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Education Policies in the 21st Century

Comparative Perspectives

Edited by
Birol Akgün · Yusuf Alpaydın

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Editors
Birol Akgün
Ankara Yıldırım Beyazıt University
Ankara, Turkey

Yusuf Alpaydın
Marmara University
Istanbul, Turkey

ISSN 2730-7646 ISSN 2730-7654 (electronic)
Maarif Global Education Series
ISBN 978-981-19-1603-8 ISBN 978-981-19-1604-5 (eBook)
https://doi.org/10.1007/978-981-19-1604-5

This Palgrave Macmillan imprint is published by the registered company Springer Nature Singapore Pte Ltd.
The registered company address is: 152 Beach Road, #21-01/04 Gateway East, Singapore 189721, Singapore

Preface

Characterized by increased mobility and technological advances, globalization has paved the way for a shared understanding of knowledge in response to interdependencies. Concepts such as Industry 4.0 and Education 4.0 have been frequently mentioned while entering the twenty-first century and have given rise to new trends and paradigms in education as a key to social and economic development. Making the right timely investments for the educational industry by studying globalization, new media, the path of technology, and the vision of the future has become increasingly important in order to be able to properly adapt to the integration of information and technology at the increasing speed with which they emerge.

Education has currently become the most important factor in solving common concerns such as economies struggling to survive in a globally competitive environment while also trying to improve people, preserve peace, and provide a more sustainable living environment for the planet. The domino effects of global phenomena are bringing nations together and blurring borders. Therefore, a more collective effort is required in education in terms of solving both local and international problems.

Published under the *Maarif Global Education Series* in this context, this book mainly deals with how education affects and has been affected by political, economic, and international developments using a comparative approach in three parts and 11 chapters. While these comparisons

involve countries' educational policies in some chapters, other chapters present these comparisons over educational models and processes.

The first part examines the relations between politics and education and reviews how the transformation of nation-states has affected educational institutions. It goes on to discuss the basic dynamics in the historical journey of the World Bank's education strategies from past to present, revealing a strategy for the future. Lastly, it examines the phenomenon of education reform as an important topic of the global agenda through the examples of Brazil and Turkey.

The second part starts by comparing the accountability policies of education systems over the cases of Spain and the United Kingdom, followed by analyses on how to solve the difficulties in transitioning from higher education to employment. The second part finishes by including another study focusing on a cost-benefit analysis, revealing the differences and similarities between vocational–technical education and general education.

The third and final part closely examines the international education sector. It begins with a discussion on international schools established and financed by the government/states in the context of cultural diplomacy and then focuses on new trends in international education mobility in the twenty-first century. This moves on to a critical review of the concepts expressed in the aims of international education programs such as global citizenship, universal culture, and international curriculum, which is then followed by a chapter examining the joint/dual international academic degree programs between the United States and China from the perspective of transnational higher education. The book concludes with a discussion on the results of the national, regional, and international transfer of education models using a comparative education approach.

We hope the book will be a reference source for researchers, experts, and educators and thank the experts from different parts of the world who have contributed with their quality articles.

Ankara, Turkey — Birol Akgün
Istanbul, Turkey — Yusuf Alpaydın

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List of Contributors

Yusuf Alpaydın Marmara University, Istanbul, Turkey

Richard Arnold Loyola University Chicago, Chicago, IL, USA

Şaban Berk Marmara University, Istanbul, Turkey

Metin Çelik Selçuk University, Konya, Turkey

Murat Çemrek Necmettin Erbakan University, Konya, Turkey

Roy Y. Chan Lee University, Cleveland, TN, USA

Stephen P. Heyneman Vanderbilt University, Nashville, TN, USA

Tavis D. Jules Loyola University Chicago, Chicago, IL, USA

İbrahim Hakan Karataş Istanbul Medeniyet University, Istanbul, Turkey

Kürşad Kültür Marmara University, Istanbul, Turkey

María-Jesús Martínez-Usarralde University of Valencia, Valencia, Spain

Muhammet Ü. Öztabak Fatih Sultan Mehmet Vakıf University, Istanbul, Turkey

Cristina Pulido-Montes University of Valencia, Valencia, Spain

Wadim Strielkowski Prague Business School, Prague, Czech Republic

Segâh Tekin Necmettin Erbakan University, Konya, Turkey

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General Education Versus Vocational Education: Vocational Education and Its Future

Şaban Berk

Besides being a significant indicator of a country's development and variable determining its level, education also plays a key role in equipping individuals with the skills needed in the social and labor market. While education equips individuals with the skills that allow them to adapt to social norms and carry society forward, it also contributes to the economy by providing individuals with the efficiency required to acquire a profession in the labor market. Individuals need certain skills to maintain their daily lives in balance in accordance with societal measures. Skills defined as the ability of individuals to use their theoretical and/or practical-technical knowledge (know-how) to perform a task or solve problems they encounter in daily life are features that can be developed over time. Acquirable with the help of inborn (God-given) talents, these skills can also be developed through education as well as experience (practical application). Abilities, knowledge, and skills that are related to one another come together and form competencies; this allows the individual to

Ş. Berk (✉)
Marmara University, Istanbul, Turkey
e-mail: saban.berk@marmara.edu.tr

B. Akgün and Y. Alpaydin (eds.), *Education Policies in the 21st Century*,
Maarif Global Education Series,
https://doi.org/10.1007/978-981-19-1604-5_6

perform a job or task. Thus, competence can be said to be a more comprehensive concept than a skill, and competence in an area may involve more than one skill.

