

Unclassified**English text only****10 September 2020****DIRECTORATE FOR EMPLOYMENT, LABOUR AND SOCIAL AFFAIRS
EMPLOYMENT, LABOUR AND SOCIAL AFFAIRS COMMITTEE****Improving Evidence on VET: Comparative Data and Indicators****OECD SOCIAL, EMPLOYMENT AND MIGRATION WORKING PAPERS No. 250**

By Viktoria Kís, OECD Centre for Skills

Authorised for publication by Stefano Scarpetta, Director, Directorate for Employment, Labour and Social Affairs.

All Social, Employment and Migration Working Papers are now available through the OECD website at www.oecd.org/els/workingpapers.

Viktoria Kís, VET and Adult Learning Team, Viktoria.KIS@oecd.org**JT03465117**

OECD Social, Employment and Migration Working Papers

www.oecd.org/els/workingpapers

OECD Working Papers should not be reported as representing the official views of the OECD or of its member countries. The opinions expressed and arguments employed are those of the author(s).

Working Papers describe preliminary results or research in progress by the author(s) and are published to stimulate discussion on a broad range of issues on which the OECD works. Comments on Working Papers are welcomed, and may be sent to els.contact@oecd.org.

This series is designed to make available to a wider readership selected labour market, social policy and migration studies prepared for use within the OECD. Authorship is usually collective, but principal writers are named. The papers are generally available only in their original language – English or French – with a summary in the other.

This document and any map included herein are without prejudice to the status of or sovereignty over any territory, to the delimitation of international frontiers and boundaries and to the name of any territory, city or area.

The statistical data for Israel are supplied by and under the responsibility of the relevant Israeli authorities. The use of such data by the OECD is without prejudice to the status of the Golan Heights, East Jerusalem and Israeli settlements in the West Bank under the terms of international law.



Co-funded by the
European Union

© OECD 2020

You can copy, download or print OECD content for your own use, and you can include excerpts from OECD publications, databases and multimedia products in your own documents, presentations, blogs, websites and teaching materials, provided that suitable acknowledgment of OECD as source and copyright owner is given. All requests for commercial use and translation rights should be submitted to rights@oecd.org.

Acknowledgements

The author is very grateful to the European Commission, in particular Mantas Sekmokas, for their advice and inputs provided throughout the work. Many people provided input into the report and feedback on the draft, including colleagues in Cedefop, Eurostat and the Education, Audiovisual and Culture Executive Agency and members of the Group of National Experts on Vocational Education and Training, the INES Working Party and the LSO Network. Within the OECD the author would like to thank colleagues for their valuable feedback on drafts of this report, including Shinyoung Jeon, Pauline Musset, Giovanni Maria Semeraro, Marieke Vandeweyer and Annelore Verhagen. The author is grateful to Marie-Hélène Doumet for the opportunity to present the draft paper to members of the INES Working Party and LSO Network.

This report was prepared by Viktoria Kís from the OECD Centre for Skills. Giovanni Maria Semeraro from the Directorate for Education and Skills supported the review of currently available data with valuable knowledge of the Education at a Glance Database, undertook data analysis using the Education at a Glance Database and provided statistical support for the report. Pauline Musset revised the draft based on the feedback received in the revision process. Charity Kome and Jennifer Cannon provided administrative support and prepared the report for publication. The report was prepared under the supervision of Anthony Mann, Montserrat Gomendio and Andrew Bell from the OECD Centre for Skills, and Mark Pearson and Stefano Scarpetta from the Directorate for Employment, Labour and Social Affairs.

The opinions expressed and arguments employed herein do not necessarily reflect the official views of the OECD member countries or the European Union.

Abstract

The international landscape of vocational education and training (VET) is hugely diverse – and more diverse than most other sectors of education systems. There is wide variation across countries in how vocational programmes are organised and delivered, the ages and stages of education at which individuals pursue VET and how VET is funded. This diversity creates an opportunity to exploit cross-country variation to identify the features of VET systems associated with better educational, labour market and social outcomes for graduates. At the same time, country comparisons need good data, but comparative data on VET have major gaps. This report identifies existing and new indicators of VET systems that are suitable for international comparisons, based on current data availability and quality. The report does not directly fill those data gaps, but establishes the dimensions of the gaps and sets out how one might go about filling them, while giving some proposals for future indicator development.

Résumé

L'éducation et la formation professionnelles (EFP) offre, à l'échelle internationale, un paysage d'une grande variété – bien plus que n'importe quelle autre composante des systèmes éducatifs. Les pays en effet ont posé des choix très différents quant à l'organisation et aux modalités d'application des programmes d'enseignement, aux âges et niveaux d'instruction concernés et aux mécanismes de financement de l'EFP. Cette diversité est une aubaine pour isoler les caractéristiques qui favorisent la réussite, éducative d'abord, puis professionnelle et sociale, de ceux qui s'engagent dans ces filières. Cela étant, les comparaisons internationales doivent s'appuyer sur des données fiables, or celles sur l'EFP présentent de sérieuses lacunes. Le présent rapport se veut un inventaire des indicateurs, nouveaux ou préexistants, qui se prêtent à de telles comparaisons entre les systèmes d'EFP, eu égard aux données disponibles à l'heure actuelle et à leur qualité. S'il n'apporte pas directement de quoi combler les manques, il permet d'en mesurer l'étendue et propose un moyen d'y remédier ainsi que quelques pistes pour la construction d'autres indicateurs.

Table of contents

OECD Social, Employment and Migration Working Papers.....	2
Acknowledgements.....	3
Abstract.....	4
Résumé.....	4
Executive summary.....	7
Chapter 1. Introduction.....	9
The aims of this study.....	9
Methodology.....	10
Scope.....	10
Data sources.....	11
Chapter 2. The structure of VET systems.....	17
The issue.....	17
Existing comparative data, gaps and opportunities.....	18
Proposals for data development.....	22
Chapter 3. Students and participation in VET.....	25
The issue.....	25
Existing comparative data, gaps and opportunities.....	27
Proposals for data development.....	34
Chapter 4. Venues for learning: Balancing the classroom and the workplace.....	36
The issue.....	36
Part 1: Work-based learning (except apprenticeships).....	36
Part 2: Apprenticeships.....	43
Chapter 5. Resources for learning.....	52
Part 1: Financial resources.....	52
Part 2: VET teachers and trainers.....	61
Chapter 6. Synthesis of potential indicators and proposed data developments.....	70
Selected indicators of VET systems.....	70
Annex A. Information on selected VET indicators.....	74
Annex B. The availability of UOE data to underpin indicators.....	79
Annex C. EU-LFS ad-hoc module “young people on the labour market”.....	84
References.....	85

Tables

Table 1.1. Types of data/information addressed in this report	14
Table 3.1. Share of students enrolled by general/vocational programme orientation (2017)	28
Table 4.1. Measuring the weight of work-based learning – Eurostat data collection	40
Table 5.1. How data on work-based learning are included in UOE data	57

Table 5.2. Selected data and indicators on private expenditure	58
Table 5.3. Expenditure on educational institutions per full-time equivalent student (2016)	60
Table 6.1. Selected indicators of VET systems	70
Table 6.2. Proposals for data development	72
Table 6.3. Potential new indicators	73
Table A A.1. Information on selected VET indicators	74
Table A B.1. Enrolment indicators	79
Table A B.2. New entrants indicators	80
Table A B.3. Graduation indicators	81
Table A B.4. Finance indicators	82
Table A B.5. Personnel indicators	83

Figures

Figure 3.1. OECD average enrolment rates, by level of study (2017)	27
Figure 3.2. Share of students above typical age in vocational programmes (2017)	29
Figure 3.3. Students in vocational programmes providing access to tertiary education (2017)	30
Figure 3.4. Average age of entry into upper secondary general and vocational programmes (2017)	31
Figure 3.5. Upper secondary vocational graduates, by fields of study (2017)	32
Figure 3.6. Vocational programmes' new entrants, students and graduates as a share of all upper secondary programmes (2017)	33
Figure 4.1. Share of VET students in combined school- and work-based programmes (2017)	37
Figure 4.2. Taxonomy of vocational education and training programmes	39
Figure 5.1. Distribution of initial sources of funding and government transfers to the private sector (2016)	54
Figure 5.2. Share of upper secondary educational institutions, by resource category (2016)	55
Figure 5.3. A simplified scheme of financial flows in VET	56
Figure 5.4. Share of teachers younger than 30, older than 50 and women among teachers (2017)	65

Boxes

Box 1.1. VET in PISA	12
Box 1.2. Comparative data collections relevant for VET	13
Box 2.1. Definitions of vocational education and training	19
Box 2.2. Institutions providing upper secondary VET – country examples	22
Box 3.1. How is enrolment in VET decided?	25
Box 3.2. Transitions to tertiary education – insights from an ad-hoc survey	34
Box 3.3. Tools to track VET graduates – country examples	35
Box 4.1. Official definitions of programmes based on the use of work-based learning	38
Box 4.2. Definitions of 'apprenticeship' in comparative analysis	44
Box 4.3. The diverse landscape of apprenticeships	46
Box 4.4. Data on apprentices in the Survey of Adult Skills (PIAAC)	48
Box 4.5. National data sources on apprentices	50
Box 5.1. Incentives for apprenticeships – country examples	52
Box 5.2. Types of teachers and trainers in VET in comparative analysis	64
Box 5.3. Entry requirements for teachers in VET	66
Box 5.4. Targeted training for workplace trainers	67

Executive summary

There is wide variation across countries in how vocational programmes are organised and delivered. This diversity creates a huge opportunity to exploit cross-country variation to identify the features of VET systems associated with better educational, labour market and social outcomes for graduates. At the same time, country comparisons need good data. Compared to some other policy topics, like higher education or early childhood education and care, comparative data on VET have major gaps. One reason for this gap in the data is the complexity of VET, but it may also reflect the status of VET relative to general and academic education.

The report identifies both existing and new indicators of VET systems that are suitable for international comparisons, based on current data availability and quality. The report does not directly fill those data gaps, but instead will seek to establish the dimensions of the gaps and set out how one might go about filling them, while giving some proposals for future indicator development.

The availability of indicators and data gaps are identified in five broad key dimensions of VET systems:

- *The structure of VET*: The organisation of VET systems, in terms of institutions of delivery, programmes and qualifications makes a big difference to the capacity of the system to respond to changing needs. In order to better understand the structure of VET systems, data on the balance of general vs. vocational content of programmes needs to be collected, a definition for professional orientation at ISCED levels 6-8 needs to be agreed on, data on the types of qualifications and individual qualifications offered should be gathered, and information on the institutional setting should be made available. While several indicators already exist in these dimensions, such as the typical duration of VET programmes, many other relevant indicators need additional data collection (e.g. the share of vocational versus general content).
- *Students and participation in VET*: Effective VET systems need to offer high-quality learning options to students from all backgrounds, and provide avenues for progression to higher levels. Various indicators would be useful in this area, such as the share of graduates from International Standard Classification of Education (ISCED 3) programmes without direct access to ISCED 5 who enrol in bridging programmes, and the share of entrants to tertiary education by the highest qualification level attained.
- *Venues for learning*: Many VET systems provide work-based learning (WBL) opportunities to their students. How much and in what ways work-based learning is used within programmes have been poorly measured. Regarding WBL within school-based programmes, minimum requirements for training to be considered work-based learning WBL component– including location and tasks – should be set. Information about features of WBL should be collected, including its duration and sequencing, and student participation. Regarding apprenticeships, there should be an agreement on a definition for use in international data collections. The definition could include the minimum theoretical programme duration (e.g. 12 months), its mandatory aspect, the share of the curriculum delivered in the workplace (e.g. 50-90%), and a clear legal status, amongst others. This would also

help to create of mapping of key features of apprenticeship schemes. Finally, data should be collected on the characteristics of apprentices.

- *Resources for learning:* As for all education and training programmes, financial resources are key in steering the system, but many of the challenges and policy tools are specific to vocational programmes. To improve the understanding of financial resources allocated to VET, there should be an expansion of the country coverage and reporting of private expenditure. This would allow to create a mapping of financial transfer schemes in VET. Personnel is another important resource in VET, with the quality of the teacher and trainer workforce being critical to effective learning in vocational programmes. To improve the data on the VET workforce, categories of teachers and trainers in VET should be defined, and data on teachers and trainers should be collected.

In many cases, it is possible to implement proposed developments in a way that builds on comparative data and information that has already been collected, at least for some countries, to maximise added value in terms of better comparative data and indicators and minimise cost for countries. The proposed data developments may add value in different ways: some would improve the comparability of existing indicators, others might underpin future indicators or be used for ad-hoc research purposes.

The data development efforts proposed in this report will ultimately lead to better comparative indicators, yielding clearer signposts of the pathways towards stronger VET systems.

Chapter 1. Introduction

The aims of this study

The international landscape of vocational education and training (VET) is hugely diverse – and more diverse than most other sectors of education systems. There is wide variation across countries in how vocational programmes are organised and delivered, the ages and stages of education at which individuals pursue VET and how VET is funded. This diversity is captured by a range of studies, including country studies of VET carried out at the OECD (synthesised in OECD (2010_[1]; 2014_[2]; 2018_[3])) and by Cedefop (2019_[4]). This diversity creates a huge opportunity to exploit cross-country variation to identify the features of VET systems associated with better educational, labour market and social outcomes for graduates. At the same time, comparisons across countries need care: policies and practices in individual countries are embedded in the history and current status of the schooling system, industrial relations and sectors of economic activity.

Country comparisons need good data, and here, in the VET sphere, there are major challenges. Compared to some other policy topics, like higher education or early childhood education and care, comparative data on VET have major gaps. For example at present the data do not even allow for the number of apprentices in different countries to be counted in a comparable way. Often, international data collections have focused on general programmes that lend themselves to easier cross-country comparisons, in spite of the fact that nearly half the students enrolled in upper-secondary education across the OECD are enrolled in VET programmes. Some data collections follow international classifications, such as the International Standard Classification of Education (ISCED), which allows to breakdown the data by programme orientation. One reason for this gap in the data is the complexity of VET, but it may also reflect the status of VET relative to general and academic education.

As pointed out by the Inter-agency Group on Technical and Vocational Education and Training (IAG-TVET), which brings together key international organisations involved in the delivery of policy advice, programmes and research on the topic of VET, there has been increased interest in recent years in evidence-based policy-making in VET and the use of valid and robust evaluation and monitoring instruments and indicators (IAG-TVET, 2014_[5]). However, the IAG-TVET also notes that there are several long-standing problems relating to monitoring and evaluating VET, including fragmented VET provision in many countries, various methodological challenges relating to the definition of VET programmes and the generation of relevant indicators, and an absence of adequate mechanisms to collect, process and aggregate the data available.

The aim of this report is to identify both existing and new indicators of VET systems that are suitable for international comparisons, based on current data availability and quality. The report will not directly fill those data gaps, but instead will seek to establish the dimensions of the gaps and set out how one might go about filling them. Ultimately, the reward for data development efforts will be better comparative indicators, yielding clearer signposts of the pathways towards stronger VET systems.

This report was prepared as part of a project funded by the European Commission, composed of two complementary strands: one strand, leading to this report, focused on the data and indicators on key features of VET systems; the other strand exploited data on outcomes for graduates, see Vandeweyer and Verhagen (2020_[6]) and OECD (2020_[7]). This report also exploits synergies with work on VET indicator development carried out in the

context of the OECD Indicators of Education Systems (INES) Working Party. It builds on insights from extensive comparative analysis on VET carried out within the OECD and in other international organisations, including the EU and its agencies, in particular Cedefop, the International Labour Organization (ILO), Unesco and the World Bank, as well as the wider academic literature.

Methodology

The work was carried out in three steps. First, initial analytical work based on the existing literature identified a set of key policy levers relevant to the effective design and delivery of VET. These key levers are therefore those on which comparative data are needed. The second step involved a systematic review of existing comparative data, assessing the availability and quality of data and identifying opportunities for development. Recognising that in most cases internationally collected data rely on the availability of national data, the work also identified some national datasets that cover key policy levers, as a way of illustrating what might be achieved at international level, if more countries were to collect the same kinds of data.

The third and final step involved the preparation of this report, synthesising data availability and quality on key issues, identifying indicators of VET systems based on existing data and advancing proposals for data development to underpin new indicators. Proposals for data development were identified based on two criteria: policy value and cost implications – the best proposals have high policy value and low cost implications.

In the course of the work, input from member countries was sought in various ways. An initial workshop held on 7 February 2019 prior to the meeting of the OECD Group of National Experts on Vocational Education and Training identified key priorities in terms of data development. The preliminary draft report was shared for comments with the Group of National Experts on Vocational Education and Training and the INES Working Party in October 2019. Initial findings were also presented at the INES Working Party meeting held on 21-23 October 2019.

Scope

Levels of education and training programmes

Focus on programmes at ISCED levels 3, 4 and 5

This report is concerned with formal vocational education and training programmes that represent at least the equivalent of one semester of full-time study. It covers upper secondary, postsecondary and short-cycle tertiary vocational programmes (ISCED 2011 levels 3, 4 and 5). Nearly all OECD countries report having at least one vocational programme at upper secondary level (ISCED 3). In postsecondary non-tertiary and short cycle tertiary programmes (at ISCED 4 and 5) most enrolment is in vocational programmes, with a few exceptions.

