics-Electronics Area teachers at Kocaeli-Izmit Vocational and Technical Anatolian High School produced a Portable Mechanical Respirator (Ventilator) with an easy-to-use control panel, functions appropriate for medical standards, innovations such as PLC programming and original software appropriate for the use of servo motor. A completely-domestic "base model" encompassing innovations will be manufactured following the completion of a series of certifications and tests appropriate for the qualities that can be used in the medical field. It is equipped with capabilities that make it possible to use the device in the medical sector when qualifications are ensured.



Healthcare and Security Personnel Hosted in Our Practice Hotels.

Vocational high schools offered accommodation and hospitality services for the doctors, nurses, technicians, caregivers, healthcare workers, police officers and gendarmerie officers assuming the most important duties in our country throughout the Covid-19 pandemic as they worked for a long period of time and in order to prevent the spread of the virus to their families.

5.2. An Overview of the Vocational and Technical Education's Future in the Wake of the Covid-19



It is very strategic to make sure that individuals acquire the interest, skills, attitudes, behavior and professional ethics required by the profession in line with their interests, abilities and character through vocational and technical education playing an important role in the economic and social development of countries. In vocational and technical education, a structure is needed which is qualified to respond to the needs of the sector's workforce, which can adapt to advanced technology and which actively participates in the planning and decision-making processes of stakeholders.

The creation of a system harmonized with 2023 goals is planned with the aims of changing the existing public perception of vocational and technical education; identifying the vocational interests and talents of students and guiding children and parents in this direction; reducing academic course intensity and updating the content of vocational courses; increasing on-the-job training opportunities for teachers; bringing the infrastructure and equipment of schools in line with the rapidly evolving and developing technologies through the use of national and international sectoral and public financial resources; prioritizing new graduates in employment and applying different wage policies for them; engaging industries more actively in vocational and technical education processes; enhancing the possibilities for cooperation with industry leaders; implementing projects that qualify as sectoral cooperation protocols and good practices at national and international levels; and granting graduates the opportunity of transition into higher education in their respective fields as part of an integrated structure.

5.2.1. R&D centers

One of the most important achievements of vocational education regarding the Covid-19 pandemic will be R&D centers. It is planned to establish around 20 R&D centers by adding new ones to 10 R&D centers established throughout this process by considering their regional distribution. Each center will focus on a different area. For example, one center will solely focus on software while another one will focus on biomedical device technologies. The centers will be in constant communication with each other and will support each other. These centers will also be used as the centers of excellence. Their main focus will be to develop products and create, register and commercialize patents, utility models, designs and trademarks. These regional R&D centers will hold trainings for teachers from now on.

These centers will also contribute significantly to the updating of vocational education curriculum.

5.2.2. Patent, Utility Model and Design Studies in Vocational and Technical Education

Awareness of patent, utility model and design is raised in vocational and technical education so as to strengthen the relation between education, employment and production and the initiatives of all vocational and technical secondary education institutions in these areas are supported. In this context, the theme of the 2019-2020 academic year is set as Patent, Utility Model and Design. In this respect, cooperation was established with the Turkish Patent and Trademark Office and our institution sped up education and guidance activities. A target was set to register 100 patents, utility models and trademarks by the end of the year. As a result, vocational and technical secondary education institutions have filed applications for 220 patents, 470 utility models, 216 designs and 104 trademarks. Evaluations are going on before the Turkish Patent and Trademark Office.

5.2.3. Distance education practices are being integrated into the education system

Vocational and technical education aims to make sure that students acquire cognitive and dynamic as well as affective skills as a whole. Therefore, the effective use of distance education models especially within the scope of industrial vocational education programs may pose a disadvantage for vocational and technical education. However, vocational and technical education will be enriched with distance education methods and techniques. As part of this solution-oriented approach, our schools affiliated to the Directorate General of Vocational and Technical Education will continue to make use of the Education Information Network (EBA) to ensure that our students are involved in education processes.