The presence of a positive correlation between the education levels of individuals who constitute a society and the level of development and welfare of that society is a widely accepted fact. From the moment they come into the world, individuals receive various levels of education from pre-school to higher education at various stages in their lives. Secondary education is the education level following primary education and lasts an average of 8 or 9 years in almost every country in the world (UNESCO, 2012). Secondary education prepares students for higher education or the labor market by providing them with basic knowledge and skills. This level of education, which is usually non-compulsory, has the sub-categories of general secondary education and vocational technical secondary education.

General secondary education is designed to prepare students for general or vocational higher education programs by improving their general knowledge, skills, and competencies. Vocational and technical secondary education prepares individuals directly for the labor market and higher education without the need for further training by providing them with knowledge, technical skills, and competence in a particular field or occupation (Berk, 2019; CEDEFOP, 2014). Successful completion of programs in vocational and technical secondary education leads to a vocational or technical qualification relevant to the labor market. Both general and vocational technical secondary education stages and education systems differ from country to country. For this reason, all international data related to education must be based on a classification that can be considered comparable for all countries in the world. In that context, the need exists for a common framework for comparison and contrast. Thus, the International Standard Classification of Education (ISCED) is used to correctly understand and interpret education systems and their inputs, processes, and outcomes and to make sure that data are comparable.

International Standard Classification of Education (ISCED)

ISCED was developed by the United Nations Educational, Scientific and Cultural Organization (UNESCO) in the 1970s. Revised in 1997, ISCED took its current form in 2011. As a product of international agreement, ISCED functions as a source of reference and comparison for regulating education programs and related qualifications according to levels and fields of education. It is a globally implemented standard framework created to collect, assemble, and analyze comparable data for the UNESCO member states.

ISCED is designed to function as a general framework for the classification of education activities and the acquired competencies into internationally valid categories as defined in the programs. The main goal is for the basic concepts and definitions of ISCED to be internationally valid and inclusive of all education systems (UNESCO, 2012). The basic stages of ISCED 2011 and the characteristics of its stages are given in Table 1.

As the ISCED levels in the table serve as a general framework for international classifications, not all education systems can be expected to include all the levels present in this framework in these exact forms. For instance, while ISCED Level 4 is not included in many countries' education systems (Turkey, Australia, England, France, Czech Republic, Spain etc.), a limited number of countries include either the general (44 in Canada and Switzerland) or vocational (45 in Germany and Finland) post-secondary non-tertiary education level (Eurydice, 2020; National Council for Special Education [NCSE], 2011; OECD, 2020b). In countries without ISCED Level 4, individuals who have completed ISCED Level 3 can proceed to tertiary education (ISCED 5 or ISCED 6) after fulfilling the required conditions. The main objectives in ISCED Level 4 are: (1) increasing employability in the labor market by improving the vocational knowledge of those coming from vocational ISCED Level 3, (2) increasing employability by providing a profession to those who come from general ISCED Level 3, (3) providing an advantage in entering tertiary education by improving the existing qualifications of those coming from both general or vocational ISCED Level 3.

Table 1 Basic stages in education and their general characteristics according to ISCED 2011

ISCED	*Level/Stage of Education*	*Duration*
0	*Early Childhood Education* Two stages: (01) Early childhood educational development. Ages 0–2 (02) Pre-primary education. From age 3 until the primary school starting age	There is no time limit, but for a program to be included within the scope of pre-school education, the educational activities must be conducted for at least 100 days a year, for no less than 2 hours a day
1	*Primary Education*	Commonly lasts 4–7 years (6 years on average). Designed to provide students with basic-level skills for reading, writing, and math
2	Lower Secondary Education Two types: (24) General Lower Secondary Education (25) Vocational Lower Secondary Education	Commonly lasts 2–5 years in addition to primary education (3 years on average). Also called the *Second Stage of Primary Education* or *Middle School Education* in some countries
3	Upper Secondary Education Two types: (34) General Upper Secondary Education (35) Vocational Upper Secondary Education	Commonly lasts 2–5 years in addition to lower secondary education (3 years on average). Ends with 12th grade (beginning from the first grade of primary school). Ends in 11th or 13th grade in some countries. Those who complete this stage of education can continue to ISCED 4, 5, or 6 depending on the country
4	*Post-Secondary Non-Tertiary Education* Two types: (44) General Post-Secondary Non-Tertiary Education (45) Vocational Post-Secondary Non-Tertiary Education	Commonly lasts 2 or 3 years. This level of education is generally designed to help students enter the labor market by providing them with vocational education. Is completed in some countries to gain an advantage for entering higher education levels for those who've completed ISCED level 3
5	Short-Cycle Tertiary Education Two types: (54) General Short-Cycle Tertiary Education (55) Vocational Short-Cycle Tertiary Education	Commonly lasts 2–3 years. Generally aimed at providing students with vocational-oriented, work-based competencies

ISCED	*Level/Stage of Education*	*Duration*
6	*Bachelor's* or equivalent *level* Three general types: (64) *Bachelor's* or equivalent Education, Academic (65) *Bachelor's* or equivalent Education, Professional (66) *Bachelor's* or equivalent Education, Unspecified orientation. This title is used in situations when there is no consensus on whether n bachelor's program is academic or professional	Requires 3–4 years of full-time university education. In education systems where degrees are awarded by total credits, a comparable number of credits must be obtained. Although not obligatory, it can be completed with a thesis or a project in some countries. While a *bachelor's* d*egree* is called "*the first* (academic) *degree*" obtained from a university or an institution of higher education, it can also be called the undergraduate degree
7	Master's or equivalent level. Three common types: (74) Master's or equivalent level, Academic (75) Master's or equivalent level, Professional (76) Master's or equivalent level, Unspecified orientation. This title is used in situations where there is no consensus on whether the master's or equivalent program is academic or professional	Normally completed in 1–4 years. In education systems where degrees are awarded by total credits, a comparable number of credits must be obtained. Commonly ends with an original thesis, project, or study equivalent to these. When integrated with bachelor's degree, the period of education may range from 5 to 8 years. It is also called the "*second*" or "*further degree*"
8	*Doctoral* or equivalent level (84) Doctoral or equivalent level, academic (85) Doctoral or equivalent level, Professional (86) Doctoral or equivalent level, Unspecified orientation. This title is used in situation where there is no consensus on whether the doctorate program is academic or professional	Takes at least 3 years. Has specific conditions for entrance and graduation. Requiring an advanced level of work and original research, this level/degree is offered in research-based higher education institutions. While generally includes both classes and research, some education systems have few or no classes. It is also called PhD, DPhil, D.Lit, D.Sc, or LL.D in some education systems