This report excludes programmes that do not comply with the scope of the Unesco-OECD-Eurostat (UOE) data collection on formal education and therefore are not included in ISCED mappings (e.g. registered apprenticeships in the United States).

Programmes outside ISCED levels 3-5 are excluded due to lack of data

This report excludes programmes at lower secondary (ISCED level 2) and at some tertiary levels (ISCED levels 6 to 8), because comparative data that distinguish between general

and vocational or professional programmes are not available for many countries. In the case of ISCED 2, current data collections allow countries to report data on VET but country coverage of the data provided is very limited. In the case of higher level tertiary programmes, although ISCED 2011 allows, in principle, a distinction to be made between academic and professional orientation at ISCED 6 and above, internationally agreed definitions on programme orientation at these levels have not yet been developed (OECD, 2017^[8]). Currently less than one-third of OECD countries provide figures on enrolment in bachelor's and master's programmes broken down by academic/professional orientation (see Table 3.1) and those figures are based on national definitions of professional orientation.

This is a major gap in comparative data, given that such higher level professional programmes (e.g. professional bachelors and masters) play an important role in the skills systems of many countries, offering opportunities to develop advanced or skills (see also Proposal 2 in Chapter 2.).

Data sources

Potential data sources for comparative analysis of VET

A range of comparative data sources may offer insights into different issues in VET. A recent study examines potential data sources on work-based learning in VET in particular, with many findings relevant to VET programmes more broadly (Flisi, 2019^[9]). These potential data sources include:

- Regular collections of administrative data, such as those led by the INES Working Party and its networks at the OECD, Eurostat and the UNESCO Institute for Statistics are typically conducted on an annual basis and underpin comparative statistics and indicators on the features, evolution and outcomes of education and training systems (e.g. enrolment, graduation, expenditure, returns to education).
- Several surveys conducted by the OECD offer relevant insights. Ad-hoc surveys, which may be cyclical, can provide useful information on issues for which less frequent data collection is considered sufficient. Large-scale international surveys of skills and competences, such as the OECD Survey of Adult Skills a product of the Programme for the International Assessment of Adult Competencies (PIAAC) or the Programme for International Student Assessment (PISA) can offer insights regarding the skills of VET students or graduates (see Box 1.1 for examples from PISA).
- A number of European surveys offer insights into system level features and participation in different types of VET, as well as the outcomes of VET (e.g. Cedefop European Skills and Jobs Survey, Cedefop VET Opinion Survey, Continuing Vocational Training Survey; Labour Cost Survey; Structure of Earnings Survey; European Union Statistics on Income and Living Conditions). The European Union Labour Force Survey (EU-LFS) offers insights through relevant core variables (e.g. HATVOC variable distinguishing individuals who have a vocational qualification, TEMPREAS variable indicating short-term apprenticeship or traineeship contracts) or ad-hoc modules (e.g. 2009 ad-hoc -module on entry of young people into the labour market and 2016 ad-hoc -module on young people on the labour market).

Box 1.1. VET in PISA

Data from PISA shed light on the competences of 15 year-olds in pre-vocational or vocational programmes in reading, maths and science – but interpretation of these data is difficult for two reasons.

First, the performance difference between vocational and general students reflects to some extent selection mechanisms into vocational vs. general programmes, rather than the impact of VET on learning. Most vocational programmes across OECD countries start after age 15 – only 14.3% of 15-year-old students are enrolled in a vocational track on average across OECD countries, while the average share of enrolment in VET at upper secondary level is much higher at 43.5% (see Table 3.1). The programmes offered to 15 year-olds are in many cases different from upper secondary VET programmes more broadly (e.g., they target those at risk of dropping out).

Second, PISA results cannot reveal much about the impact of targeted occupational training because at age 15 students, even if they are in a vocational track, have typically spent very little time in such targeted training.

Some results from PISA 2015:

- On average across OECD countries students in pre-vocational or vocational programmes score 22 points lower in science than those in general/academic and modular programmes, after accounting for the socio-economic profile of students and schools.
- Vocational enrolment tends to be higher in disadvantaged schools than in advantaged schools.
- 15 year-olds enrolled in vocational programmes receive, on average, around 80 minutes less per week of regular science instruction than their peers in academic tracks.

Source: OECD (2016^[10]), *PISA 2015 Results (Volume II): Policies and Practices for Successful Schools*, <https://dx.doi.org/10.1787/9789264267510-en>.

Focus on system-level administrative data collected through the Unesco-OECD-Eurostat data collection, the OECD INES Working Party and its networks

This report mostly focuses on the first type of data mentioned above: i.e. data collected through the Unesco-OECD-Eurostat (UOE) data collection and Indicators of Education Systems (INES) and its networks, in particular the one administered by the INES Network for the Collection and Adjudication of System-Level Descriptive Information on Educational Structures, Policies and Practices (NESLI). Box 1.2 provides an overview of these data collections, as well as the now ceased Eurostat data collection on VET. The main reason for focussing on these system-level administrative data is that they are internationally comparable, provide coverage for a large set of countries and are updated regularly.

The UOE international data collection exercises only include *formal* programmes for the sake of international comparability and feasibility. Formal education is defined as education that is “institutionalised, intentional and planned through public and recognised private institutions”. It is “recognised as such by the relevant national education or equivalent authorities” (OECD, 2017, p. 25^[8]). Other types of education

(e.g. non-formal -education, informal learning, incidental or random learning) are outside the scope of UOE international education statistics. This means that some vocational programmes are excluded – those that fall under the category of non-formal education (i.e. institutionalised, intentional and planned by an education provider but not leading to a formal qualification recognised by education authorities). For example, in some countries, apprenticeships (e.g. United States) are excluded from the UOE data collection, because they lead to an 'occupational' qualification that is not seen as a formal education qualification.

Box 1.2. Comparative data collections relevant for VET

UNESCO-OECD-Eurostat (UOE)

The annual UOE questionnaires collect data on the enrolment of students, new entrants, graduates in various levels of education, educational personnel, class size, educational finance, and other aspects of education.

Network on Labour Market, Economic and Social Outcomes of Learning (LSO)

The work of the LSO Network, mainly through LFS data, focuses on various outcomes of education, including: educational attainment; school-to-work transitions; adult learning; employment, unemployment and earnings; educational and social intergenerational mobility; and social outcomes, such as health, trust in public institutions, participation in the political process and volunteering.

Network for the Collection and Adjudication of System-Level Descriptive Information on Educational Structures, Policies and Practices (NESLI)

The Network for the collection and adjudication of system-level descriptive information on educational systems, policies and practices develops indicators for collection of system-level data.

The Eurostat VET data collection (suspended)

The Eurostat VET data collection was a standardised collection of VET programmes in the EU. The data collection started in 1995 (with reference year 1993/94) and was organised jointly by Eurostat and Cedefop. In 2000 the VET data collection was suspended by Eurostat due to lack of resources. Several variables of the VET collection are now fully or partially collected by the UOE data collection. Some data are no longer collected, such as percentage of time spent at school vs. in the workplace; minimum qualification required for teachers and trainers; destination of participants directly after programme completion.

Individual and household surveys

Household surveys, such as the EU-LFS and the European Union Statistics on Income and Living Conditions (EU-SILC), and individual-level surveys, such as the OECD Survey of Adult Skills (PIAAC), collect information on the respondents' highest obtained educational qualification. This generally allows to distinguish individuals with general and VET qualifications.

Source: Cedefop (2008^[11]), *Evaluation of Eurostat education, training and skills data sources*, https://www.cedefop.europa.eu/files/5185_en.pdf; OECD (2012^[12]), *INES Indicators of Education Systems*, <https://www.oecd.org/education/skills-beyond-school/49338320.pdf>.

Terminology of types of data and information

This report uses the following terms to refer to different types of data and information that might be collected on VET:

- **Unit of analysis:** e.g. persons, institutions, programmes, qualifications that can be identified based on an operational definition.
- **Characteristics** of the unit of analysis (e.g. age, gender for persons).
- **Mapping of policy and practice:** These descriptions of policy and practice are linked to a particular unit or units of analysis, for example qualification requirements (policy) for teachers of vocational theory (where such teachers are the unit of analysis).

A clear definition of the unit of analysis is essential, as the comparability of results from data collections on characteristics, policy and practice hinges on the comparability of the unit of analysis itself. For example, clear definitions of types of VET teachers (in this case the unit of analysis) underpin the comparability of data on their age (characteristic), qualification requirements and working hours (policy and practice).

Table 1.1. Types of data/information addressed in this report

Type of data/information	Examples	Ways of improving data/indicators
Unit of analysis (which can be counted)	Apprentice, teacher	Create or refine existing operational definitions Define subcategories with operational definitions
Characteristics of the unit of analysis (which can be described)	Age, gender	Identify characteristics of interest for data collection
Policy and practice (which can be mapped)	Requirements for VET teachers	Identify areas interest for data collection. Refine existing data (e.g. adding qualitative information)

Analytical focus

The main purposes of VET

Vocational programmes may serve a variety of purposes. They may be designed to equip students with medium-level vocational skills and prepare them for entry into the labour market and/or higher-level studies. Some programmes target higher-level skills and lead to postsecondary or tertiary qualifications. Many countries strive for excellence in the design and delivery of VET programmes, by providing high quality vocational skills, supporting entrepreneurial activities, diffusing innovation, and acting as knowledge and innovation hubs for companies (European Commission, n.d.^[13]). Several studies have explored the links between skills and innovation (e.g. (Andrews, Nicoletti and Timiliotis, 2018^[14])) and some have highlighted the potential of VET to remove skills bottlenecks and facilitate the diffusion and adoption of innovation in particular in small and medium enterprises, where many VET graduates work (e.g. (Moso-Diez, 2019^[15])).

There are also programmes that focus on lower level vocational skills and aim to provide job-relevant skills to those who dropped out from school or are at risk of dropping out. Focusing on inclusion, some programmes are pre-vocational and help disadvantaged learners prepare for mainstream vocational programmes (e.g. (Jeon, 2019^[16]; Bergseng, Degler and Lüthi, 2019^[17]; Kis, 2016^[18])).

These different purposes tend to be associated with different programme characteristics (e.g. duration, level) and student characteristics (e.g. age, full-time vs. part-time enrolment). Comparative data and indicators can help provide a picture of the purposes of

vocational programmes and design features, underpinning the monitoring and assessment of VET systems.

Focus on selected features of VET systems

Among the many features of VET systems, a limited set were selected for analysis in this report. This selection of features was based on two criteria:

- The importance of the feature in comparative policy analysis: features were selected when policy and practice in the area is particularly important for high-quality VET, or data provide essential contextual information for the interpretation of other comparative data.
- The potential to obtain meaningful comparative data: The focus is on data that are internationally comparable and feasible to collect in the light of data availability at national level.

Based on these criteria, four features of VET systems were selected for analysis. First, it is important to understand how national VET systems are structured and fit within national skills systems. Second, data on participation and the profile of students are essential indicators of the attractiveness of VET systems, the characteristics of the target population and the output of the system in terms of targeted skills. Third, the use of different venues for learning (i.e. schools vs. workplaces) is a key feature differentiating VET systems across OECD countries – with some making extensive use of apprenticeships, while others offering school-based programmes only. Fourth, data and indicators are essential on resources dedicated to learning in VET: financial resources and more specifically, the supply and quality of teachers and trainers.

This approach means that some important VET policy issues were excluded from the scope of this report. For example, the governance of VET is important, including how social partners are engaged in the development and delivery of vocational programmes at national, regional, local and sectoral level. Yet limited availability of comparative data on this topic led to its exclusion from this report. Similarly, issues including career guidance, vocational pedagogy and measures of the vocational skills of students and graduates are beyond the scope of this report because the potential to obtain meaningful comparative data in the short and medium run is limited.

The areas covered in this report are closely linked to the four areas for monitoring and evaluating VET policies and reforms identified by the IAG-TVET: finance, access and participation, quality, and relevance. The latter area is outside the scope of this report, as labour market outcomes of VET graduates are documented extensively in the second strand of this project, see Vandeweyer and Verhagen (2020^[6]) and OECD (2020^[7]). The IAG-TVET provided an initial mapping of fundamental indicators that are readily available and of indicators that would be desirable, but that are not expected to be as readily available – certainly not in developing countries. This report builds on their initial mapping to identify existing and desirable indicators in OECD countries, providing a more detailed assessment in certain areas (e.g. work-based learning) and recommendations on how to advance comparative data collection.

The structure of the report

Chapter 2. explores how VET systems are structured in terms of programmes, qualifications and institutions. Chapter 3. looks at data on the profile of students and participation in VET (entrants, enrolment and graduates), including the targeted fields of study. Chapter 4. examines different venues for learning, looking at the balance of

work-based and school-based components. It first looks at the use of work-based learning in mainly school-based programmes, then it focuses on apprenticeships. Chapter 5. looks at resources for learning in VET: financial resources and the supply and quality of the teacher and trainer workforce. Each chapter starts with a critical review of existing comparative data, confirming their reliability and suitability for international comparison. Tables describing the availability of raw data to underpin specific indicators by type of programme (i.e. vocational vs. general, school-based vs. combined school and work-based) and ISCED level are provided in Annex B. This is followed by proposals for the development of comparative data.

Finally, Chapter 6. draws together the conclusions from the first four chapters, identifying key indicators of VET systems in the light of current data availability and quality, proposing new indicators, and highlighting the data that would be needed in support.

Chapter 2. The structure of VET systems

The issue

Why this matters for high-quality VET

The organisation of VET systems, in terms of institutions of delivery, programmes and qualifications makes a big difference to the capacity of the system to respond to changing needs. The challenge is to ensure that VET systems are flexible and responsive to changing labour market needs, without, as an unintended result, creating instability and complexity. When programmes and qualifications are changed too often, or there are too many of them, learners (and their parents) can find it hard to navigate through available options. Complexity or lack of continuity may also make it difficult for employers to engage with the VET system and trust the qualifications delivered. For example, it may be harder for employers to offer work-based learning if there are frequent changes in the skills they have to teach or in the associated administrative processes. If there are too many qualifications targeting similar skills, employers will become confused, and tend to attach less value to any individual qualification (OECD, 2014^[2]).

The occupational skills delivered by VET need to be responsive to labour market needs. In the short-term, this means ensuring that the number of people trained in different sectors and occupations is adjusted in response to labour market needs. In the medium and long-term programmes need to be updated, created or abolished. In addition to occupational skills aligned with labour market needs, graduates of vocational programmes also need a broader range of general skills. Sound literacy and numeracy skills underpin individuals' capacity to learn – whether in the context of higher education after completing VET, at work, or pursuing other opportunities to up-skill or re-skill. Vocational programmes need to give sufficient weight to these skills to ensure graduates are well- prepared not just for a first job, but for a lifelong career.

Why comparative data are useful

Data on how VET systems are organised in individual countries can underpin the interpretation of comparative data on specific issues, such as participation, fields of study and expenditure. Data can provide a picture of the range of vocational programmes offered within a country and how these are connected to other programmes in terms of pathways. The existence of pathways from VET to further learning matters for the attractiveness of vocational programmes. If students (and their parents) perceive VET as a dead-end, those who are not sure about their career plans may want to keep their options open by pursuing academic education. So the mere existence of vertical pathways from VET to higher levels of education or training helps enhance the status of vocational programmes. In addition, the existence of horizontal pathways from VET to general education, even if rarely taken up, can signal that general education remains an option for VET students at different stages of their learning career.

Programmes with *some* vocational content come in many shades of grey. Data on the balance of occupational vs. general skills targeted by programmes would allow a more nuanced picture of programmes with vocational content. Within vocational programmes, the desirable amount of general content is likely to depend on the purpose of the programme and the profile of its students. For example, some vocational programmes with a strong general component may be designed as a pathway to tertiary education. Also, data can reveal whether general skills receive sufficient attention – too little general education can

amplify initial weaknesses in literacy and numeracy in a damaging way, particularly when the programme is part of the initial education system.

Existing comparative data, gaps and opportunities

Programmes

ISCED mappings provide an overview of programmes offered

ISCED mappings give an integrated overview of national education programmes and provide details of what might be called “types of vocational programme” – identifying for example upper secondary technical or vocational programmes, but not drawing a distinction between electrician and plumbing apprenticeships. The variety of individual programmes offered might also be related to where they are delivered. Schools might organise individual programmes into a smaller set of options, while apprenticeships might offer a wider range of individual programmes, especially if the curriculum is negotiated to a large extent between each company and school or college. For example, in the United States apprenticeship programmes can be customised according to the needs of individual employers.

There is variation across countries in how broad or narrow some programmes are, as defined in ISCED mappings. For example in France, “professional tertiary education in IUT” refers to two-year studies in technological fields at ISCED level 5. By contrast, in the United States “certificate programmes” (ISCED level 4) can be offered in any field of study and typically last from six months to less than two years.