- Education activities will be sustained over the EBA network to make distance education a part of the education system.
- Creation of education modules using interactive/virtual



reality/4D technology in a way to cover some components of the skills training for distance education

- Conducting a study for the future occupation profiles by considering new approaches shaped by the pandemic process.
- Updating the achievements of vocational education programs by evaluating factors such as distance education and emerging occupational profiles etc.
- Certification courses will be developed in all areas of vocational and technical education for the development of digital skills.
- Distance education course videos will be mainstreamed in vocational and technical education, fine arts high schools and sports high schools.
- The creation of coeducation models (distance – face-to-face- workplace) and the transformation of the portion of apprenticeship training carried out in VTCs into distance education in particular
- Certification programs will be developed for digital professions.
- Measures will be taken to offer face-to-face education for the achievements associated with national occupational standards within the scope of areas and branches considered as dangerous and very dangerous occupations.
- Distance education course videos will be prepared for vocational training centers.
- Ensuring that the occupational courses taken in their respective fields by the graduates of vocational high schools during secondary education are considered as prior learning within the scope of the Turkish Qualifications Framework while attending Vocational Colleges.

5.2.4. Distance teacher training

In-service training plays an important role in the personal and professional development of directors and teachers. In order to minimize the risk of the Covid-19 outbreak and to protect the health of our teachers, there will be no face-to-face training unless it is mandatory, except for practical on-the-job in-service training until the pandemic is eliminated. Instead, the risk of Covid-19 pandemic will be minimized by conducting in-service training through distance training.

- Development of training modules handling pedagogical methods for distance education and organizing training intended for ensuring that teachers/directors make correct use of distance education tools in technical and pedagogical terms
- Transferring personnel training to a distance education platform especially by way of the creation and use of a training/meeting/conference platform by MoNE and making the same platform available for the use of the entire ministry for meetings among provinces etc.

5.2.5. Production Will Go On in Vocational Education During the Covid-19 Pandemic

In line with the measures taken against Covid-19, the Directorate General of Vocational and Technical Education under the Ministry of National Education (DGVTE) will proceed with the production of cleaning agents such as hypochloride-based surface cleaners, disinfectants, alcohol-based hand sanitizers etc. at VTE secondary education



schools with a revolving-fund enterprise and a chemistry department, the production of masks at VTE secondary education schools with a revolving-fund enterprise and a fashion design technology department, the production of disposable overalls at VTE secondary education schools with a revolving-fund enterprise and a fashion design technology department and the production of disposable forks and knives at VTE secondary education schools with a revolving-fund enterprise and a plastics technology department.

After Covid-19, the production capacity of vocational and technical education schools will be increased in line with the needs of the country.

5.2.6. The Project “Be Prepared for Disasters”

The protocol “Be Prepared for Disasters” was prepared with the Disaster and Emergency Management Presidency (AFAD) affiliated to the Ministry of Interior during the COVID-19 pandemic so as to evaluate the role that could be assumed by vocational and technical education in cases of pandemics, natural disasters and wars etc. in the evidence of its strategic significance indicated by the production of masks, sanitizer and respirators etc. and to identify the certain duties to be assumed by certain vocational high schools in such cases.

This cooperation is essential for planning the production capacity of vocational and technical Anatolian high schools prior to disaster and emergency, associate them with emergency centers and regions and enabling them to offer production support in the supply of equipment, tools and supplies required by the relevant teams during intervention.

This protocol will also ensure that students, teachers and staff will be certified in emergency intervention and first aid, the certified staff will install, repair and demount the tools, supplies, teams and equipment as required during any disaster and emergency, will also produce them if necessary, raise awareness of the public, guide them, support first aid teams, support production for covering their food needs, practice hotels and boarding houses will be allocated in case of any emergency, preliminary preparations will be made and action plans will be drawn up.

5.2.7. Strengthening Vocational Training Centers

One of the problems that may affect our county just like the entire world will be unemployment in the wake of the COVID-19 pandemic. Therefore, it will be necessary to strengthen vocational training centers where the rate of unemployment for its graduates stands at 87%.

High employment rates for vocational education graduates outside the field they graduate from indicate that vocational education graduates mostly tend to make use of the employment opportunities outside their areas when there is no change in their personal rights if they work in their areas or outside their areas. Incentive mechanisms are needed for guiding this flow towards the area of graduation. In this sense, MoNE will continue to work jointly with other ministries and institutions for increasing the minimum wage to be earned by the graduates of vocational education when they work in their area of graduation.