Source Obtained and summarized from UNESCO (2012)

General or Vocational Technical Education

In many countries in the world, young people have to make an important decision at the end or at a certain stage of their compulsory education, the results of which will strongly affect the rest of their lives. As a result of deciding between two types of education, individuals choose either general education or vocational and technical education. General education aims to improve skills that are generally useful in all professions (e.g., literacy, numeracy) but does not aim to prepare individuals for a particular profession or group of professions. Meanwhile, vocational and technical education aims to develop skills for a specific group of professions, a specific profession, or a specific type of business (CEDEFOP, 2017). Vocational and technical education not only provides its graduates with an advantage in finding jobs but also contributes to strengthening the economy, reducing unemployment, and increasing social inclusion (CEDEFOP & Education and Training Foundation [ETF], 2020). According to 2016 data across OECD countries, 56% of upper secondary education students registered for general secondary education while the remaining 44% registered for vocational and technical programs. The availability and accessibility of existing types of education and the value of the studied program in the labor market are among the determining factors in students' distributions when enrolling in general or vocational and technical secondary education institutions. In a third of the countries who share their data with OECD, the number of students enrolled in vocational and technical secondary education institutions is more than the number of students enrolled in general secondary education institutions. Table 2 presents the share of vocational and technical secondary education for all secondary education types in some OECD countries according to 2018 data (OECD, 2020a).

As seen in Table 2, the percentage of vocational and technical secondary education in all secondary education types in OECD countries varies greatly from country to country. The percentage of vocational and technical secondary education in all secondary education is greater than 70% in Finland, the Czech Republic, and Slovenia; greater than 60% in Slovakia, Austria, Netherlands, and Switzerland; while less than 20% in South Korea, Chile, and Brazil. Some of the main reasons behind these differences are the organization and structure of vocational and technical education, the opportunities these provide the attending students, the program content, and the opportunities it includes for proceeding to

Table 2 Ratio of vocational and technical secondary education schools in all secondary education

Country	*Percentage*	*Country*	*Percentage*
Finland	72	Portugal	40
Czech Republic	71	Estonia	40
Slovenia	71	Latvia	39
Slovakia	68	France	39
Austria	68	Hungary	38
Netherlands	68	Denmark	38
Sweden	64	Spain	36
Luxembourg	62	Ireland	36
Italy	54	Sweden	35
Poland	52	New Zealand	30
Russia	51	Iceland	28
Norway	49	Colombia	27
Australia	49	Lithuania	27
EU23 Average	47	Japan	22
Turkey	46	South Korea	18
Germany	46	Chile	16
England	44	Brazil	11
OECD Average	**42**		

higher education and employment. In spite of all the advantages of vocational and technical education cited above, the percentage of students enrolled in general education programs (56%) being higher than that of students enrolled in vocational and technical education programs is interesting. According to CEDEFOP and ETF (2020), the fact that few vocational and technical education graduates exist among white-collar managers and people who graduate from these programs are still mostly preferred for jobs that require physical activity are among the main reasons behind this. According to Jüttler et al. (2020), the most important reason why general education is preferred more is, because this type of education has a better recognition and reputation among people as well as greater expectations of prestige, high income, and social status. Similarly, the social stratum the parents belong to and the interests and talents of the student also have determining roles in the student's choice of school type in secondary education.

Discussions on the balance between general or vocational and technical secondary education types are commonly focused on the transition from school to work. In other words, they are evaluated according to the advantages they provide in post-graduation employment (Hanushek et al., 2017). Vocational and technical education plays a key role not only in technological and economic development but also in increasing/eliminating unemployment in general and youth unemployment in particular through positive contributions to employment (German Federal Ministry for Economic Cooperation and Research [BMZ], 2012). A significant difference exists in employment rates between vocational and technical secondary graduates and general secondary education graduates. According to Eurostat 2019 data, while the rate of employment in the first three years following graduation is 62.8% for general secondary education graduates (aged 20–34), this rate is 79.1% for vocational and technical secondary education graduates. Therefore, individuals that have received vocational and technical education are 16.3% more likely to be employed compared to those who have not. The employment rates of general education graduates and vocational and technical education graduates for EU member/candidate states are given in Table 3.