Programme orientation is classified into two categories

The distinction between the vocational or general orientation of education programmes is based on the ISCED definitions, and many indicators at level 3 and 4 in the UOE data collection are available by programme orientation (see Box 2.1). In practice, the boundary between vocational and general programmes can be blurred and it may be hard to classify programmes that contain a mix of general and vocational education and allow direct access to tertiary education. This opens room for different interpretations at national level, leading to possible inconsistencies in comparative data.

The current UOE definition for the orientation of education programmes (OECD, 2017, p. 83_[8]) might have the unintended consequence of encouraging the classification of programmes that allow access to higher level programmes as general. The definition of general education mentions preparation for higher level programmes and lifelong learning. By contrast, the definition of vocational education is silent on preparing participants for lifelong learning.

Various countries have programmes that contain the term ‘vocational’ or ‘technical’ in their title and lead to a vocational qualification but also allow direct access to higher levels of education, however being, in at least some cases, classified as general. For example, in Ireland the Leaving Certificate Vocational Programme, which provides direct access to tertiary programmes, is classified as general education (Eurostat, 2020_[19]). In Switzerland the vocational baccalaureat, classified as general education in the ISCED mapping, combines apprenticeship with additional general education and provides access to universities of applied science (UNESCO, 2020_[20]). That being said, only in a quarter of OECD countries do only general programmes give access to tertiary education, suggesting that many countries do not automatically classify programmes that give access to tertiary education as general.

Moreover, the definition of VET used in the context of the coverage of vocational and professional education (OECD, 2017, p. 28^[8]) recognises that programme orientation does not necessarily determine direct access to tertiary education: vocational programmes may prepare for tertiary studies and some general programmes do not give direct access to further education. Indeed, in most EU countries the majority of upper secondary VET students are enrolled in programmes that provide direct access to tertiary education (Cedefop, 2018^[21]).

Box 2.1. Definitions of vocational education and training

The UOE statistical coverage is aligned to the International Standard Classification of Education (ISCED 2011) (UNESCO-UIS, 2012^[22]) and, for statistical reporting purposes, further detailed in the UOE Manual (UNESCO-UIS/OECD/EUROSTAT, 2019^[23]) and the *OECD Handbook for Internationally Comparable Education Statistics* (2017^[8]).

Orientation of education programmes

“Vocational education is designed for learners to acquire the knowledge, skills and competencies specific to a particular occupation, trade, or class of occupations or trades. Vocational education may have work-based components. Successful completion of such programmes leads to labour market-relevant vocational qualifications acknowledged as occupationally oriented by the relevant national authorities and/or the labour market.

General education programmes are designed to develop learners’ general knowledge, skills and competencies, as well as literacy and numeracy skills, often to prepare participants for more advanced education programmes at the same or a higher ISCED level and to lay the foundation for lifelong learning. Such programmes are typically school- or college-based. General education includes education programmes that are designed to prepare participants for entry into vocational education but do not prepare for employment in a particular occupation, trade or class of occupations or trades, nor lead directly to a labour-market relevant qualification.”

Coverage of vocational and professional education

“Vocational education and training (VET) programmes prepare participants for direct entry into specific occupations without further training. Successful completion of such programmes leads to a vocational or technical qualification that is relevant to the labour market. Vocational programmes are further divided into two categories (school-based programmes and combined school- and work-based programmes), based on the amount of training provided in school as opposed to the workplace. The degree to which a programme has a vocational or general orientation does not necessarily determine whether participants have access to tertiary education. In several OECD countries, vocationally oriented programmes are designed to prepare students for further study at the tertiary level, and in some countries general programmes do not always provide direct access to further education.”

Source: OECD (2017^[8]), *OECD Handbook for Internationally Comparative Education Statistics: Concepts, Standards, Definitions and Classifications*, <https://dx.doi.org/10.1787/9789264279889-en>.

Available data do not capture different nuances of programme orientation

In practice, all programmes that are not ‘purely general’ contain a mix of general and vocational content, but in varying proportions. Some programmes that lead to a vocational qualification have a large general education component (e.g. those with a technological orientation). Some of the general content in vocational programmes may be necessary elements of the occupational target (e.g. some physics for the electrician) but other content may be designed to provide a broader education to those pursuing vocational programmes. In Norway, schools can adapt the national curriculum to their needs and may choose to adjust the content towards the targeted vocational field. Conversely, some countries have programmes that are predominantly general, but have a small element of vocational content. For example, in the United States there is no separate vocational track in high schools, but students can sometimes choose to pursue ‘career and technical education’ (CTE) courses. These typically aim to give a flavour of an occupation rather than seeking to make students ‘job-ready’, and programmes do not lead to a recognised vocational qualification. Data on the vocational vs. general content in percentage terms within programmes could therefore help capture this variation, which has important implications.

The removal of ‘pre-vocational’ orientation in the ISCED taxonomy may have affected reported enrolment patterns

A recent Cedefop report (2018^[24]) found that the reclassification of programmes following the implementation of ISCED11 might have led to changes in reported enrolment patterns in comparative data, without any actual change over time.¹ The transition from the earlier ISCED97 to the new ISCED11 classification eliminated the pre-vocational category: some programmes classified in ISCED97 as pre-vocational were reclassified as general, some others as vocational, while still more were split into two programmes or classified as out of scope. For example, in Austria, one pre-vocational programme was reclassified as vocational and another as general. In Denmark, two pre-vocational programmes were defined as out of scope of the UOE. In Italy, two pre-vocational programmes were merged into one vocational programme, while another pre-vocational programme was split into a general and a vocational one (Cedefop, 2018^[24]).

For ISCED levels 6 and above there is no commonly agreed definition for vocational or professional orientation

ISCED 2011 allows for the possibility of coding academic and professional orientation at tertiary levels, but internationally agreed definitions on programme orientation at these levels have not yet been developed (OECD, 2017^[8]). Less than a third of OECD countries provide figures on enrolment in bachelor’s and master’s programmes broken down by academic/professional orientation (see Table 3.1). But these data are based on national definitions of professional orientation, which undermines the comparability of data.

¹ Programmes with vocational orientation have to provide labour market-relevant qualifications. The programmes classified previously as pre-vocational did not comply with this purpose and despite including some technical content they were not preparing for skilled worker and/or technician-level jobs. The ISCED2011 Operational Manual recommended that they are rather to be classified as general programmes. The assessment on the detailed content of pre-vocational programmes was carried individually by countries that could take the decision on the change of category.

Qualifications

The use of the term ‘qualification’

The term ‘qualification’ is typically used to refer to two different concepts. First, a qualification might refer to qualification 'type', with a title such as “diploma”, “certificate”, “national vocational qualification”. These are associated with one level or encompass several ones (e.g. Level 2 Certificate). Second, a qualification sometimes refers to an individual field of study, and, for vocational qualifications, a target occupation (or group of occupations). Examples include “Landscape gardener certificate” or “National Vocational Qualification – Chemical Technician”. This report will use the term “individual qualification” to refer to the latter.

A qualification might be achieved through one or more programmes

Sometimes there is a one-to-one relationship between a VET programme and a qualification such that the programme is the only route to the qualification. In other cases, a qualification does not necessarily correspond to a single programme. One reason is that more than one programme might lead to a given qualification: for example in the Netherlands, a basic secondary VET qualification (MBO niv.2) might be acquired through two programmes – either through full-time school-based or dual VET or part-time school-based VET. Some qualifications can be obtained without pursuing any fixed programme. For example, in Austria, Germany, Norway and Switzerland individuals with relevant work experience might take a final qualifying examination and obtain the same qualification as apprentices receive at the end of their training (Kis and Windisch, 2018^[25]). Systems for recognising prior learning, available in many countries, can allow individuals to obtain many types of qualification without following set programmes.

Data are available on different types of qualifications but not on individual qualifications themselves

ISCED mappings provide information on how programmes lead to particular qualifications. Currently no comparative data are available on individual qualifications (e.g. all vocational certificates for different occupations offered in a given country).² Information on how many qualifications and individual qualifications exist within a country can be an indicator of complexity.

Another reason for limiting the number of vocational qualifications is that employers may like narrow individual qualifications for the wrong reasons. Even if the required skills are similar to other occupations, very narrow qualifications reduce the risk of skilled employees moving to other industries (e.g. a cable car mechanic might have very similar skills to other mechanics, but employers of cable car mechanics might have an interest in separating the two). Limiting the overall number of vocational qualifications helps to avoid this kind of practice.

Institutions

How institutions that deliver vocational programmes are organised is an important part of the national context. Currently data are available on whether institutions are public or

² The EU ESCO database provides information on qualifications at a more granular level, but as it is a register of programmes it does not include statistical data about their programmes (European Union, 2020^[91]). The ISCED-F classification on fields of study allows for detailed disaggregation of fields.

private. Several other features of institutional set-up are relevant for VET policy, for example:

- **Delivering only vocational or both vocational and general programmes:** This matters for teacher recruitment and might affect opportunities for students to move between tracks. For example, when the same institution delivers vocational and general education, recruiting general teachers might be easier as a maths teacher can teach in both tracks. Changing between tracks might also be easier when it does not imply changing schools.
- **One field or multi-field:** When an institution delivers several programmes in different fields of study, it might be more flexible in terms of adapting its provision to changing labour market needs. At the same time, offering various programmes requires additional equipment and staff, and limits opportunities for economies of scale.
- **Size:** Covering some of the fixed costs of VET (e.g. equipment for practical training) is particularly challenging to cover for smaller institutions. This makes it hard for small institutions to offer a wider range of programmes. But in areas with low population density and when it is important to provide options near students' home, small institution size is hard to avoid.

Other interesting data to collect on institutions includes measures of institutional autonomy and information about how institutions are financed (see Chapter 5. For a discussion on financial resources for VET). Box 2.2 describes some country examples, giving a flavour of the huge variation in how institutions delivering VET are organised.

Box 2.2. Institutions providing upper secondary VET – country examples

Regional training centres (ROC) in the Netherlands

Subsidised upper secondary VET programmes are delivered in 43 multi-sectoral ROCs, as well as specialised institutions (e.g. in trade and agriculture). They provide different types of vocational programmes and can enrol a large number of students (e.g. some have around 10 000 students). The creation of ROCs led to economies of scale, new types of governance and competition between institutions.

Source: (Smulders, Cox and Westerhuis, 2016^[26]), Cedefop ReferNet VET in Europe reports. http://libserver.cedefop.europa.eu/vetelib/2016/2016_CR_NL.pdf

Institutions providing upper secondary programmes in the United Kingdom

A wide range of institutions can deliver upper secondary programmes: further education colleges, sixth form colleges and state-funded or independent schools. FE colleges focus on technical and professional education and training, while sixth form colleges and secondary schools tend to provide academic education exclusively.

Source: AoC (2017^[27]), *College Key Facts 2016/17*, <https://indd.adobe.com/view/2ecfd04e-047c-49cc-91d3-18f9bdb9ca73>.

Proposals for data development

Proposal 1: Collect data on the balance of general vs. vocational content of programmes

This would enrich the current binary taxonomy of general versus vocational programmes with a more nuanced picture of programme orientation. It would also be useful to collect

such data for programmes currently classified as general in ISCED mappings — this would help identify programmes with some vocational content, including those that might be pre-vocational (often an ISCED level 2 or 3) and prepare for entry into vocational programmes, rather than entry into the labour market.

Data on the general component of programmes would measure the attention dedicated to general skills – including numeracy, literacy and digital skills – within vocational programmes – crucial in allowing transitions into tertiary education and more broadly, supporting lifelong learning. There is increasing awareness among policy makers, in the context of rapid automation driving greater need for worker reskilling and upskilling, that vocational programmes must prepare not just for a first job, but also for further learning (for example in Germany aspiration to improve “permeability” has been a driver in VET policy development since the 1960s (BIBB, 2011^[28])).

Data could be collected through an ad-hoc questionnaire. For each programme answers could refer to pre-defined ranges. One option would be to measure input hours of instruction dedicated to general vs. vocational subjects classified into ranges (e.g. 20- 29% of hours of instruction are dedicated to general subjects). The data collection might focus on the school-based component of programmes and the results obtained analysed in combination with data on the school-based share of the curriculum.

The implementation of this proposal would require a clear definition of what distinguishes vocational from general subjects. General subjects are not related to a specific occupational area (e.g. mathematics, language) and may be the same as those taught in general programmes, while vocational subjects are related to a specific occupational area targeted by the programme (e.g. electronics, sales techniques). In some cases, allocating a subject to one or the other category may be challenging, for example when both types of content are integrated in a class (e.g. a physics class specifically designed for electricians). Also the balance of general vs. vocational content might vary across occupations – in that case answers should describe the typical balance in the programme.

Proposal 2: Agree on a definition for professional orientation at ISCED levels 6-8

Similarly to the internationally agreed definition for vocational orientation for programmes at lower levels, an internationally agreed definition for professional orientation for programmes at ISCED level 6 and above would underpin the collection of comparative data. This would help fill a major gap in the availability of comparative data of a sector that in many countries is dynamic and plays a key role in developing higher level occupational skills.

Proposal 3: Collect data on the types of qualifications and individual qualifications offered

An initial mapping of qualification types (e.g. diploma, certificate) would provide a useful indication of the complexity of a country’s qualification system. This would be an intermediate step, providing a qualitative foundation for further information collection. The precise categories of qualification types would need to be defined in consultation with countries, recognising that existing qualification types differ across countries. This could then form the basis for the collection of information on individual qualifications, and allow a count of how many individual qualifications (i.e. specific to the target occupation) are offered for each qualification type. This would provide an indication of the breadth or narrowness of some qualification types. Information on individual qualifications could be linked to information on fields of study within the ISCED-F classification. Currently, the

categories of fields of study are based on academic areas, which are not always adapted to the context of VET, in which programmes and qualifications are driven by different target occupations.

Information on types of qualifications and individual qualifications offered could be linked to the VET programmes through which those qualifications can be obtained. In some cases there is a one-to-one relationship between a qualification and a programme, in others a specific qualification may be obtained through several programmes. Also the breadth of programmes might vary – some programmes may target one occupation or a small set of occupations, while others may target a wide range of occupations.

Proposal 4: Collect information on institutions that provide vocational programmes

Information on the institutional setting in which VET is delivered would provide useful contextual information on each country's VET system.³ Such information collection, with institutions as reporting units, might build on the current Eurydice data collection on educational institutions in Europe (Eurydice, 2019_[29]), which already offers data on the number of educational institutions from pre-primary to post-secondary non-tertiary education level (ISCED levels 0-4). The Eurydice data collection provides information on both institutions providing regular education and separate institutions dedicated to special needs education, with the data being disaggregated according to ISCED level, main orientation of the programmes provided (general and /or vocational) and number of institutions within that type (total and allowing a breakdown by public, government--dependent private, private independent).⁴

Issues to be covered through new data collection may include:

- Is VET typically delivered in dedicated institutions or within the same institution as general programmes at the same level?
- Do institutions that deliver VET typically specialise in one field of study (or group of occupations) or target several ones?
- A measure of school size (e.g. average school size might be obtained from data on the number of educational institutions and enrolment).

³ It should be noted that the UOE already has some data on institutions, more specifically on whether institutions are public or private, with the latter being further broken down into private government-dependent and private government-independent institutions.

⁴ Separate institutions dedicated to adult education are out of scope of the Eurydice data collection.

Chapter 3. Students and participation in VET

The issue

Why this matters for high-quality VET

Entrance and enrolment rates in VET and their evolution over time, are sometimes viewed as indicators of the attractiveness of VET systems (Cedefop, 2014_[30]) – although it is important to keep in mind how decisions about vocational or general enrolment are made. For example, in systems where tracking into VET is based on academic achievement, some students may have little choice in practice (see Box 3.1). Effective VET systems need to offer high-quality learning options to students from all backgrounds, and avoid being a vehicle for segregation in education and training. In many countries, enrolment in VET is influenced by academic achievement, which in turn is correlated with socio-economic status and immigrant background (OECD, 2016_[31]). The challenge is to ensure that students enrol in VET because it suits their interests and abilities, and not because of their personal circumstances, which they cannot influence (OECD, 2016_[10]). In addition, it is essential to ensure that VET graduates can pursue pathways of progression into higher levels of learning, including academic programmes – and that barriers to the use of such pathways are tackled.

Similarly, VET systems need to offer equal opportunities to men and women. Gender imbalances in particular fields or types of programme, for example, can raise equity issues – in an apprenticeship system dominated by the construction sector, the benefits yielded by apprenticeships fall disproportionately on men. Policies typically aim to address this in two ways: widening the coverage of programmes (e.g. expanding apprenticeships into traditionally female occupations) and encouraging entry into non-traditional occupations (e.g. encouraging women to train as electricians).

Box 3.1. How is enrolment in VET decided?

Selection and self-selection work in different ways across countries and the basis of selection can also vary (e.g. test results, records of academic performance, recommendations of feeder schools, teacher advice etc.). Some insights into selection mechanisms are available from PISA – although it is important to keep in mind that at age 15, only about 14% of enrolment is in vocational or pre-vocational programmes. This means that data can give an indication of the degree of selectivity in the school system, rather than precisely capturing selection into VET. PISA 2012 results show that in 13 countries, where vocational or pre-vocational programmes are offered at age 15, the majority of students are in schools that select students based on academic performance or school recommendations. PISA 2015 results show that disadvantaged students are much more likely to be enrolled in a vocational programme than their advantaged peers, even after taking students' science performance into account (OECD, 2016_[10]).