6

Conclusion

Today, millions of people are fighting the COVID-19 pandemic and the pandemic is affecting all aspects of our daily lives. Various measures are taken by public agencies in different countries to prevent the coronavirus from spreading to a larger area. Due to the scale and impact of the pandemic, it is not possible to consider the coronavirus pandemic solely as a public health issue. As a result of these measures, education is one of the areas most affected by the coronavirus pandemic. As of the last week of March 2020, it is estimated that 1.3 billion children and young people - nearly 80% of the world's student population- were affected by school closures in 138 countries. This huge impact of coronavirus on access to education has created a huge pressure on education authorities all over the world. Most countries thrive to create and update distance education platforms to sustain their education processes. Simultaneously, education activities were initiated to enlighten all education stakeholders about the coronavirus pandemic (Callaway, Cyranoski, Malapaty, Stoye, and Tollefson, 2020; UNESCO, 2020c; Ting, Carin, Dzau, and Wong, 2020; European Training Foundation (ETF); 2020; Ozer, 2020).

Although there is a major crisis in education on a global scale, vocational and technical education has a great potential for contribution to the fight against the coronavirus pandemic. A strong vocational education system can support the needs of society with its capacity for production and adaptation, especially in crisis situations. Depending on its importance and potential, vocational education continues to be a highly-debated way of education throughout the world (Ozer and Perc, 2020).

Skills gained through vocational education are questioned in manufacturing and services sectors, especially due to the widespread use of automation supported by artificial intelligence technologies. In a new era of autonomy and artificial intelligence, vocational education and training systems around the world have been restructured so that vocational education and training students can acquire and improve more general skills in a wider circle of occupational areas. Problem-solving and adaptation skills of vocational education students will increase with the restructuring depending on the changes in the labor market. In current crisis situations, it seems that the needs of the society and labor market may change dramatically in a short period of time. It is of great importance to offer occupational skills as well as general skills and present flexible education opportunities to them so as to increase the capacity of production and adaptation in vocational education and training and to support R&D studies (Perc, Ozer, Hojnik, 2019; Hanushek, Schwerdt, Woessman and Zhang, 2017; Ozer and Suna, 2019; Özer, 2020).

In accordance with the new social order mandated by the ongoing COVID-19 pandemic all over the world, countries are setting new policies. Education systems affected by the pandemic have an important place in policy areas.

The first step taken in relation to the education and training system in our country was intended for ensuring adequate social isolation. The Ministry of National Education firstly suspended school education activities immediately after the first case was diagnosed in Turkey. Likewise, the vocational and technical education schools and institutions affiliated to our ministry have acted proactively throughout the pandemic to support the socio-economic development of the country. Contributing significantly to the self-sufficiency capacity of our country, vocational high schools were covered by visual media and press as well as global media throughout this process. Initiated with the production of sanitizer and masks, the process continues with an increased production capacity and the diversification of products.

In this respect, 800,000 liters of hand sanitizer, 60 million masks, more than 1 million disposable face visors and aprons/overalls, respirators, ultrasonic surgical mask machines, video laryngoscope devices, N95 mask machines, ultraviolet-C (UVC) air sterilization devices, isolated sampling units, intensive care beds, ozone air disinfection devices and contactless infrared thermometers were produced and such production is currently ongoing.

Such cleaning and disinfectant materials and surgical masks were delivered free of charge to the elderly and families in need in 81 provinces under the coordination of governor's offices and face visors were delivered free of charge to healthcare professionals under the coordination of the Ministry of Health.

Online platforms and distance education solutions rapidly introduced by our ministry in a way to set an example for the entire world upon the suspension of face-to-face education in our country were put into practice with the Education Information Network (EBA) and the Turkish Radio and Television Corporation (TRT). As part of this solution-oriented approach, our schools affiliated to the Directorate General of Vocational and Technical Education has ensured that our students continued to be involved in education processes.

R&D studies have been given momentum so as to support the sustainable socio-economic development role of vocational and technical education schools turning into one of the main actors in social utility-oriented production throughout the pandemic. In vocational and technical education, studies are underway to increase the diversity of services and products with high added value.

Increased social support for vocational high schools gained momentum during the pandemic. Our studies will go on to sustain the reflections of interest in our vocational and technical education schools in national and international media and to make sure that our schools achieve the value it deserves before all stakeholders.

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Notes



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