When considering Table 3 in general, countries with well-structured vocational and technical education systems, strong ties with the stakeholders (e.g., sectors, NGOs) included in the education process, and well-established graduate-tracking systems are seen to have significantly higher employment rates for vocational and technical secondary education graduates compare to general secondary education graduates. For instance, while the employment rate for vocational and technical secondary education graduates is 26.6% higher than that of general secondary education graduates in Germany, this gap is 26.3% for Luxembourg, 24.0% for Austria, and 23.6% for Estonia. However, the employment rate of general secondary education graduates is higher in some countries compared to that of vocational and technical secondary education graduates. Countries that fall within this group are noteworthy all former Soviet Bloc states with the exception of Finland, Greece, and Cyprus. Finland's existence within this group is a situation that begs for explanation. The conclusion is that the sectors the countries are predominantly fed by affect this issue. In some countries like England and the USA, secondary education institutions offer both general education and vocational and technical education simultaneously. While the students that go to these schools

Table 3 Employment rates of general secondary education graduates and technical secondary education graduates in EU member/candidate states

Countries	*General secondary education*	*Vocational and technical secondary education*	*Countries*	*General secondary education*	*Vocational and technical secondary education*
EU Average	62.8	79.1	Malta	86.0	91.2
Belgium	61.6	77.1	Netherlands	78.7	90.4
Bulgaria	63.0	73.5	Austria	64.0	88.0
Czech Republic	75.9	86.8	Poland	71.0	78.9
Denmark	77.1	84.7	Portugal	70.9	76.0
Germany	66.8	93.4	Romania	63.6	67.7
Estonia	62.6	86.2	Slovenia	77.3	79.1
Ireland	69.9	75.9	Slovakia	86.8	84.6
Greece	51.3	50.9	Finland	82.9	80.4
Spain	53.6	66.0	Sweden	83.0	87.4
France	50.8	68.8	United Kingdom	75.6	83.4
Croatia	No data	73.9	Iceland	89.2	No data
Italy	38.3	56.6	Norway	77.5	93.4
Cyprus	73.8	70.2	Switzerland	72.8	85.7
Latvia	74.2	65.6	Montenegro	No data	58.5
Lithuania	69.6	67.3	North Macedonia	33.2	57.1
Luxembourg	73.7	100.0	Serbia	No data	60.9
Hungary	71.7	86.3	Turkey	44.3	50.6

Source Eurostat (2020)

receive a solid vocational and technical education, they also receive a general education that provides them with an advantage in the transition to higher education (Machin et al., 2020). The Vocational and Technical Secondary School Project in Turkey (e.g., ITU Vocational and Technical Anatolian Secondary Schools and ASELSAN Vocational and Technical Anatolian Secondary Schools) can also be considered within the same scope. Like their equivalents in the USA and England, the Vocational and Technical Anatolian Secondary School Project in Turkey offers both a general education as well as vocational and technical education curriculum in the chosen profession. According to the International Labor Office (ILO, 2020), people who have graduated from vocational and technical

education institutions are more in demand in areas that require knowledge in advanced technology such as robotics and artificial intelligence compared to those who've graduated from equivalent general education institutions. Therefore, the preference of machines (robots) over humans in some professions in the future as a result of the developing technologies will not replace the availability of jobs for graduates of vocational and technical education; on the contrary, it will positively contribute to their employment.

The Cost of General Education and Vocational and Technical Education

Every education activity, or rather every type of activity whether it be education-related or not, has a cost. Direct or indirect, all expenses from the planning of activities to their implementation are included in this cost. Education expenditures in an education system include all expenditures for schools, universities, and other public and private educational institutions. Other direct or indirect educational services provided for students and their families are also included in this expenditure (OECD, 2020c).

Education expenditures are divided into two categories: direct and indirect. Direct educational expenditures include expenses directly related to education such as teachers' salaries and other investments in teachers, education expenses outside of school (in the workplace), and administrative expenses. Indirect expenditures are the expenses not directly related to education but that support education. These include students' meals, accommodations, transportation, and health expenses. Higher education expenses such as research and development and students' accommodations (e.g., dormitories), and health insurance are also considered within the scope of indirect educational expenditure. These expenses can be covered by public, private, or international sources. While public expenses are covered by central, regional, or local governments, private expenses are covered by families and other private organizations, religious organizations, and non-profit civil society organizations (e.g., charitable organizations, associations). These international sources are the funds provided by bilateral agreements or international agencies (OECD, 2018b). When considered within the context of these variables, the cost of vocational and technical education can be said to be higher than general education. The cost of a student receiving general and vocational technical secondary education and the percentages allocated to education from the

gross domestic products in OECD countries according to 2017 data are given in Table 4.

The currency is shown as PPS (Purchasing Power Standard), an artificial currency that tries to equalize the purchasing powers of different currencies. Theoretically, a PPS can buy an equal amount of goods and services in every country (CEDEFOP, 2020; data.oecd.org.tr). Numbers in bold show that the education program in question contains some elements from the other education type. Countries with a grey background (21) in Table 4 show where the expenditure per student is higher in vocational and technical secondary education compared to general secondary education. Countries with a white background (10) show where the expenditure per student is equal for vocational and technical secondary education and general education. Countries with a light blue background (6) show where the expenditure per student in general secondary education is higher compared to vocational and technical secondary education.

As seen in Table 4, although countries have significant differences, both the OECD average and the EU average (OECD = 11,521, EU = 11,774) for the cost for a student receiving vocational and technical secondary education is higher than for a student receiving general secondary education (OECD = 10,051, EU = 10,383). The cost for a student who has graduated from vocational and technical secondary education is on average 1500 PPS more than the cost of a general secondary education graduate. The cost of a vocational and technical secondary education graduates ranges from Mexico (3980 PPP) to Luxembourg (22,546 PPP). Various reasons may exist as to why the cost of a vocational and technical student varies so dramatically (about 4.5 times) among the countries. The main ones are: the size and structuring of vocational and technical education within the whole education system, the programs that are offered, investments aimed at updating or keeping programs up-to-date. Particularly in countries where a work-based vocational and technical education is provided, subsidization of the additional education expenses made in the workplaces and made by private sector by the government is one of the prominent factors that increase the cost of this education type. Similarly, some vocational and technical education programs require expensive equipment and advanced infrastructure; this is another factor that increases costs. These programs mainly include programs that require engineering, manufacturing, and construction. The percentage of these programs in all vocational and technical secondary