Source: OECD (2016_[10]), *PISA 2015 Results (Volume II): Policies and Practices for Successful Schools*, <https://dx.doi.org/10.1787/9789264267510-en>.

Why comparative data are useful

Data on participation in VET shed light on how VET fits within the overall national education and skills system.⁵ In many countries in continental Europe, Latin America and Asia, VET is one of the options at upper secondary level (ISCED 3). By contrast, in some other countries (e.g. Canada⁶, United States), VET is mostly offered at postsecondary level (Table 3.1). At upper secondary level, students may choose vocational courses usually as a small part of the high school curriculum (Kis, 2011^[32]; Kuczera, 2011^[33]). In many countries (e.g. Austria, Germany, Switzerland), provision is developed at both levels, with postsecondary vocational programmes offering avenues of progression for graduates of the upper secondary VET system (Musset et al., 2013^[34]; Fazekas and Field, 2013^[35]; Fazekas and Field, 2013^[36]).

Data on the age, gender and socio-economic background of students can provide a picture of the target population or main participants in vocational programmes in different countries (e.g. teenagers, young people with some labour market experience or older adults). Data on gender and socio-economic background in particular are useful to identify challenges related to equity and measure changes over time – as streaming of students into VET programmes and courses is strongly related to factors such as academic achievement, socio-economic status, and individual characteristics such as gender and migrant status

Data on the fields of study and occupations are indicators of the occupational skills targeted by vocational programmes. They help assess the alignment of provision with labour market needs, though without capturing the quality of graduates. First, data on entrants to different fields of study tend to reflect the choices of students – often balanced by other factors, such as labour market needs revealed by employer provision of work placements or quotas defined by authorities. Data on enrolment in different fields indicate the occupational mix programmes are developing – important, for example, when comparing expenditure on VET. Finally, data on graduates by field of study reveal the output of VET programmes.

Data on the take-up of progression pathways can be an indicator of the effectiveness of pathways. In some countries, there is a well-trodden path from upper secondary VET to postsecondary or tertiary education. In others those routes exist but are long and filled with obstacles, so few people end up taking them and many fall by the wayside – often because of weaknesses in academic skills among VET graduates. In addition, better data on pathways from VET also improve the interpretation of data on outcomes. For example, in some countries a considerable share of tertiary education students had completed a vocational programme (on average across European OECD countries 20% of tertiary students are graduates of upper secondary or postsecondary non-tertiary vocational programmes (Eurostat, 2016^[37])). Consequently, measures of outcomes from tertiary education will partially capture skills developed by VET. Also, data can reveal when learners complete a programme at the same (or lower) level as their highest level of qualification. For example, in Germany 29% of new apprentices have already completed general upper secondary education at the same ISCED level (BIBB, 2019^[38]).

⁵ VET systems might differ between subnational entities within countries, as is for example the case in Canada. This can complicate selecting indicators that are meaningful at the national level for purposes of international comparison.

⁶ In the case of Canada, how VET fits into the education system varies considerably by provinces and territories, both at the secondary and post-secondary levels. This complicates selecting indicators that are meaningful at the national level for purposes of international comparison.

Existing comparative data, gaps and opportunities

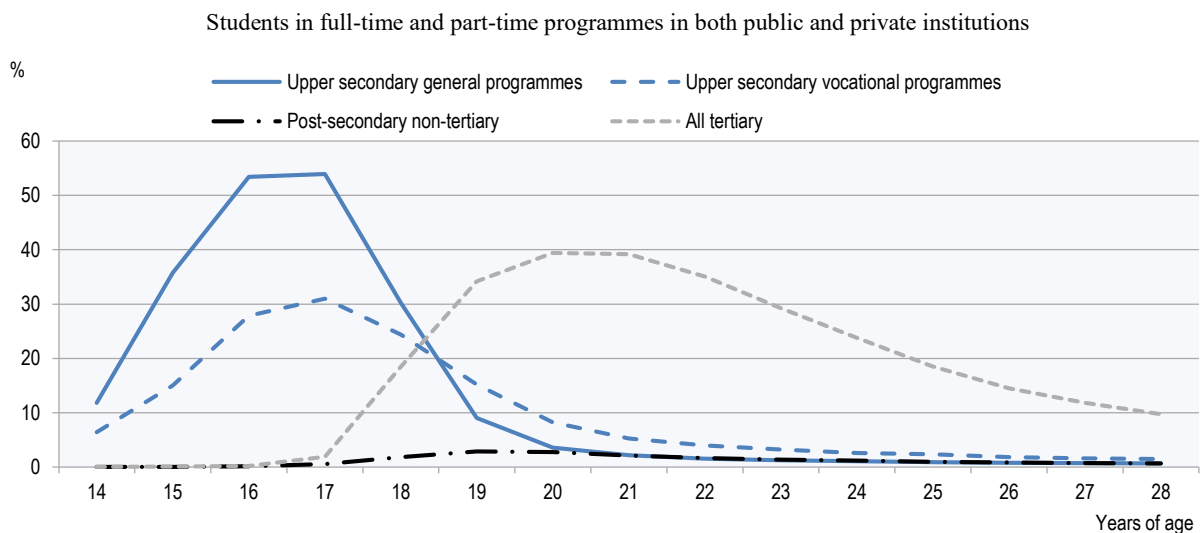
The UOE data collection provides data on entrants, enrolment and graduates by ISCED level and programme orientation. Data can be broken down by a range of variables, such as gender, age, field of study, part-time or full-time. Table A B.1 and Table A B.2 in Annex A provide an overview of data availability and opportunities to calculate additional indicators.

Enrolment

Data on the number of students enrolled in general and vocational programmes are collected for ISCED levels 3, 4 and 5 and they can be broken down by age, by fields of study, by school-based or combined school- and work-based nature of vocational programmes and by types of programmes allowing students to fully or partially reach completion and access tertiary education. Indicators based on enrolment data capture the full scope of educational institutions, including all types of institutions, all the grades and both initial and adult education, and they are used to describe the main features of education systems.

Enrolment rates are calculated by age and measure the participation of the population in education at all levels, at a specific level or in programmes with a general or vocational orientation. Analysing the evolution of enrolment rates over different ages gives a picture of students' transition through different education levels and/or programme orientations (Figure 3.1). Table 3.1 provides the breakdown of upper secondary to short-cycle tertiary education into general and vocational programmes and of bachelor's and master's education into academic and professional programmes.

Figure 3.1. OECD average enrolment rates, by level of study (2017)



Source: OECD (2019^[39]), *Education at a Glance 2019: OECD indicators*, <https://dx.doi.org/10.1787/eag-2019-en>.

Table 3.1. Share of students enrolled by general/vocational programme orientation (2017)

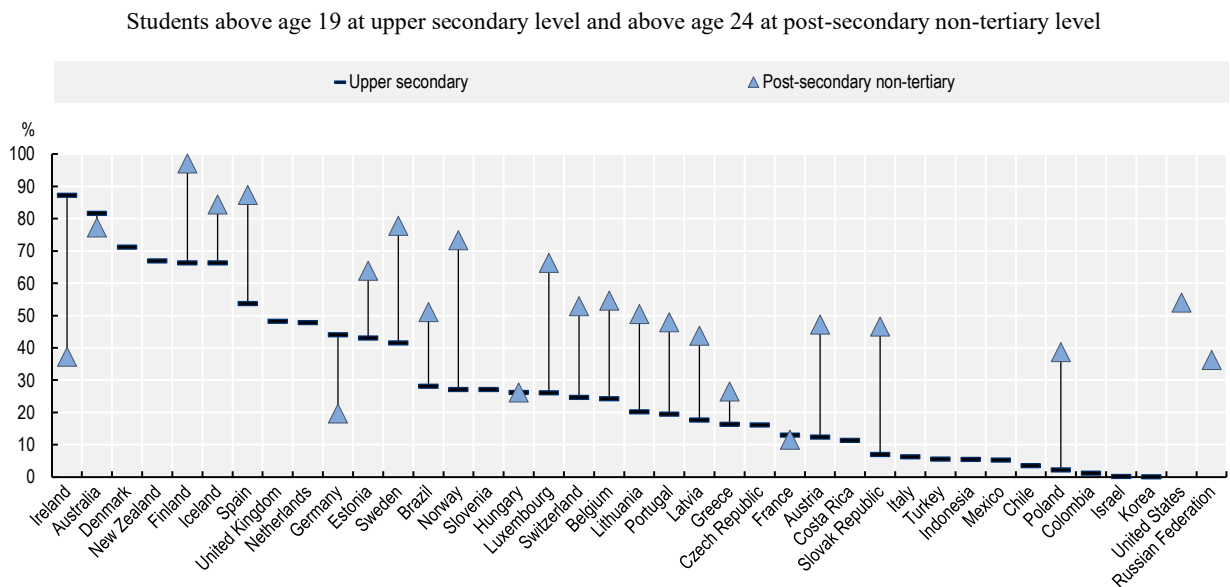
	<i>Upper secondary</i>		<i>Post-sec. non-tert.</i>		<i>Short-cycle tertiary</i>		<i>Bachelor's</i>		<i>Master's</i>	
	General	<i>Vocational</i>	General	<i>Vocational</i>	General	<i>Vocational</i>	Academic	Professional	Academic	Professional
Australia	45	55	n/a	100	3	97	no breakdown		no breakdown	
Austria	31	69	n/a	100	n/a	100	no breakdown		no breakdown	
Belgium	42	58	7	93	n/a	100	36	64	100	n/a
Canada	91	9	figures missing		figures missing		100	n/a	100	n/a
Chile	72	28	n/a	n/a	n/a	100	76	24	95	5
Czech Republic.	28	72	89	11	n/a	100	89	11	100	n/a
Denmark	61	39	n/a	n/a	n/a	100	40	60	94	6
Estonia	59	41	n/a	100	n/a	n/a	no breakdown		no breakdown	
Finland	28	72	n/a	100	n/a	n/a	no breakdown		no breakdown	
France	60	40	43	57	n/a	100	72	28	27	73
Germany	54	46	7	93	n/a	100	90	10	100	n/a
Greece	71	29	n/a	100	n/a	n/a	65	35	92	8
Hungary	77	23	n/a	100	n/a	100	no breakdown		no breakdown	
Iceland	70	30	1	99	40	60	no breakdown		no breakdown	
Ireland	90	10	n/a	100	no breakdown		no breakdown		no breakdown	
Israel	60	40	100	n/a	n/a	100	no breakdown		no breakdown	
Italy	45	55	n/a	Incl. in ISC3	n/a	100	no breakdown		no breakdown	
Japan	78	22	no breakdown		20	80	no breakdown		no breakdown	
Korea	83	17	n/a	n/a	n/a	100	97	2	35	65
Latvia	61	39	n/a	100	n/a	100	35	65	26	74
Lithuania	73	27	n/a	100	n/a	n/a	60	40	93	7
Luxembourg	38	62	n/a	100	n/a	100	52	48	35	65
Mexico	65	35	n/a	n/a	n/a	100	no breakdown		81	19
Netherlands	32	68	n/a	n/a	n/a	100	no breakdown		no breakdown	
New Zealand	71	29	no breakdown		no breakdown		no breakdown		no breakdown	
Norway	50	50	n/a	100	n/a	100	100	n/a	100	n/a
Poland	48	52	n/a	100	n/a	100	no breakdown		no breakdown	
Portugal	59	41	n/a	100	n/a	100	no breakdown		no breakdown	
Slovak Republic.	31	69	n/a	100	n/a	100	no breakdown		no breakdown	
Slovenia	29	71	n/a	n/a	n/a	100	55	45	n/a	n/a
Spain	65	35	n/a	100	n/a	100	no breakdown		no breakdown	
Sweden	66	34	29	71	15	85	breakdown n/a		breakdown n/a	
Switzerland	36	64	20	80	n/a	100	76	24	95	5
Turkey	54	46	n/a	n/a	n/a	100	no breakdown		no breakdown	
United Kingdom	53	47	n/a	n/a	54	46	100	included in ISC5	100	included in ISC5
United States	100	n/a	n/a	100	no breakdown		no breakdown		no breakdown	
Brazil	90	10	n/a	100	n/a		100		69	
Colombia	74	26	100	n/a	n/a		100		100	
Costa Rica	67	33	n/a	n/a	100	n/a	no breakdown	n/a	100	n/a
Russian Federation.	49	51	n/a	100	n/a		100		n/a	

Source: OECD (2019^[40]), Education at a Glance Database, <https://doi.org/10.1787/f8d7880d-en>

Most OECD countries offer vocational programmes in upper secondary education, although students enrol at very different ages as the share of older students (aged 20 and above) in OECD and partner countries ranges from 0% to nearly 90% (Figure 3.2). This

may also depend on differences in how individual countries classify programmes as general or vocational. Enrolment data also highlight that, unlike upper secondary education that offers also general programmes, the post-secondary non-tertiary and short-cycle tertiary levels of education almost exclusively include vocational tracks (Table 3.1), with some exceptions (e.g. Czech Republic and Israel).

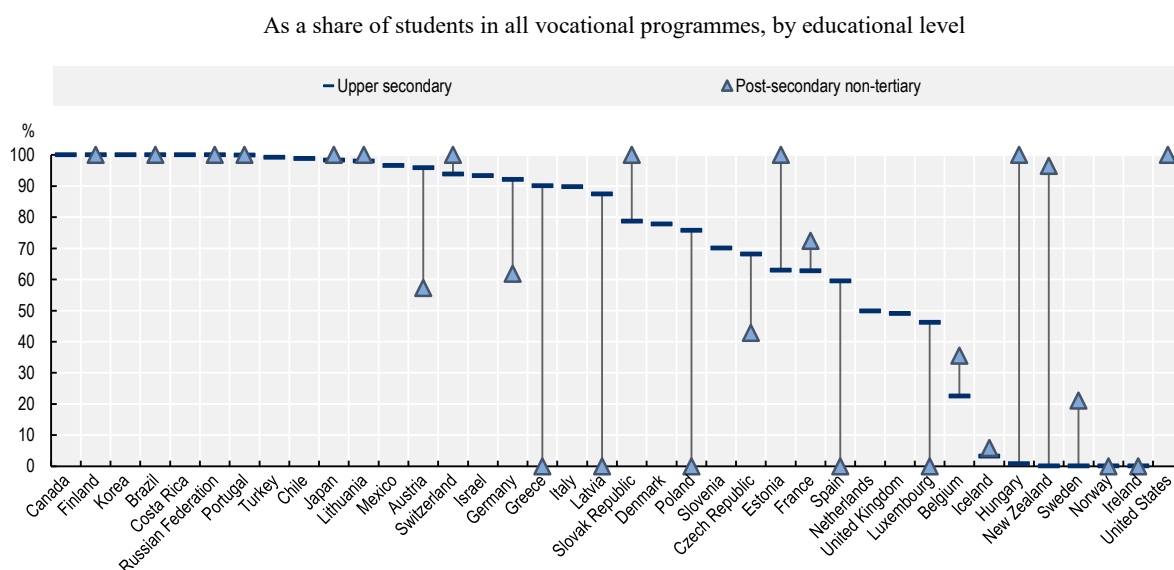
Figure 3.2. Share of students above typical age in vocational programmes (2017)



Source: OECD (2019^[40]), Education at a Glance Database, <https://doi.org/10.1787/f8d7880d-en>

Enrolment data by subcategories can be relevant to analyse pathways between secondary and tertiary education. At upper secondary level, for example, in about half of the OECD and partner countries at least 90% of students in vocational programmes are enrolled in programmes that provide access to tertiary education (Figure 3.3). In contrast, in about one-quarter of countries with data available, vocational programmes do not give access to tertiary education. This may be also related to the lower status of VET in national education systems or to the national classification of programmes reflecting the possibility to access tertiary education rather than programmes' general or vocational orientation.