Table 4 Total costs for one student who has graduated from general and vocational technical education program and the percentage of GDP allocated to education

Country	*General Secondary Education*	*Vocational and Technical Secondary Education*	*% of GDP allocated to education*
Australia	14,019	7,371	6.0
Austria	14,425	18,054	4.8
Belgium	**14,210**	14,896	5.7
Canada	13,891	13,891	5.9
Chile	4,383	8,342	6.3
Colombia	3,436	3,436	5.5
Czech Republic	8,174	9,645	3.6
Denmark	9,526	9,526	5.5
Estonia	6,878	7,670	4.4
Finland	8,719	**7,985**	5.2
France	13,944	16,227	5.2
Germany	12,963	17,960	4.2
Greece	5,834	8,756	No data
Hungary	7,961	9,494	3.9
Iceland	10,785	13,426	5.8
Ireland	8,890	8,890	3.4
Israel	**6,940**	**17,258**	6.2
Italy	10,883	10,883	3.9
Japan	11,510	11,510	4.0
South Korea	14,394	14,394	5.0
Latvia	7,048	8,628	4.0
Lithuania	6,066	5,832	3.4
Luxembourg	22,236	22,546	3.2
Mexico	3,115	3,980	4.4
Netherlands	11,365	15,776	5.2
New Zealand	12,004	13,859	6.3
Norway	17,398	16,982	6.6
Poland	6,798	8,639	4.3

(continued)

Table 4 (continued)

Portugal	10,463	10,463	5.2
Slovakia	7.217	7,441	3.6
Slovenia	9,199	7,599	4.2
Spain	9,732	**12,851**	4.3
Sweden	11,078	14,723	5.4
Switzerland	18,966	18,966	
Turkey	5,448	6,159	5.0
UK	13,429	8,978	6.3
USA	15,202	15,202	6.1
OECD Average	10,051	11,521	4.9
EU23 Average	10,383	11,774	4.5

Source OECD (2020a)

education is 33% in OECD countries, although this does vary by country (OECD, 2020a). The distribution of vocational and technical education programs by country according to the preferred fields is shown in Table 5. The percentages in parenthesis indicate the percentage of vocational and technical secondary education in all secondary education in countries.

As seen in Table 5, the distribution of vocational and technical education programs in the fields of engineering, manufacturing, and construction are higher in 30 out of 37 OECD countries than in other fields. Therefore, per-capita cost of vocational education in these countries is higher than the others. In Ireland, Netherlands, Spain, and England, the programs of health and social services predominate vocational and technical secondary education. In Colombia, Luxembourg, and Brazil, the fields of business, management, and law are predominant. Only in Portugal does the service sector have a bigger share than others in vocational and technical education. The differences among countries with regards to the programs they put emphasis on in vocational and technical secondary education are related to the ties their economies have with the related sectors. For instance, the programs in Japan, where sectors of manufacturing and production are predominant in the economy, related to engineering, manufacturing, and construction have the highest percentage (42.42%) of all vocational and technical educations, whereas

Table 5 Distribution of vocational and technical education by programs in some OECD countries

Countries	*Engineering, manufacturing and construction*	*Business, management and law*	*Services*	*Health and welfare*	*Information, communication technology*
Hungary (38%)	50.73	10.69	29.75	4.19	0.07
Iceland (28%)	50.41	0.89	21.49	10.27	2.07
Estonia (40%)	49.73	2.00	28.35	No data	12.14
Lithuania (27%)	47.77	15.02	27.26	0.60	3.16
Chile (16%)	47.14	28.83	3.99	5.87	1.58
Sweden (35%)	43.87	8.16	19.20	18.73	No data
South Korea	43.66	27.45	5.31	2.51	4.81
Japan (22%)	42.52	30.25	7.62	5.85	0.44
Norway	41.01	7.01	18.12	26.98	2.01
Czech Republic (71%)	39.52	16.39	18.36	6.30	4.62
Greece (29%)	38.98	8.44	8.60	24.57	12.89
Poland (52%)	38.82	12.72	25.04	0.09	10.94
Russia (51%)	38.53	16.62	19.49	6.23	6.54
Slovakia (68%)	38.21	14.98	23.60	8.73	1.02
Latvia (39%)	38.83	12.19	26.34	No data	7.45
Belgium (57%)	36.07	21.27	22.72	7.45	1.36
Slovenia (71%)	35.66	12.88	15.36	12.29	5.24
Austria (68%)	34.94	27.96	18.83	2.95	2.41
Germany (46%)	34.41	32.99	12.27	11.18	2.86
France (39%)	34.13	21.22	19.10	19.12	No data
OECD Average	32.76	18.43	16.77	12.60	4.01
Switzerland (64%)	32.10	32.84	9.03	16.00	2.72

(continued)

Table 5 (continued)

Countries	*Engineering, manufacturing and construction*	*Business, management and law*	*Services*	*Health and welfare*	*Information, communication technology*
EU Average (47%)	31.53	16.82	19.43	12.90	4.59
Australia (49%)	29.75	19.48	16.54	21.00	0.46
Turkey (46%)	29.57	14.66	9.11	26.12	12.69
Denmark (38%)	28.88	23.78	13.97	25.13	No data
Italy (54%)	26.81	22.89	26.44	8.07	6.80
Finland (72%)	24.29	19.87	20.07	21.80	3.07
Colombia (27%)	24.05	46.76	No data	No data	No data
Luxembourg (62%)	22.79	30.09	5.25	14.44	2.74
Netherlands (68%)	17.82	19.42	21.64	24.15	3.95
Spain (36%)	17.51	13.17	14.50	19.52	6.60
Portugal (40%)	16.69	14.06	25.18	15.44	12.17
Brazil (11%)	15.95	26.91	3.75	10.66	15.66
New Zealand (30%)	15.55	13.27	15.27	4.40	0.16
England (44%)	8.51	11.51	14.75	15.55	3.68
Ireland (36%)	2.34	15.09	10.24	36.37	2.37

Source OECD (2020a)

programs in England related to the service sector and health and social services are highest (30.3%).

Vocational and technical education is divided into three groups according to the duration and type of education provided at a school or workplace: (a) school-based vocational and technical education, (b) school- and work-based vocational and technical education, (c) work-based vocational and technical education (Adıgüzel & Berk, 2009; OECD, 2018a). Although the majority of the theoretical classes and practices take place in the school in school-based vocational and technical

education practices, workplace practices are also found at certain percentages (e.g., 10%) or for certain periods (e.g., six months; Schaap et al., 2012). In school and work-based programs (also called the dual system), the theoretical part of education generally takes place at school, whereas the practical part takes place in real work settings with collaborations between schools and workplaces. The time spent at school (10–75%) and the time spent at the workplace (25–90%) differ by country depending on the age of the student and their chosen occupation (OECD, 2019). In work-based vocational and technical education, however, all of the training takes place at the workplace. Work-based vocational and technical education, which is preferred for the continuous vocational training of employees, concerns the current and future positions of the employee and aims to carry them to the next level. Because it is based on learning through practice/experience, it is performed on real work in real work settings (CEDEFOP, 2015a, 2015b).

Whether in the school-based, the work-based, or the dual system, workplace practices in vocational and technical education not only facilitate graduates' transition from school to the labor market (Horn, 2013) but also increase the chances of employment by providing them with the skills needed in the labor market (EC, 2013) and minimizing skill mismatches. Benefitting from these advantages of vocational and technical education is directly related to the duration of the workplace training, the suitability of the placement to the relevant field, and the quality of the offered workplace training (Kuczera & Jeon, 2019; Rintala & Nokelainen, 2019). In some countries that have shared their data with OECD (Denmark, Germany, Hungary, Ireland, Latvia, Netherlands, and Switzerland), the number of students enrolled in the dual system comprise 89% of the total number of students in vocational and technical education programs. The distributions of vocational and technical secondary education students in school-based and dual systems for some OECD countries are shown in Table 6. The percentages in parenthesis indicate the percentage of workplace practices within the dual system. For example, Switzerland, where the share of the dual system within vocational and technical secondary education is 90.26%, has an 80% share of workplace practices and a 20% share of education provided in school (OECD, 2020a).

As seen in Table 6, 90% of the students enrolled in vocational and technical secondary education receive school-based training in 14 out of 35 countries. On the other hand, more than 44% of the students enrolled

Table 6 Distributions of vocational and technical secondary education students in school-based and dual systems for some OECD countries

Country	*School-based Vocational and Technical Education*	*School and Work-based (dual) Vocational and Technical Education*
Costa Rica	100.00	–
Czech Republic	100.00	–
Greece	100.00	–
Italy	100.00	–
Japan	100.00	–
South Korea	100.00	–
Lithuania	100.00	–
Mexico	100.00	–
Brazil	100.00	–
Spain (minimum 35%)	97.17	2.83
Sweden (60%)	94.44	5.56
Belgium	94.01	5.99
Israel (25%)	93.69	6.31
Estonia (18–25%)	93.52	6.48
Chile	87.69	12.31
Slovakia	86.69	13.31
Finland (80–90%)	85.89	14.11
Portugal (41–47%) 4	85.74	14.26
Poland (46%)	85.60	14.40
Luxembourg	77.96	22.04
France (62–75%)	75.42	24.58
Australia	74.14	25.86
Slovenia (22–50%)	72.00	28.00
OECD Average 3	65.60	34.40
EU23 Average 3	62.08	37.92
Austria (80%)	54.53	45.47
UK (<80%)	51.87	48.13
Iceland (20–50%)	44.46	55.54
Norway (50%)	28.82	71.18
Turkey (50%) 4	22.00	78.00
Germany (60%)	10.93	89.07
Switzerland (80%)	9.74	90.26
Netherlands (70%)	–	100.00
Denmark	–	100.00
Hungary	–	100.00
Ireland	–	100.00
Latvia (50%)	–	100.00

Source OECD (2020a)

in vocational and technical secondary education receive education in the dual system in 12 out of 35 countries. The ratio of the time spent at the workplace to total time in the dual system of vocational and technical secondary education also differs by country. For instance, the time spent at the workplace in Estonia is 18–25%, whereas this rate is 25% in Israel and above 80% in Finland and Switzerland. Similarly, whether the workplace practice is concurrent or consecutive depends on the country. While the education given at school and the practices carried out in the workplace are concurrent (parallel) in most countries, they can be consecutive in others. For instance, the first two years of the four-year (2 + 2) vocational and technical secondary education in Norway is given at school, while the last two years are spent at the workplace (OECD, 2020a). Regardless of the way it is offered, vocational and technical education that takes place by being involved in real work environments in real work processes undeniably not only minimizes the time lost for orientation by facilitating the transition from school to work but also improves the quality of vocational education by including the employer in the training process (Atkinson, 2016; Drysdale et al., 2016).