Figure 3.3. Students in vocational programmes providing access to tertiary education (2017)



Source: OECD (2019^[40]), Education at a Glance Database, <https://doi.org/10.1787/f8d7880d-en>

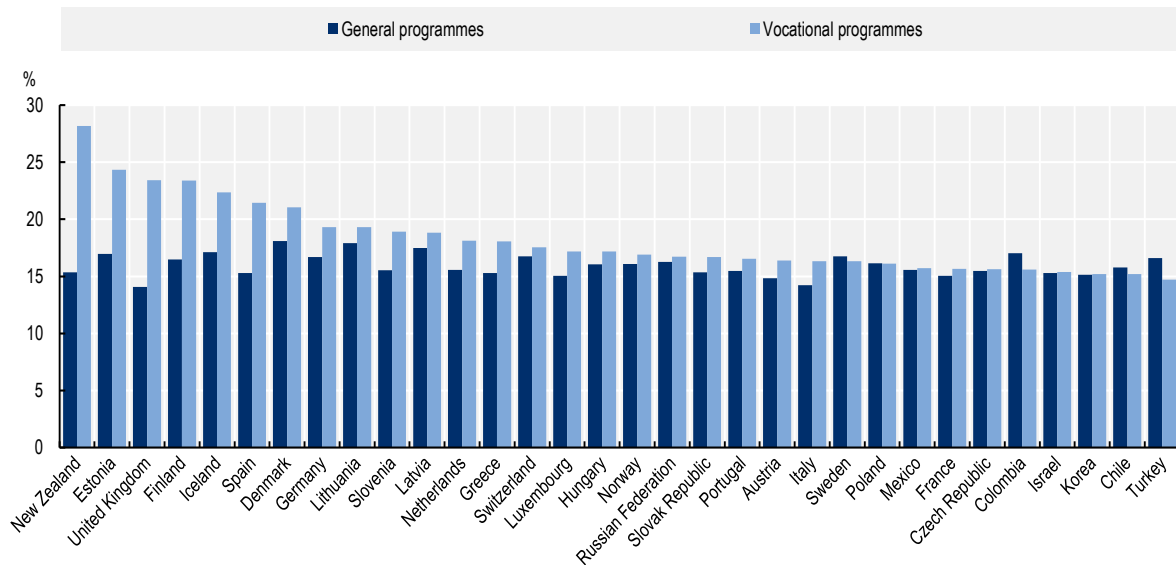
Entrants

Data on the characteristics of new entrants both to the general and vocational programmes are available. Figure 3.4, for example, shows the average age of new entrants into upper secondary general and vocational programmes. This reveals large differences between countries where upper secondary VET entrants are around 15 years old (e.g. France, Czech Republic, Israel, Korea, Chile, Turkey) and those where they are above 20 (e.g. New Zealand, Estonia, United Kingdom, Finland).

New entrants' data by age are used at tertiary educational levels to calculate tertiary entry rates by summing age-specific entry rates (OECD, 2019^[39]). However, entry rates are not calculated at upper secondary levels, mainly because of two reasons. First, upper secondary entry levels are relatively high in OECD countries as continuing education at least until the upper secondary level has become the norm. Second, the high number of new entrants leads sometimes to entry rates above 100% (e.g. Slovenia and United Kingdom at upper secondary level), reflecting both a need to review the existing data and to further develop the methodology to estimate the probability of entering educational programmes.

Data by age can also be used to calculate the average entry age to a certain programme or educational level. Average entry ages in vocational programmes range from 15 in Turkey to 28 in New Zealand and suggest that VET systems have different functions across countries, as they target different parts of the population at a different age and point in individuals' lives/careers. It is particularly striking how the average age of entry differs between general and vocational programmes in certain countries, e.g. Estonia, New Zealand and United Kingdom (Figure 3.4).

Figure 3.4. Average age of entry into upper secondary general and vocational programmes (2017)



Source: OECD (2019^[40]), *Education at a Glance Database*, <https://doi.org/10.1787/f8d7880d-en>

Graduation and completion

Data on both graduates and first-time graduates are available through the UOE data collection and allow the distinction between those who graduated for the first time and those who pursued a second or further qualification at the same level.

Table A B.3 in Annex B provides an overview of the availability of indicators on graduates and first-time graduation rates.

It is important to distinguish between the two concepts: graduation and completion rates. Graduation rates represent the estimated percentage of the population in a certain age group expected to graduate from a certain level of education (e.g. upper secondary) over their lifetime. By contrast, completion rates refer to the percentage of new entrants into a specified level of education who graduate with at least a first degree at this level, in the amount of time normally allocated for completing the programme.

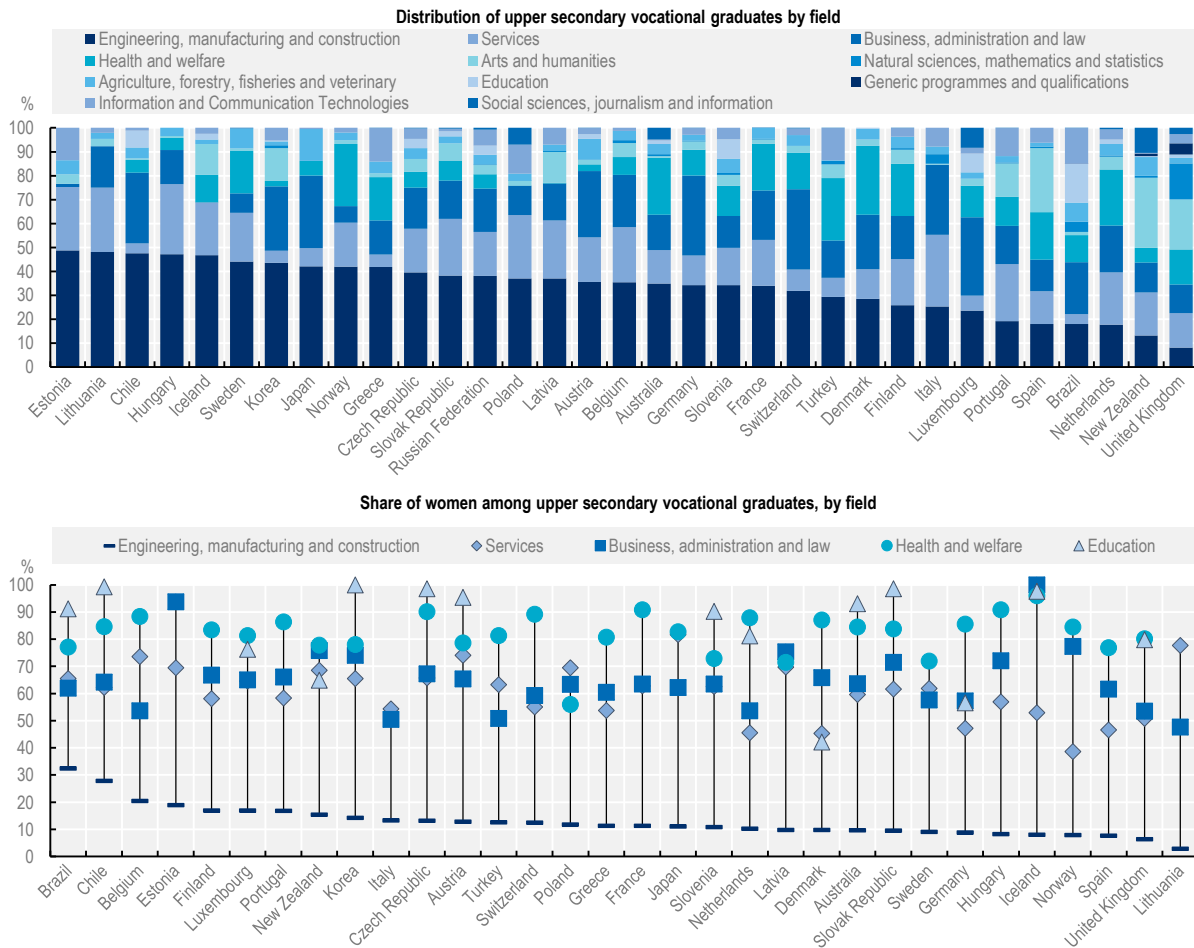
Data on entrants and graduates do not allow to track the flow of students through the system – for example graduates include those who obtained a qualification through validation of informal or non-formal learning without pursuing the programme that typically leads to that qualification. In addition, similarly to entry rates, the interpretation of first-time graduation rates is not easy and can be far from estimating the probability of graduating from a certain programme.

Information on the flow of students through the system is available through data on completion rates, collected through cyclical ad-hoc surveys conducted through the INES Working Party. Results from the 2016 OECD ad-hoc survey on upper secondary completion rates were published in *Education at a Glance 2017* (OECD, 2017^[41]). Results from the OECD ad-hoc survey on tertiary completion rates (see Box 3.2) were published in *Education at a Glance 2019* (OECD, 2019^[42]).

Data on graduates can, however, be analysed in relation to the fields of study, which are a relevant measure with regard to the supply of skills for the labour market. The breakdown by broad fields highlights that engineering, manufacturing and construction is the most

popular one in many OECD countries and it is especially popular among boys; another popular field of study is the one of services, but the gender balance varies to a large extent across countries (Figure 3.5).

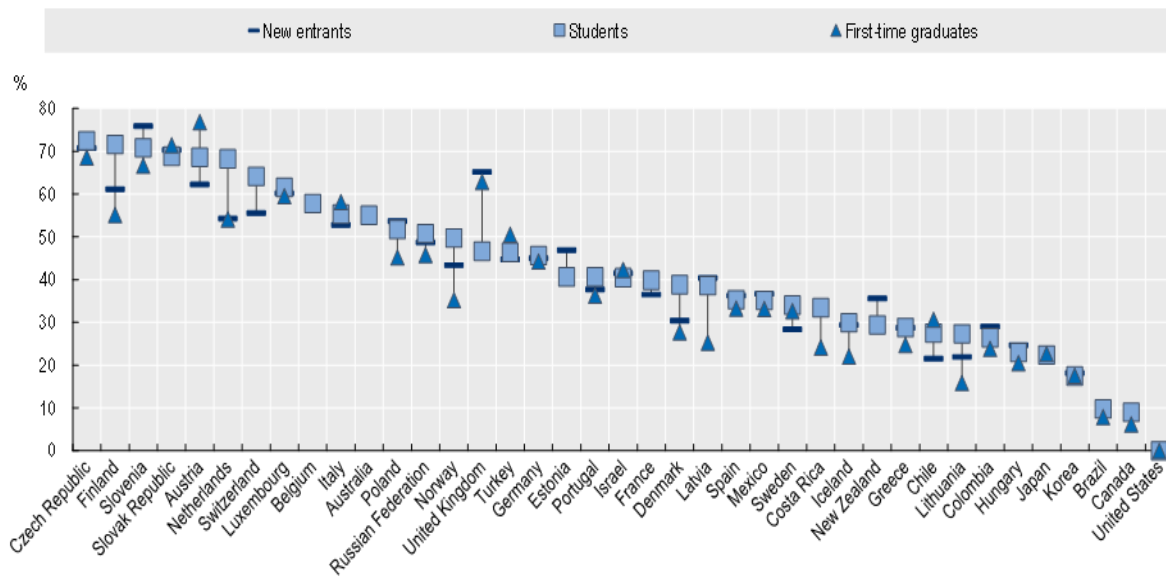
Figure 3.5. Upper secondary vocational graduates, by fields of study (2017)



Source: OECD (2019_[40]), Education at a Glance Database, <https://doi.org/10.1787/f8d7880d-en>

Indicators on graduates can also be related to data on enrolment and entry to VET programmes. For example, the evolution of the share of students in VET programmes from entry to graduation can highlight some patterns within educational levels and can help ensure coherence and full data coverage of new entrants, students and graduates.

Figure 3.6. Vocational programmes' new entrants, students and graduates as a share of all upper secondary programmes (2017)



Source: OECD (2019^[40]), Education at a Glance Database, <https://doi.org/10.1787/f8d7880d-en>

Transition to tertiary education

ISCED mappings allow to identify potential pathways

ISCED mappings describe higher-level programmes to which each programme provides direct access. This allows to identify potential entry routes into vocational programmes, as well as pathways from vocational upper secondary programmes to bridging programmes, postsecondary and tertiary education. Data are also available on the share of students in upper secondary vocational programmes that provide direct access to tertiary education (without distinction regarding the type of tertiary programmes accessible).

Ad-hoc survey data are available on transitions to tertiary education

The OECD ad-hoc survey on tertiary completion rates (see Box 3.2) collected data on the orientation (vocational or general) of the upper secondary qualification held by first-time entrants to ISCED 5, 6 and 7 long first degrees. In addition, data were collected on whether entrants took at least a gap year between these two levels or moved from upper secondary education without any significant break.

Box 3.2. Transitions to tertiary education – insights from an ad-hoc survey

The ad-hoc survey on tertiary completion rates followed a cohort of students from entry into bachelor's programmes until three years after the end of the programme's theoretical duration.

The survey found that in some countries (e.g. Estonia, Norway, Slovenia) graduates of vocational upper secondary education are more likely to have taken at least one gap year after completing upper secondary education and before entering tertiary education than those who pursued general upper secondary education. This may be driven by the fact that some VET graduates enter the labour market before pursuing further studies. Another reason might be that when vocational programmes do not allow direct access to tertiary education, VET graduates need to pursue a bridging programme or take a specific entry examination.

Source: OECD (2019^[42]), *Education at a Glance 2019: OECD Indicators*, <https://dx.doi.org/10.1787/f8d7880d-en>.

Proposals for data development

Proposal 1: Collect data on the use of progression pathways

The development of comparative data on pathways has been identified as a priority by many OECD countries. The description of VET systems and pathways between general and vocational education and programmes at ISCED 2, 3 and 4 and tertiary education is a priority area for indicator development in the INES Working Party.

Various indicators that could be developed in this area, include:

- Share of graduates from ISCED 3 programmes without direct access to ISCED 5 who enrol in bridging programmes (e.g. within a certain number of years following graduation). Data on this are currently not available.
- Share of entrants to tertiary education by the highest qualification level attained (e.g. ISCED 34 or 35 and, if relevant, participation bridging programmes).

In addition, information on the take-up of different pathways can be collected through the use of administrative data that allow tracking individuals or survey data. Several OECD countries have national data that allow the tracking of VET graduates – Box 3.3 describes some examples. Such tools are typically used to track VET graduates transition into the labour market, but it may also be used to follow pathways, which may include further studies, as well as periods of employment. For EU member states a mapping of VET graduate tracking measures has been completed (ICF, 2017^[43]). It shows that VET graduate tracking is considered systematic and well-established in Austria, Germany, Ireland, Luxembourg and the Netherlands and it is 'partially systematic' in another 14 EU countries (i.e. regular tracking systems which may not cover all regions, take measurements at multiple points or contain all key indicators). Survey data (e.g. labour force surveys) might also be used to identify upper secondary VET graduates who pursue postsecondary or tertiary education – for example asking respondents to report not only their highest qualification but their second highest qualification or the type of upper secondary programme they pursued.

Box 3.3. Tools to track VET graduates – country examples

Canada

The Education and Labour Market Longitudinal Platform allows researchers to unlock information about past cohorts of students from publically-funded college/university and registered apprentices to better understand their pathways and how their education and training affected their career prospects. The Platform consists of three core data sets: The Postsecondary Student Information System; The Registered Apprenticeship Information System; and Income Tax data, as well as other Statistics Canada datasets (e.g. Census 2016, Immigration Database (IMDB), 2018 National Graduates' Survey), and programme or administrative data from selected provinces and territories and ESDC (Employment and Social Development Canada). The data available within the Platform are linked longitudinally, allowing researchers to better understand the behaviours and outcomes of students and apprentices over time. There are plans to add further datasets that would allow to assess the effectiveness of program interventions.

It is worth noting that one of the primary objectives of the Education and Labour Market Longitudinal Platform is to produce data that will help develop labour market information and tools (e.g. ESDC's Career Tool) to assist upper and post-secondary students and job seekers in making decisions about their studies and career.

Source: Statistics Canada (2018^[44]) Pathways and earnings indicators for registered apprentices in Canada, <https://www150.statcan.gc.ca/n1/pub/37-20-0001/372000012018002-eng.htm>

England (United Kingdom)

The Department for Education has developed the Longitudinal Education Outcomes (LEO) database that brings together students' information relating to their education, employment and benefits claims from administrative data sources. In addition to information on employment, income, and any benefits claimed it contains information on students such as their personal characteristics (including gender and ethnic group), schools attended, courses taken and qualifications achieved, and if the young person qualified for free school meals or had special education needs during their education. LEO is used to enable comparisons of the performances of schools, colleges and universities; provide statistical information to support education and career decisions; evaluate and monitor the impact of education or training on outcomes; and support government decision making which improve services.

Source: Department for Education – England (2017^[45]), Longitudinal Education Outcomes study: how we use and share personal data, https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/664729/LEO_privacy_notice_Dec17_v1.0.pdf

Estonia

Tracking graduates is a legal obligation and data are regularly analysed. The measure 'Labour Market Success of Vocational and Higher Education Graduates' uses administrative data and covers VET and higher education graduates (e.g. employment status, income) and provides feedback on the education system for actors at various levels (e.g. school level). In addition, the 'VET Graduates Research' measure combines administrative data analysis, web-based questionnaire with graduates and interviews with graduates and relevant stakeholders (e.g. public servants, members of the Commission of Occupational Examination).

Source: (European Commission, 2017^[46]) Mapping of VET graduate tracking measures in EU Member States, <https://op.europa.eu/en/publication-detail/-/publication/00d61a86-48fc-11e8-be1d-01aa75ed71a1/language-en>

Chapter 4. Venues for learning: Balancing the classroom and the workplace

The issue

Why this matters for high-quality VET

Many VET systems offer work-based learning opportunities to students, in recognition of the many benefits that workplace exposure can have for school-to-work transitions and for employer engagement in the overall VET system. First, workplaces can provide a strong learning environment for the acquisition of both soft and hard skills. At work trainees can learn from skilled employees familiar with the latest techniques and equipment. Even short work placements can motivate students to learn by helping them connect what is taught at school to real work contexts, and allowing to put existing skills into practice and refine them (Musset, 2019^[47]). Longer work placements allow schools to save on costly equipment and helps relieve teacher shortages (OECD, 2010^[1]). Second, the availability of work placements sends a signal of employer needs in an occupation, helping to shape the mix of provision. In occupations with shortages of skilled labour, employers can be expected to be keen to offer placements to train skilled workers and identify potential new recruits. Finally, a period of work-based learning (WBL) is also an excellent opportunity for students to connect with potential employers.