Future Projections in Vocational and Technical Education

Global economic competition is daily increasing the pressure it puts on businesses to produce more quality products in order to survive. High-quality products and high-quality works with high added-value are considered to be the core of economic success in the whole world for the economies of the next centuries. In light of these challenges, educating and developing human resources have tremendous importance for the sustainable and competitive development of all countries (UNESCO, 2004). In this context, the effectiveness of a vocational and technical education system is directly proportional to the extent it is able to meet the expectations of the labor market (sector) within global economic competitiveness.

As a result of globalization, the qualifications expected from skilled workers are changing. Today, occupations with previously clear-cut boundaries are now expiring and getting replaced by broad-based occupations consisting of different disciplines. As a result of this process, vocational and technical education should prepare individuals not for

jobs or professions whose boundaries have been precisely set beforehand but for professions whose qualities, contents, and boundaries can change as needed based on the conditions of the rapidly changing world. This change that occurs in professions and ways of doing work require individuals to be provided with vocational and technical skills related to employment in the labor work as well as social skills such as collaboration, effective communication, problem-solving, life-long learning, and information literacy.

Although field-specific vocational and technical skills called hard skills are important in the rapidly changing labor market full of uncertainties, another group of skills is found to be just as important for success: social skills. Hard skills are the technical or non-technical (soft/hard) skills that are the subject of employment; they are usually acquired through education and completed with a diploma or certification. The employment of an individual in a line of work mainly depends on these skills. Social skills (also called complementary and supporting skills) are usually the inborn qualities such as one's personality traits, but these skills can also be acquired and/or developed through education. For instance, a lawyer's or engineer's field-specific knowledge and skills constitute their hard skills, whereas skills like effective communication, cooperation, and team-work are the social skills that provide an advantage to their owner in a more effective use of these hard skills and boost their total effect.

In addition, the quick adoption of developing technologies and new forms of work organization radically transforms workplaces, employment relationships, and labor market dynamics. These transformations will not only cause some sectors to shrink and some professions to disappear but will also pave the way for new skills and competencies yet unknown. Certain changes will also occur in the function and content of the vocational and technical educational institutions responsible for providing individuals with not only an education suitable for the needs of these newly emerging skills but also with social skills. In this context, vocational and technical education institutions will have to go through certain transformations in terms of organization and content.

Structural Status of Vocational and Technical Education Institutions in the Future

Institutions that provide vocational and technical education should function as life-long learning centers. Education is not a process that is limited to a certain time period or to certain school years, nor does it end after

acquiring a diploma or certification in a specific field. Today, employees are unable to sustain their jobs in any field with the education they obtained in their school years. Therefore, any type of education individuals may need at any point in their lives or at any stage of their professional careers in any field should be made available to them. This concept, which has previously been called in-service training, has now evolved into continuing professional development, and should take place among the significant functions of vocational and technical educational institutions.

On the other hand, it is clear that changing jobs or workplaces will continue to be faster in the near future due to all kinds of crises (economic recession, pandemic etc.), technological, demographic, and other structural changes. Therefore, acquiring new skills and updating/improving existing ones will become even more crucial. Continuing professional development that is designed in accordance with the features/expectations of the target group and the labor market in acquiring new skills and updating/improving new ones will also play a key role in forming an effective life-long learning system. Trainings to be offered within the scope of continuing professional development can be utilized to both in acquiring new skills and ways of doing work that emerge in parallel with the developments in the sector and in the instruction of new technologies (CEDEFOP & ETF, 2020). The vocational and technical education institutions that are to host continuing professional development trainings will take on a complementary role in life-long learning in that sense. Employers will be substantial supporters of vocational and technical education institutions as continuing professional development centers within the scope of life-long learning because the skills and competencies acquired or updated in these institutions will directly contribute to work or establishments that are hiring, and as such employers will gain technological and financial benefits.

The change in the function of vocational and technical education institutions, whose current function is limited to providing formal (and partially informal) education to individuals within a certain age range, will also undoubtedly necessitate a special regulation in their administration. With this regulation, public institutions, sectors, non-governmental organizations (associations or foundations), trade associations, federations, or confederations, all of which are shareholders in vocational and technical education, should be included in the administration process in proportion with the benefit they gain from the output.

Content and Process

Aside from the functional and structural changes in vocational and technical education institutions, their content should also be amended in some ways in the future. For a vocational and technical education to be able to meet the constantly changing expectations of the labor market, the content should not be specific to standard occupations or courses but should be prepared for the skills required by employing institutions (sectors, labor markets). The effort and time spent should be minimized by arranging content modularly so as to meet the expectations of the sector or employer in the best way possible. A module is a self-contained learning unit with content that can be taught on its own; it can be combined with other modules to form a larger group of vocational functions; it provides qualification for employment with certification if necessary; and it contains at a minimum, objective, content, process, and assessment dimensions. On the other side, modular education is a learner-centered education style in which instruction is delivered wholly or partially through modules (Berk, 2019, p. 32).

According to CEDEFOP (2015a), modular education has a key role with its flexible and learner-based structure in meeting the rapidly changing skill needs of the individual and the sector. As life-long learning centers, providing continuous professional development trainings in a modular content will increase VET institutions' effectiveness.

In today's labor market where the knowledge and competences acquired during formal school years becomes invalid and/or insufficient, individuals gaining the competence of learning to learn (one of the eight key skills in European Union documents) is crucial to keep their jobs. Learning to learn is a competence that includes the skills of being aware of one's learning needs and learning process/characteristics (e.g., learning style, learning strategy), identifying existing opportunities for learning, and overcoming obstacles encountered in the learning process. Learning to learn involves integrating one's new knowledge and skills with existing learning and life experiences in order to use and apply them over various settings (e.g., home, work, and school; Official Journal of the European Union, 2006). Institutions that provide vocational and technical education should have occupation-specific competences that help with employment, as well as practical social and complementary trainings that include learning to learn in their content. Like other skills,

social- and complementary-skills training should also be carried out in practice to ensure that the learner has been adopted as a behavior.