Why comparative data are useful

How much and in what ways work-based learning is used within VET programmes have been poorly measured, although these ‘details’ of implementation are crucial. Many OECD countries have a predominantly school-based VET system (e.g. Chile, Mexico, Korea, Sweden) or have a sizeable school-based system alongside apprenticeships (e.g. Austria, Ireland, Netherlands, United Kingdom). How work placements are regulated and organised determine whether students will systematically participate in quality-assured placements, allowing them to develop useful skills and connect to employers – or work placements remain an optional add on and of limited value.

This chapter looks separately at two broad categories of work-based learning and uses the following working definitions (relevant sections below will discuss in detail definitional issues). Part 1 focuses on work-based learning in mainly school-based programmes, in which the work-based component accounts for less than 50% of the curriculum. Part 2 focuses on apprenticeships, in which the work-based component accounts for 50% or more of the curriculum. The 50% threshold, used here for operational purposes, is consistent with the typology used by Cedefop (Cedefop, 2014^[48]), which distinguishes between “school-based VET with on-the-job training periods” (maximum 50% of duration in the workplace) and “alternance schemes or apprenticeships”.

Part 1: Work-based learning (except apprenticeships)

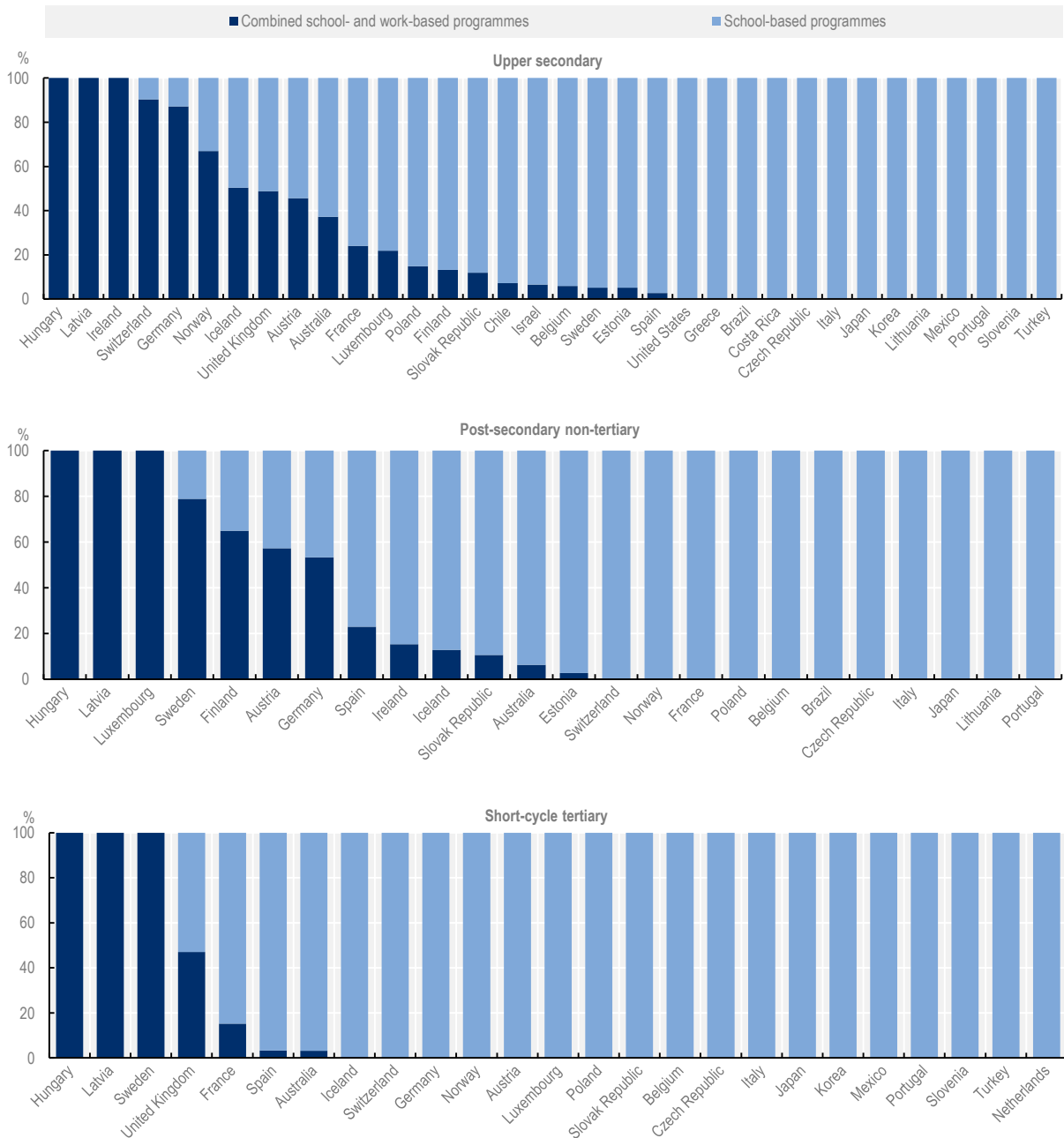
Existing comparative data, gaps and opportunities

Data are available on “combined school- and work-based programmes”

The UOE data collection yields comparative data on the share of students in “combined school and work-based programmes” and “school-based programmes” at upper secondary, postsecondary non-tertiary and short-cycle tertiary programmes (ISCED11 levels 3, 4 and 5, but not for level 6 and above). Combined school and work-based programmes are defined

as those involving between 25% and 90% of work-based learning (see Box 4.1) while school-based programmes are those where the school-based component represents at least 75% of the curriculum. Figure 4.1 shows the share of upper secondary VET students in combined school and work-based programmes at upper secondary, postsecondary non-tertiary and short-cycle tertiary programmes.

Figure 4.1. Share of VET students in combined school- and work-based programmes (2017)



Source: OECD (2019^[40]), Education at a Glance Database, <https://doi.org/10.1787/f8d7880d-en>

The definition of “combined school- and work-based programmes” includes most apprenticeship programmes (e.g. those out of the scope of ISCED mappings or those with

over 90% of the curriculum delivered in a workplace are not covered) but apprenticeships are not separately identified. The 25-90% bracket is a relatively large range – an apprenticeship involving four days a week at work and a two-year programme with one semester in the workplace would both fit this definition.

Ongoing work within the INES Working Party and the LSO network focuses on developing indicators on the use of work-based components in vocational programmes and refining the existing taxonomy.

Box 4.1. Official definitions of programmes based on the use of work-based learning

School-based, combined school- and work-based and work-based programmes (UOE)

- In combined school- and work-based programmes, at least 10% but less than 75% of the curriculum is presented in the school environment or through distance education. Therefore, the work-based component of a school- and work-based programme would be a minimum of 25% and a maximum of 90%. These programmes can be organised in conjunction with education authorities or institutions. They include apprenticeship programmes that involve concurrent school-based and work-based training, and programmes that involve alternating periods of attendance at educational institutions and participation in work-based training (sometimes referred to as “sandwich” programmes).
- “In school-based programmes, instruction takes place (either partially or exclusively) in educational institutions. These include special training centres run by public or private authorities, or enterprise-based special training centres if they qualify as educational institutions.” At least 75% of the curriculum is presented in the school environment (this may include distance education).
- In work-based programmes the school-based component makes up less than 10% of the time. Such programmes are usually non-formal education programmes or informal learning leading to a qualification that is recognised by national education authorities (or equivalent).

Two types of combined school- and work-based programme (LSO)

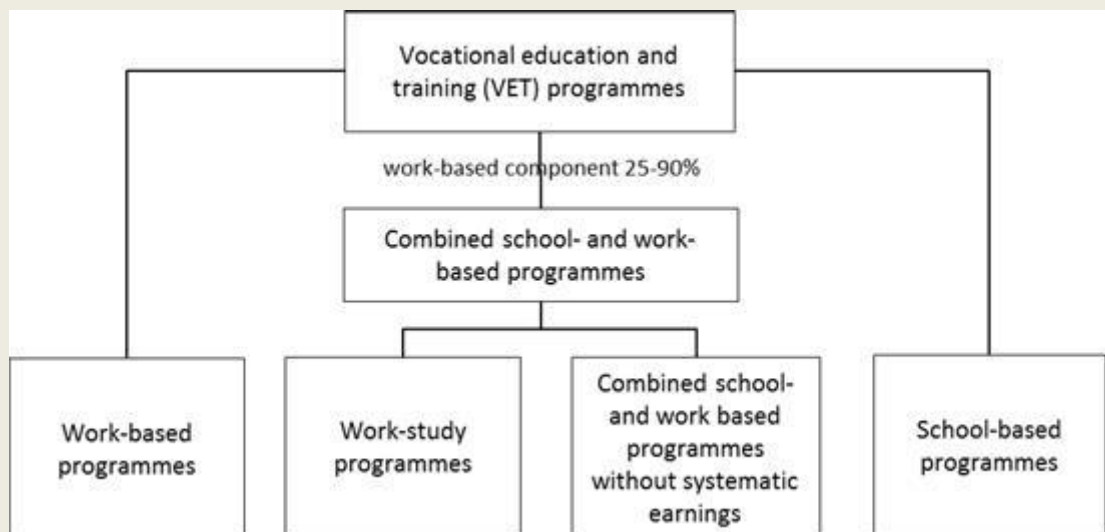
LSO uses a further breakdown of the taxonomy that distinguishes between two types of combined school- and work-based programmes:

- Work-study programmes: formal education/training programmes combining interrelated study and work periods for which the student/trainee receives earnings. Students/trainees in such programmes are considered to be both “in education” and “in employment”.
- Combined school- and work-based programmes without systematic earnings below Figure 4.2 provides a synthesis of the taxonomy described above.

Work-based learning in the EU-LFS

The 2016 EU-LFS Ad-Hoc Module on young people on the labour market provides data on the prevalence and associated outcomes of work-based learning (understood as learning by doing actual work in an external company or institution). In particular, the module provides information about the extent to which young people, during their highest level of completed formal education, acquired real-world work experience; if this experience was paid or not; what type of experience it was (e.g. if it was an apprenticeship). Information on work experience during the highest level of completed formal education will be collected as part of the core EU-LFS data collection from 2021 onwards, and will distinguish five main modalities of work-based learning, based on duration and payment. Concerning duration, it will identify work experience(s) at a workplace with duration of seven months or over; from one to less than seven months; and less than one month (or no experience). As far as the payment component is concerned, work experiences where at least one work experience was paid will be distinguished from those where all work experiences were unpaid.

Figure 4.2. Taxonomy of vocational education and training programmes



Source: OECD (2017, p. 29^[81]), *OECD Handbook for Internationally Comparative Education Statistics: Concepts, Standards, Definitions and Classifications*, <https://dx.doi.org/10.1787/9789264279889-en>, (UNESCO-UIS/OECD/EUROSTAT, 2019^[23]), <http://uis.unesco.org/sites/default/files/documents/uoe-data-collection-manual-2019-en.pdf>, (Flisi, 2020^[49]), Building up evidence on work-based learning in VET - A reflection on sources for possible indicators or benchmarks on work-based learning, <https://publications.jrc.ec.europa.eu/repository/bitstream/JRC118196/jrc118196.pdf>

The now ceased Eurostat VET data collection aimed to offer a more fine-grained picture of the use of WBL in vocational programmes. It offered five categories setting out ranges for the use of WBL (see Table 4.1). These were defined after the data collection and in consultation with national experts. In mainly school-based programmes, data were collected on the “degree of contact with a workplace”, with the following three categories: “no contact; very few contact (1- 10% of learning time); contact more important (11- 25% of learning time)” (Eurostat, 2000^[50]).

Table 4.1. Measuring the weight of work-based learning – Eurostat data collection

Category	Time spent in a VET institution	Time spent in a working environment
In an education/training institution	90-100	0-10
Mainly in an education/training institution with some time spent in a workplace	75-90	10-25
Alternate programmes	25-75	25-75
Mainly at a workplace with some time spent in an education/training institution	10-25	75-90
At a workplace	0-10	90-100

Source: Eurostat (2000_[50]), *Education and training Methodology*, <https://ec.europa.eu/eurostat/web/education-and-training/methodology>

Ensuring consistency in what is reported as ‘work-based component’ is essential

Currently used definitions underpinning the UOE and LSO data collections are based on a definition of work-based learning defined as “some combination of observing, undertaking and reflecting on productive work in real workplaces” (OECD, 2017_[8]). Crucially, this definition excludes simulated work environments such as school workshops. Some other definitions used in comparative analysis are more permissive – for example the Cedefop definition of ‘work-based’ includes simulated work environments in school settings (Cedefop, 2014_[48]) and the earlier Eurostat VET data collection referred to time spent in “working environment (enterprise or other)” (Eurostat, 2000_[50]). This distinction is fundamental. School-based workshops and real workplaces are the main environments for the acquisition of practical vocational skills, with different sets of challenges and potential benefits.

The guidelines underpinning the UOE data collection (which allows for the identification of students in combined school- and work-based programmes) set out that enterprise-based special training centres are considered part of school-based programmes, if those centres “qualify as educational institutions” (OECD, 2017, p. 29_[8]). More clarity regarding how individual countries implement this, whether specific training venues “quality as educational institutions” would be desirable to ensure comparability, in particular regarding the following, commonly used arrangements:

- **Inter-company training centres:** In some countries, they play an important role in delivering the curriculum in VET programmes. -they typically involve classroom--like settings for theoretical instruction and/or workshops for the development of practical skills. In practice, there are some differences across countries how inter --company training centres are used. For example, in Germany, Norway and Switzerland they complement training in workplaces. By contrast, in Austria, they can complement training in workplaces or replace the work-based component for young people who cannot find a work placement (ideally, until they do find one).
- **Dedicated workshops in firms:** Some firms (especially larger ones) have dedicated workshops where they train apprentices before engaging them in the production process. Such arrangements are like school-based training workshops in that they are not part of productive work, but they are also like learning on-the-job as they enable students to learn from skilled workers in firms and using equipment in firms.
- **Replicates of real workplaces in schools.** These allow learners to reap some but not all of the benefits of work-based learning. For example in a restaurant run by a catering school, students cook and serve real customers, though they may not face

the same pressures and expectations as in regular restaurants and they do not gain useful connections with potential employers.

Comparative data are lacking on the design features of WBL components

These features are important, because together they determine whether work-based learning is used in what might be called a ‘lukewarm’ approach, with WBL as an optional add-on and poorly connected to the curriculum – or it is viewed as a key element of the programme with a major role in developing skills (OECD, 2014^[2]). The paragraphs below focus on key aspects of the design of WBL components:

- **Mandatory vs. optional:** It would be important to set out whether data refer to mandatory placements, required in order to obtain the qualification, or optional placements. When work-based learning is optional there tends to be variation in its take-up, while mandatory work-based learning creates a different dynamic for schools, learners and employers – one in which close partnership is essential.
- **Recognised as part of the curriculum:** The full-benefits of work-based learning can only be realised if it is an integrated component of programmes – it is part of the curriculum and yielding credit. This requires clearly defined learning outcomes, assessments can then check whether those have been achieved and learning at the workplace can be recognised in credits (OECD, 2014^[2]). Without such a framework underpinning quality assurance, expectations on employers may be unclear and students may end up in inappropriate placements, undermining the potential benefits of work placements.
- **Sequencing:** Work placements can take place at different stages of a vocational programme, yielding different kinds of benefits to students, schools and employers. Placements throughout or in the middle of the programme allow students to put their learning into practice and gain motivation for further learning at school/college. When placements take place at the end of the programme, its desired role is typically to connect recent graduates with potential employers.

Data on participation in work-based learning are essential but patchy

Data on participation can reveal its use in practice. This is also helpful to identify those that might be left out – some types of students, geographical areas or occupations. For example, when WBL is not mandatory, disadvantaged students who lack informal networks that enable contacts with employers might struggle to obtain work placements. Even in programmes that contain a mandatory work-based component, not all students appear to participate in it. There seem to be some difference between what students are supposed to participate in (as suggested by UOE data) and what young people report they have participated in (as measured by EU-LFS data). For example, in some countries UOE data suggest that all (or nearly all) VET students are enrolled in combined school and work-based programmes. But data from the EU-LFS ad-hoc module on young people in the labour market show that not all those who pursued these programmes report taking part in WBL in companies (see for example (Flisi, 2019^[9]))

Several reasons might lie behind this. For example, some learners might find themselves in the middle of their programme with mandatory work placement but are not able to find a placement. To avoid drop-out, countries often offer alternatives to these students (e.g. pursuing school-based practical training in Hungary (MSZOE, 2019^[51]) and Norway (Haukås and Skjervheim, 2018^[52])). It is important to capture this in data to improve comparability, recognising that despite the aspiration of universal WBL in these programmes, some students do not pursue a work-based learning component.

Proposals for data development

Proposal 1: Identify necessary conditions for training to be considered work-based learning

Clarification of the design of the work-based component would improve the comparability of data obtained through existing data collections. It would be helpful to identify key necessary conditions to be considered work-based learning. This might include:

- **Location:** Learning takes place in a real workplace, with an employer, under the guidance and supervision of employees and using equipment owned by the employer.
- **Tasks:** Activities carried out by the learner during the placement include at least some skilled productive work (i.e. tasks usually performed by skilled workers (Muehlemann, 2016^[53])).

The definition proposed above would exclude placements that involve only observing other people work or carrying out only unskilled tasks (e.g. making photocopies). Such opportunities might provide a valuable experience in learning about work, but they cannot be considered as a means of developing practical vocational skills. Conversely, this definition would include time spent in dedicated training workshops in firms (but not workshops in schools). This would help feasibility, as it may be hard to identify how much time spent in the company is spent in a training workshop vs. in the production process. Also such company-based training workshops are akin to learning in the workplace: students practice on equipment owned by the company and learn from skilled employees and the skills learnt are subsequently put into practice through skilled productive work.

Proposal 2: Collect data on the features of work-based learning

For each VET programme within a country data might be collected, additionally to what is already covered by ISCED mappings, on issues such as:

- **Mandatory vs. optional:** WBL should be considered mandatory if participation in it is formally required for the completion of the programme. It would be important to set out whether options are available to students who fail to obtain a work placement and describe those alternatives.
- **Duration:** This may be expressed as percentage of overall curriculum, based on ranges that are narrower than the current range (25-90%), such as 0-25%, 26-50%, 51-75% etc.
- **Sequencing:** e.g. one vs. several blocks, at the end, in the middle or spread out through the programme.

Requirements might vary across target occupations and schools may have room for defining some features of how work-based learning is used (e.g. sequencing) – these would need to be clearly recognised.

Proposal 3: Collect data on participation in work-based learning

This should measure the extent to which work-based learning is used in practice. This may include questions such as:

- What is the share of students who participate in work-based learning in the course of the programme?

- How much time (as % of the total curriculum) do students spend in work-based learning in the course of the programme (in practice, as opposed to what is advised in theory)?

A distinction might be helpful between programmes with a mandatory WBL component and those with optional WBL, with data more easily collected on the first. In programmes with mandatory WBL, not complying with the requirement and pursuing an alternative typically requires a special procedure, which typically needs to be approved and registered (e.g. authorisation to participate in workshop-based practical training). This would facilitate the collection of national data. For programmes with optional WBL, the availability of relevant data at national level is likely to be uneven.

Part 2: Apprenticeships

The issue

Why this matters for high-quality VET

Among the different pathways to skills, apprenticeships are distinct in that they combine extensive work-based learning with a school-based component. Unlike in other programmes that involve work-based training/learning, apprenticeships are characterised by the provision of a dual status: apprentices are considered as both employees of the hosting firms and students working towards a formal qualification recognised by the national educational system.⁷ This dual status of apprentices leads to a number of legal, regulatory and coordination issues, including apprenticeships' content (i.e. comprehensive sector-wide skills vs firm-specific skills) and the financing of training (cost-benefit calculations) (Šćepanović and Martín Artiles, 2020^[54]). Apprenticeships allow participants to exploit the benefits of work-based learning mentioned above: the strong learning environment offered by workplaces, the possibility to learn from skilled employees on up-to-date equipment. In apprenticeships the availability of a work placement is usually (though not always) a condition for enrolling in the programming, helping match the provision of VET to labour market needs. There is much empirical evidence on the benefits employers reap from the productive contribution of apprentices (Jansen et al., 2015^[55]; Strupler, Wolter and Moser, 2012^[56]). In addition, employers can observe the performance of apprentices and can reap benefits from recruiting the best ones upon completion (for theory see (Acemoglu and Pischke, 1996^[57]; 1999^[58]), for a review of the research evidence (Muehleemann, 2016^[53])).

Why comparative data are useful

Apprenticeship models differ across countries along parameters like apprentice wages, programme duration, how apprentices split their time between the employer and school/college and funding arrangements. These design features affect the costs and benefits of apprenticeships, and therefore their attractiveness, both to potential apprentices and employers (Muehleemann, 2016^[53]; Kuczera, 2017^[59]). One of the challenges for policy makers is to design schemes that suit specific contexts, recognising that the optimal design

⁷ In Germany, Norway and Switzerland, apprentices have a special contract, and terminating that contract ends the relationship of the apprentice with the employer; whereas in England (United Kingdom), apprentices are considered employees and sign an apprenticeship agreement on top of an ordinary contract. In some context the term applies only to the period of training in a company; in other contexts it applies to the whole educational programme (i.e. including both school-based as well as work-based components) (OECD, 2018^[3]).

features of apprenticeship programmes will often vary even within a country depending on the sector, occupation and target group (OECD, 2018^[3]). Better data might help policy makers by:

- Describing the characteristics of apprenticeships in countries that have made extensive use of the institution or have managed to expand apprenticeships.
- Showing how diverse apprenticeships are (e.g. share of on-the-job vs. off-the-job component, how components alternate, levels of education targeted).
- Showing trends over time (e.g. increasing use of apprenticeships in the services sector).

Nonetheless, very few countries systematically collect comparable data on participation in apprenticeships. According to OECD and World Bank (2013^[60]), only around 30% of high-income countries had indicators to measure youth participation in apprenticeships, while no lower-income countries have such indicators available. It is argued that country coverage of this indicator could be expanded by using data from primary sources, such as labour force surveys, census or surveys covering the topic of school-to-work transitions.

Existing comparative data, gaps and opportunities

There is no agreed definition for comparative data collection

One of the key barriers to data collection on the topic of apprenticeships is that there is no agreed definition of apprenticeships for the purposes of the collection of comparative administrative data. The blurred boundaries and unclear definitions regarding apprenticeship has also been noted by a recent Cedefop report (2018^[61]). One pragmatic approach used in several international studies (e.g. (Cedefop, 2018^[61]; OECD, 2018^[3])) involves focusing on programmes defined as apprenticeship by individual countries. Despite the absence of a commonly agreed definition, some common elements emerge:

- alternation of school-based and work-based components
- contractual relationship between the employer and the apprentice
- delivery of a nationally recognised qualification.

Box 4.2. Definitions of ‘apprenticeship’ in comparative analysis

European Commission

The Council recommendation on a European framework for quality and effective apprenticeships defines apprenticeships as formal vocational education and training schemes that i) combine learning in education or training institutions with substantial work-based learning in companies and other workplaces; ii) lead to nationally recognised qualifications; iii) are based on an agreement defining the rights and obligations of the apprentice, the employer and, where appropriate, the vocational education and training institution; and iv) with the apprentice being paid or otherwise compensated for the work-based component. Moreover, a number of additional criteria are defined for learning and working conditions of apprenticeships (e.g. pedagogical support; social protection; work, health and safety conditions) and for framework conditions (e.g. social partner involvement; support for companies; flexible pathways and mobility).

EU-LFS ad-hoc module (2016)

Work experience was a mandatory part of the curriculum, the work lasted at least six months and was paid.

Cedefop

Systematic, long-term training alternating periods at the workplace and in an educational institution or training centre. The apprentice is contractually linked to the employer and receives remuneration (wage or allowance). The employer assumes responsibility for providing the trainee with training leading to a specific occupation.

Eurostat data collection on VET (discontinued)

Apprenticeships have the following characteristics:

- 25-75% of the training time is spent in a school/college or training centre, the rest of the time spent in a working environment.
- participants of which receive a salary / wage for their participation in the programme and are linked (either directly or via their education/training institution) to the employer by a contract or an agreement.”

International Labour Organisation (ILO)

The 1962 Vocational Training Recommendation defines apprenticeship as: “Systematic long-term training for a recognised occupation taking place substantially within an undertaking or under an independent craftsman should be governed by a written contract of apprenticeship and be subject to established standards.”

The more recent Handbook defines “Quality Apprenticeships” as: “Quality Apprenticeships are a unique form of technical vocational education and training, combining on-the-job training and off-the-job learning, which enable learners from all walks of life to acquire the knowledge, skills and competencies required to carry out a specific occupation. They are regulated and financed by laws and collective agreements and policy decisions arising from social dialogue, and require a written contract that details the respective roles and responsibilities of the apprentice and the employer; they also provide the apprentice with remuneration and standard social protection coverage. Following a clearly defined and structured period of training and the successful completion of a formal assessment, apprentices obtain a recognized qualification.”

Source: European Commission (2018_[62]), Recommendation on a European Framework for Quality and Effective Apprenticeships, <http://data.consilium.europa.eu/doc/document/ST-6779-2018-INIT/en/pdf>; Eurostat (2018_[63]), The ad-hoc module "young people on the labour market", https://ec.europa.eu/eurostat/cache/metadata/en/lfs_16_esms.htm; Cedefop (2014_[48]), Terminology of European education and training policy, <http://dx.doi.org/10.2801/15877>; Eurostat (2000_[64]), Education and training Methodology, <https://ec.europa.eu/eurostat/web/education-and-training/methodology>; ILO (2017_[65]), ILO Toolkit for Quality Apprenticeships, <http://www.ilo.org/skills>.

Terminology varies greatly across countries

Some countries have used the term ‘apprenticeship’ to refer to programmes’ semesters or blocks or to shorter programmes in which the work-based learning is concentrated or that target a narrower set of skills that other countries would not consider as such. For example, in Israel the ‘Starter programme’ includes 6-9 months of training and participants are considered ‘apprentices’ (Kuczera, Bastianići and Field S, 2018_[66]) and in England prior to

the 2012 introduction of a 12-month minimum many apprenticeship programmes were shorter than one year (Mirza-Davies, 2015^[67]). Terms other than ‘apprenticeship’ are sometimes used to refer to what other countries might call ‘apprenticeship’. Belgium, Germany, Spain, Hungary, Netherlands use the term ‘dual VET’ (Cedefop, 2018^[61]), while in Australia the umbrella term ‘Australian apprenticeships’ includes both ‘traineeships’ in non-trade related areas (e.g. business, accounting) and ‘apprenticeships’ in trade-related areas.

A mapping of features of apprenticeship schemes in Europe exists

A recent Cedefop publication (Cedefop, 2018^[61]) identifies what individual countries call ‘apprenticeship’ and maps out schemes in Europe, setting out their characteristics such as presence and form of alternation, duration, responsibility sharing between education and training and the labour market, relationship between training company and learner.

The mapping of apprenticeship schemes in OECD countries is partial

A recent study (OECD, 2018^[3]) describes key features of apprenticeships in selected OECD countries (including non-European countries), drawing on national data. This includes apprentice wages, duration, financial incentives to employers, pre-apprenticeship programmes. Existing data reveal great variation across countries (and in some cases also within countries between the different subnational entities) in the extent and ways of using apprenticeships (Box 4.3), but country coverage is incomplete and more precision would be desirable (e.g. capturing more precisely how wages increase by year of training).

Box 4.3. The diverse landscape of apprenticeships

ISCED levels

While many European countries use apprenticeships mainly at upper secondary level (ISCED 3), others have apprenticeships predominantly at postsecondary level. In Canada, for example, apprenticeship programmes are at ISCED 4 level. In Australia, apprenticeships lead to qualifications at ISCED level 2, 3 and 4 (DGT, 2019^[68]). In England (United Kingdom), apprenticeships are available from level 2 to 6. (Unesco, 2019^[69]).

Sectoral coverage

In some countries apprenticeships remain focused on traditional craft and trade occupations, while in others they have expanded to sectors such as services. For example, in Australia, non-trade apprenticeships (called traineeships) now outnumber trade apprenticeships (Hargreaves, Stanwick and Skujins, 2017^[70]). In England (United Kingdom), service sector apprenticeships have grown strongly since the 1990s (Lanning, 2011^[71]). Ireland introduced programmes in service and business areas following the economic crisis (Condon and McNaboe Joan, 2016^[72]).

Form of alternation

The on- and off-the-job components may alternate in different ways. In Austria, Germany and Switzerland, on-the-job and off-the-job components are typically alternated within a week; in Ireland in blocks of several weeks; while in Norway, a two-year school-based component is typically followed by two years spent in the workplace (OECD, 2018^[3]).

Legal status

Some countries use a special apprenticeship contract, while others build on regular employee contracts. In Germany, Norway and Switzerland apprentices have a special contract and terminating that contract ends the relationship of the apprentice with the employer, whereas in England, apprentices are considered employees and sign an apprenticeship agreement on top of an ordinary contract (OECD, 2018^[73]).

UOE data are available on participation in the broader category of ‘combined school- and work-based programmes’

Currently available data through the UOE collection cover “combined school- and work-based programmes” at ISCED level 3, 4 and 5 (see Box 4.1). This definition includes most apprenticeship programmes, but does not separately identify them. For example, this definition would include a two-year programme with one semester spent in a workplace, which would typically not be regarded as apprenticeship at the national level.

Some apprenticeships are not included in the UOE data collection

The UOE data collection excludes some apprenticeships, in particular in countries where programmes are not organised in conjunction with educational authorities or educational institutions. For example in the United States, apprentices obtain an industry-issued credential upon completion and may get credit towards a college degree, but the programme itself does not always lead to an educational qualification and apprenticeships are not reported in ISCED mappings.

The design of VET systems can affect how apprentices are counted

Clearly setting out how programmes are structured is important to ensure correct interpretation of comparative data. In countries where apprentices spend alternating days at school and at work (e.g. Austria, Germany, Switzerland), those participating in a four-year programme would be considered as apprentices throughout the four years. By contrast, in Norway the typical pathway to a vocational qualification includes two years spent at school (with several shorter work placements) and two years spent full-time with an employer (Haukås and Skjervheim, 2018^[52]). The overall balance of the four years is similar, with over half of the time spent in a workplace. But the term ‘apprenticeship’ is used in Norway to refer only to the second set of two years. As a result, in international reporting those enrolled in the first two years are considered to be in school-based programmes.

Some insights are available from the Survey of Adult Skills (PIAAC)

Some studies exploit comparative data on apprentices based on the Survey of Adult Skills (PIAAC) (see Box 4.4). This method of identification implicitly relies on national definitions of apprenticeships, as questions in the background questionnaire refer to apprenticeships (and internships). The Survey of Adult Skills (PIAAC) offers useful

insights into basic skills and labour market and social outcomes for adults who completed apprenticeships, allowing comparisons with those who pursued other options. But apprentices cannot be distinctly identified in all countries and small sample sizes limit the depth of analysis possible.

Box 4.4. Data on apprentices in the Survey of Adult Skills (PIAAC)

Quintini (2015^[74]) uses two variables from the background questionnaire for the Survey of Adult Skills (PIAAC): the current status of the respondents (C_Q07), which includes “apprenticeship or internship” as an option and the type of contract (D_Q09), which includes “an apprenticeship or other training scheme” as an option. Those who report being in an apprenticeship in one of both of these variables are considered apprentices. “A second step consist in identifying apprentices that are not reporting themselves as working and those not reporting themselves as studying.”

Kuczera (2017^[75]) uses the same two variables from the Survey of Adult Skills (PIAAC), but focuses on those currently studying in upper-secondary education or short post-secondary programmes (ISCED level 3 longer than 2 years or ISCED 4C). The purpose of this was to eliminate internships, assuming that those are more common in long post-secondary programmes than at lower levels of education and training.” (Kuczera, 2017, p. 17^[75]).

Source: Quintini, G. (2015^[74]), “Working and learning: A diversity of patterns”, *OECD Social, Employment and Migration Working Papers*, No. 169, <https://dx.doi.org/10.1787/5jrw4bz6hl43-en>, Kuczera, M. (2017^[75]), “Striking the right balance: Costs and benefits of apprenticeship”, *OECD Education Working Papers*, No. 153, <https://dx.doi.org/10.1787/995fff01-en>

Proposals for data development

Proposal 1: Agree on a definition for apprenticeships for use in international data collections

This might include setting necessary conditions for a programme to be considered an apprenticeship in international data collections. For example:

- minimum theoretical programme duration (e.g. 12 months)
- mandatory work-based component (i.e. learners who fail to obtain a work placement and pursue the programme through alternative options should not be considered apprentices)
- share of the curriculum delivered in the workplace (e.g. 50-90%)
- financial compensation: apprentices receive a wage from the employer
- clear legal status: contractual relationship with the employer in the form of a special apprenticeship contract or employment contract.

An agreed definition would allow labelling national programmes as apprenticeships. This could underpin further data collection on the features of apprenticeship programmes and on apprentices. The recent efforts by the International Labour Organisation (ILO) to propose standards on quality apprenticeships could be a first step in this direction (ILO, 2019^[76]).

A distinction might need to be drawn between apprenticeship programmes (and related data on enrolment) and data on graduates.⁸ In some cases, national data may not allow distinctions to be drawn between individuals who pursued an apprenticeship and those who obtained the same qualification as apprentices but without pursuing an apprenticeship programme (e.g. qualification based on taking the qualifying examination or recognition of prior learning, those who completed their programme through not work-based alternatives).