As in other levels and types of education, technical teachers have a key role in the success of vocational and technical education. While technical teachers perform their teaching duties, they also carry out processes such as experimentation, application, production, and technological development. Therefore, technical teachers should also have the knowledge and skills on how to use theoretical knowledge in solving the problems encountered at home, at school, or in social life in addition to a deep and broad technical knowledge and practical skills (work experience) in the field they teach. Especially in rapidly developing and changing fields and in occupations that require specific competences, the demand for teachers can be provided by these institutions in cooperation with the leading companies in the sector.

Employing sectors' experts as teachers in the VET institutions will not only satisfy the need for teachers but also improve the quality of training by providing production knowledge and skills and the ability to apply knowledge in real professional life problems. Welcoming technical teachers from various backgrounds in this way will allow them to bring the atmosphere they were trained in, their way of doing work, and their academic knowledge into the educational environment, which will lead to mutual enrichment. Teachers from different sources, like sectors, should always be able to take classes (especially teaching classes) from higher education institutions through mutual agreements between stakeholder institutions (sectors, VET schools, higher education institutions). Technical teachers should maintain close relationships with the labor market and spend a certain number of days per week or month in real workplaces. Also, continuing professional development lessons that may vary in duration and content depending on the field should be compulsory at regular periods.

Results and Suggestions

Vocational and technical education plays a key role in providing the skilled workforce needed for countries' economies. However, this education has a smaller share than general education in its education level (see Table 2). Graduating from vocational and technical education, despite the high cost, increases the chances of employment for the individual (see Table 3). This proves the necessity for increasing the share of vocational

and technical education in all secondary education levels. In that context, efforts should be made to improve the image and perception of vocational and technical education in society and certain advantages should be provided for those who attend this type of school. Incentives such as paying a certain amount of their insurance or giving allowance for their education expenses can increase the appeal of vocational education.

In vocational education, the cost per student is higher compared to general education although it varies depending on the program (see Table 4). The cost difference is even bigger in programs that require expensive equipment and infrastructure in particular. Therefore, resource waste should be prevented by taking necessary measures to ensure the employment of individuals in their training fields. For instance, employing an individual who has had four years of expensive education in mechanics for a job a general education graduate can do is a serious waste of resources. On that note, both directing the individual to the right profession by employing personality and vocational tendencies tests before they are oriented toward a profession (before they begin their vocational education) and offering incentives for their employment in their own area can contribute to preventing wasted resources.

Distributions of vocational and technical education by program vary from country to country. Programs related to sectors that comprise the economies of country are observed to predominate the technical and vocational education system of that country (see Table 5). When the service sector is predominant in a country's economy, programs that train prospective employees for this sector are also predominant; when the manufacturing/production sector is predominant in the economy, the programs that train prospective employees for this sector are predominant in VET institutions. In this context, when deciding upon the programs to offered in vocational education, populism should be avoided and programs responding to local, regional, and national needs should be offered.

Vocational and technical education is offered as school-based, work-based, or both school- and work-based (dual system) education (see Table 6). Transition from school to work becomes easier depending on how large a part the workplace practices take in the vocational and technical education system. The vocational education process should be practice-based and contain the element of workplace practices in order to be able to meet the constantly and rapidly changing needs of the labor market for individuals of all ages. When they are offered in the

dual system, the share of workplace practices should be no less than 50%, taking into account the type of the institution and the program, the level of education, and whether it is formal or informal. In this context, strong collaboration between educational institutions, employer establishments, and NGOs (organizations, foundations) should be ensured.

Institutions that provide vocational and technical education should undergo certain changes both in their structural functions and in their content and processes. Structurally, they should function not only as institutions providing education at a certain level but also as life-long learning centers that offer services from acquiring new skills to updating existing ones for all age groups. Changes in content and processes should also be made. Rather than programs with clear-cut boundaries in terms of content, a flexible modular structure whose content and limits can easily be adjusted as needed should be adopted. Modular education should not be limited to official documents or programs, but the modular structure should also be ensured in practice. Courses or modules should also be oriented at the acquirement/improvement of social skills in vocational and technical education institutions.

According to CEDEFOP and ETF (2020), the skill needs of the labor market will become complicated and unpredictable due to demographical changes, digitalization, green economy,[1] migration, and geographical mobility. A labor market skill agency should be established in order to be able to respond accurately, timely, and flexibly to the current and future challenges posed by these uncertainties. A Labor market skill agency should aim to minimize loss of time and efforts by identifying the types and levels of skills that may emerge in the future using scientific methods and sharing them with educational institutions, thus increasing the suitability of skills provided in educational institutions to the expectations of the labor market. By strengthening the cooperation between the main stakeholders of vocational and technical education, a labor market skill agency will help learners receive a better education highly suited to sector expectations. This establishment, which will serve as some kind of strategical skill foresight, will also guide in the correct structuring of programs and practices by providing accurate information to policy-makers, training and employing, teachers and vocational guides.

[1] *Green economy* refers to environmentally sustainable economic progress aimed at promoting low-carbon and socially inclusive development (United Nations, 2011).

The last but most important suggestion for vocational and technical education institutions is to have a unit within them for the recognition and validation of non-formal and informal learning or to be in strong cooperation with institutions and organizations that can undertake this function. Vocational qualifications acquired from different sources (non-formal or informal) in various ways should also be validated and given the opportunity to be employed.

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