Proposal 2: Collect data on the characteristics of apprentices

Data to be collected include:

- **Age of apprentices:** Typical apprentices are teenagers in some countries, while in others they are mostly adults who often have work experience and were employed by the company prior to starting training – in Austria less than 5% of apprentices are aged 25 or older, while in England (UK) the figure is 40% (Kuczera, 2017^[75]).
- **Gender:** When apprenticeships target occupations perceived as traditionally “male”, women benefit less from the advantages of apprenticeships. For example, in the United States only one in five apprentices are female (DOL, 2018^[77]). In Ireland women accounted for less than 1% of new apprentices in 2004, but recent reforms have expanded beyond traditional trades to service-based occupations and sectors (e.g. insurance practice, financial services, accounting) (Watson, McCoy and Gorby, 2006^[78]) (Department of Education and Skills, 2017^[79]). By contrast, in Switzerland 41% of apprentices are female (FSO, 2019^[80]).
- **Sectoral/occupational coverage:** In some countries apprenticeships remain focused on traditional craft and trade occupations, while in others they have expanded to sectors such as services. For example, in Australia non-trade apprenticeships (called traineeships) now outnumber trade apprenticeships (Hargreaves, Stanwick and Skujins, 2017^[70]). In England service sector apprenticeships have grown strongly since the 1990s (Lanning, 2011^[71]). Ireland introduced programmes in service and business areas following the economic crisis (Condon and McNaboe Joan, 2016^[72]).
- **Apprentice wage:** Apprentices earn a very small share of a skilled wage in some countries and a much higher share in others (e.g. 30-80% of skilled worker wages in Norway vs. about 20% of skilled worker wages in Switzerland (Kuczera, 2017^[75]). It would be also important to set out whether wages are paid during the time spent at work only or during the whole programme and whether they increase over the duration of the programme.

If UOE data for relevant variables were collected by national programme (rather than ISCED category), the UOE data collection could yield some of the data (e.g. age, gender, field-of-study). Some issues arise from the fact that what is considered a ‘programme’ might vary across countries. In Norway as noted above, VET programmes are delivered through a model comprised of two years at school and two years in a company – but the term ‘apprentice’ is reserved to those pursuing the final two years of the programme. In the Netherlands, secondary vocational education (leading to MBO niv.3) might be pursued through school-based or dual pathway – both are considered one programme in the ISCED mapping.

⁸ This proposal, if applied to UOE, would only cover the UOE scope or it would need to be covered by an INES ad hoc (possibly cyclical) survey.

This may be complemented by data collection on additional variables, which are relevant for apprentices but not for the student population as a whole. For example, the share of incumbent workers (i.e. individuals already employed by the same employer prior to starting the apprenticeship) among apprentices is an important indicator in some countries, as it reveals whether the extent to which apprenticeship is used as a tool for employee training, as opposed to a way of offering initial training and finding new recruits. For example, England collects data on this. The highest prior qualification of apprentices is also important indicator, as it reveals by which pathway apprentices enter programmes (e.g. lower secondary education, general upper secondary education, etc.).

Alternatively, a separate survey might collect data on apprentices for some countries only, recognising that the role of apprenticeships in VET and data availability at national level vary widely across countries. Given that some apprenticeships are not included in the UOE data collection (e.g. registered apprenticeship in the United States), additional data collection beyond UOE would also be useful to improve country coverage.

Box 4.5. National data sources on apprentices

A number of countries have detailed administrative data on apprentices, programmes and employers (e.g. Australia, England, Germany, and Switzerland). National data collections typically cover issues such as:

- Apprentice background: age, gender, highest prior level of qualification, socio-economic background, migrant status.
- Apprentices classified by type of programme – duration, target occupation, industry sector, ISCED level.
- Firms (or employers) providing apprenticeships: share of firms that take apprentices, firm size, economic sector.
- Apprentice wages: data are available when they are agreed at national / sectoral level, or are reported as wages in administrative data or apprentice surveys exist.
- Other indicators of apprenticeship provision: indicators of supply and demand, new starts, contract terminations, target occupations and sectors, teachers and trainers.

Proposal 3: Create a mapping of key features of apprenticeship schemes

This could build on existing mappings of apprenticeships, in particular the mapping of schemes in Europe (Cedefop, 2018^[61]) and the study of apprenticeships in OECD countries (OECD, 2018^[3]). It may be implemented through an ad-hoc survey and invite countries to offer updates every few years. A mapping exercise would also allow identifying apprenticeship schemes that are excluded from the UOE data collection.

Issues to be covered may include:

- ISCED level(s) at which apprenticeships are offered
- where training is delivered: school/college, workplace, other training centres (e.g. inter-company training centres, training offices)

- requirements for apprentice supervisors: occupational skills (e.g. vocational qualifications), pedagogical skills (e.g. targeted training is optional / mandatory/ not systematically available)
- programme duration
- form of alternation (e.g. blocks of weeks, days within a week)
- legal status: student / apprentice / employee, type of contract (e.g. employee contract or special apprenticeship contract)
- financial arrangements: apprentice wages if relevant (how they are set, amounts), financial incentives to employers.

Proposal 4: Support countries in the implementation of a cost-benefit survey of apprenticeships using a common methodology

Austria, Germany and Switzerland have implemented cost-benefit surveys of apprenticeships, using a common methodology. These surveys target employers that take on apprentices and aim to measure the costs generated by apprenticeships and the benefits yielded to employers. The initial methodology was proposed in the 1970s in Germany. The first surveys focused on costs, while subsequent surveys also covered benefits during apprenticeship, and later post-training benefits. In Switzerland, the first representative survey was conducted in 2000 using a very similar methodology to that used Germany. This was followed up by surveys in 2004 and 2009. In Austria, a cost-benefit study was conducted in 1997 with a different methodology, but the latest survey in 2016 used the same methodology as Germany and Switzerland (Moretti et al., 2017^[81]; Muehlemann, 2016^[53]). These surveys yield data on various background variables (e.g. company characteristics, apprentice characteristics) and focus on issues such as:

- the costs employers bear when taking on an apprentice.
- how apprentices spend their time in the workplace.
- apprentice wages.
- the relative productivity of apprentices compared to skilled workers.

This framework could be adapted and used in other countries, ensuring that the results are comparable. Such surveys might be particularly desirable in countries with a relatively large apprenticeship system or those that view the promotion of apprenticeships a policy priority. Even if not all countries are covered, the kind of detailed insights that cost-benefit surveys provide would be useful for comparative analysis.

Chapter 5. Resources for learning

Part 1: Financial resources

The issue

Why this matters for high-quality VET

As for all education and training programmes, financial resources are key in steering the system, but many of the challenges and policy tools are specific to vocational programmes. Financial resources can encourage institutions to offer some programmes rather than others and steer the number of places offered in each occupation. This is essential to ensure the mix of provision is responsive to labour market needs. Funding arrangements need to take into account the targeted field of study, recognising that some programmes are cheaper to deliver than others – one challenge is that the high costs of starting new programmes (e.g. new equipment, staff recruitment) encourages the continuation of existing programmes and discourages the introduction of new programmes. Financial tools are also commonly used to encourage employers to offer work-based learning – for example in the form of tax breaks to training companies, subsidies to employers to take on an apprentice.

Why comparative data are useful

Comparative data can shed light on how much and in what ways governments, households and employers invest in VET. This can help compare the cost-effectiveness of different VET systems and approaches to delivery. For example, the effective use of work-based learning can reduce the costs of delivering programmes at the same time as promoting quality. When students can learn practical skills on equipment available in workplaces, school workshops typically need to provide basic equipment to develop basic practical skills.

Various financial flows between the public budget, employers and individuals are specific to VET – such as subsidies to employers that offer apprenticeships, or employer funded training levies (see Box 5.1 for examples of incentives in selected OECD countries). Data on transfer schemes and amount of transfers are essential to enable meaningful international comparisons of expenditure.

Box 5.1. Incentives for apprenticeships – country examples

England (United Kingdom)

A universal levy is set at the rate of 0.5% of payroll, and is applied to the proportion of the payroll that is above GBP 3 million. Contributions from employers who pay the levy are topped up with a 10% contribution from the government. Grants are available to companies and education and training institutions offering apprenticeship to 16- 18 year-olds.

Netherlands

Subsidy from 2014 to employers providing apprenticeships of maximum EUR 2 700 per student per year (depending on the duration of the apprenticeship and the number of training companies asking for subsidy).

Norway

Employers receive a subsidy per apprentice of around EUR 14 800 for two years of work placement. The exact amount of the subsidy depends on sector characteristics (e.g. higher subsidy in small crafts) and apprentice characteristics (e.g. higher subsidy for a young person with special needs).

Switzerland

All companies within a given economic sector may be required to contribute to a corresponding vocational and professional education and training (VPET) fund (e.g. to develop training programmes, organise courses and qualifications procedures, promote specific occupations). The Confederation may declare some VPET funds to be of general interest and therefore mandatory for all companies within a given economic sector.

Source: Kuczera, M (2017^[59]), Incentives for Apprenticeship, <https://dx.doi.org/10.1787/55bb556d-en>

Existing comparative data, gaps and opportunities for development***Comparative data are available on educational expenditure***

The UOE data collection on educational finance uses a framework built around three dimensions (OECD, 2017^[8]):

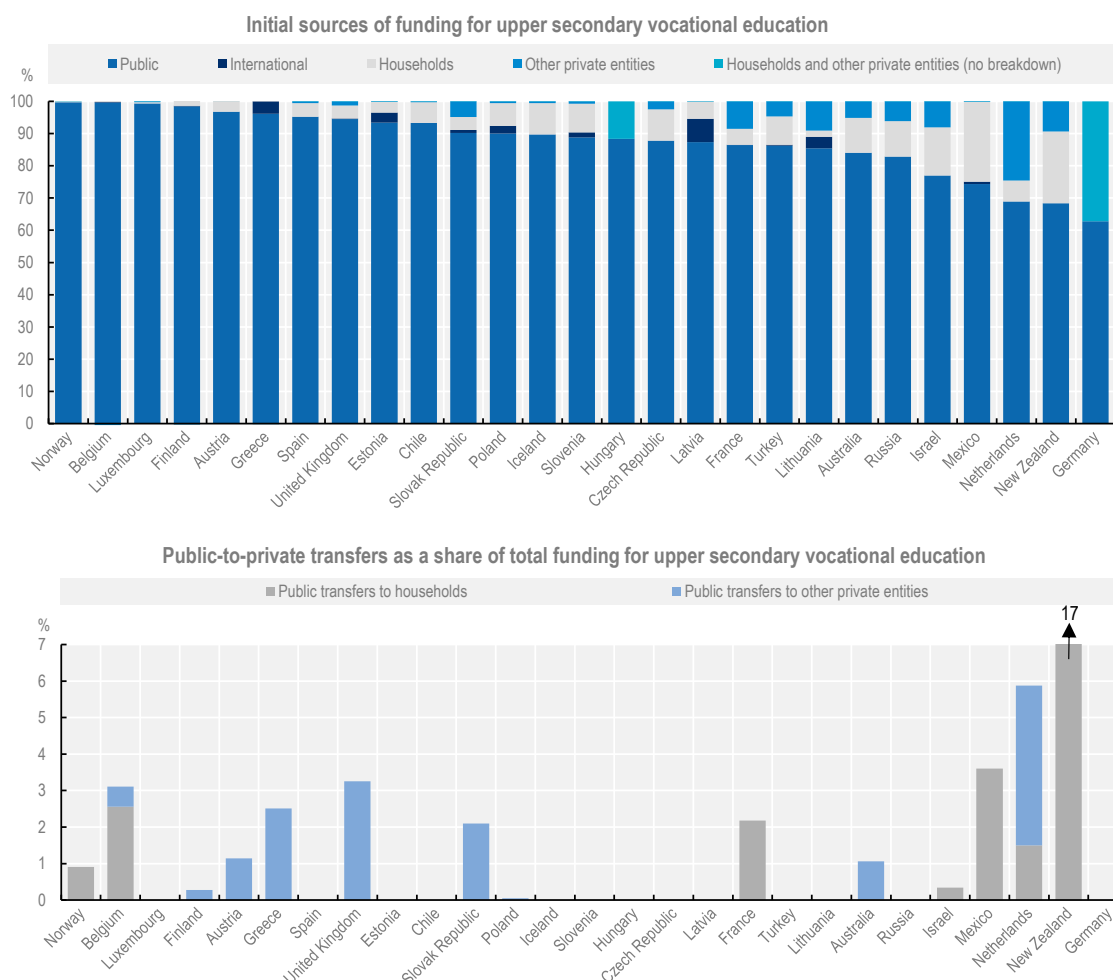
- **Sources of funds** include the public sector, international agencies and private entities. Private entities in turn include households and other private entities, such as companies.
- **Location of service providers** refers to the location where spending occurs. Spending on educational institutions includes spending on schools and universities, as well as non-teaching institutions (e.g. education ministries). Spending outside education institutions includes purchased books, computers, fees for private tutoring and student living costs.
- **Type of expenditure:** Goods and services purchased include expenditure on educational core goods and services directly related to instruction and education (e.g. teachers, teaching materials, building maintenance, administration). Peripheral goods and services include ancillary services (e.g. meals, transport), and R&D. This dimension also breaks down current and capital expenditure and identifies financial transfers between the public and private sectors and between different levels of government within the public sector.

These three dimensions can be combined to identify specific categories of expenditure of interest. As the framework is designed for all educational expenditure, not just VET, the following paragraphs focus on data and indicators that can be extracted for VET, highlighting challenges for the interpretation of indicators and opportunities for development.

- Education expenditure statistics highlight that in all countries public expenditure represent the majority of the funding sources of VET (Figure 5.1). Only in Germany, the Netherlands and New Zealand an important share of the initial funding for VET comes from private sources (households and other private

sources). Indicators on how education is funded also show that public financial resources for VET are transferred to the private sector and that public-to-private transfers are relatively significant in a subset of OECD countries.

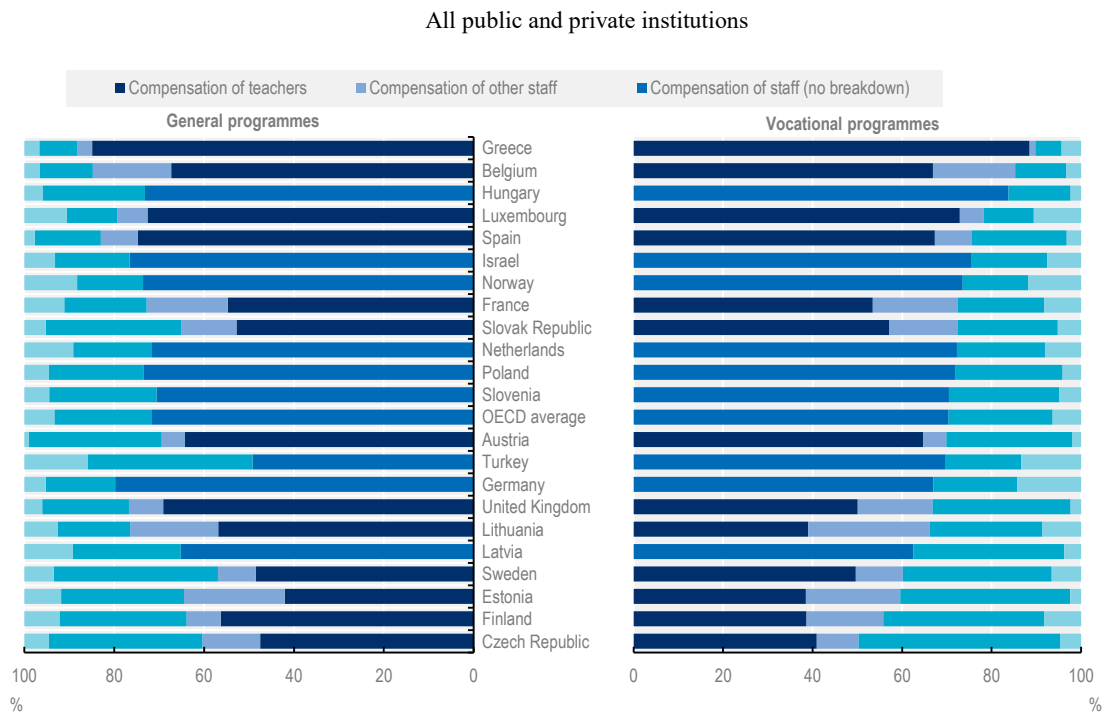
Figure 5.1. Distribution of initial sources of funding and government transfers to the private sector (2016)



Note: Initial public spending includes both direct public expenditure for educational institutions and amounts that are transferred to the private sector, and excludes transfers from the international to the public sector. Initial private spending includes households' and other private entities' initial funding for education and excludes public subsidies received from the public sector. For further information, see indicator C3 in *Education at a Glance 2019*.

Source: OECD (2019^[40]), Education at a Glance Database, <https://doi.org/10.1787/f8d7880d-en>

Other than funding education, expenditure indicators also look at the spending of educational institutions. The compensation of teachers and other staff represents the most relevant category of their budgets (Figure 5.2). Other current expenditure (i.e. not on paying staff) includes expenditure on subcontracted services (e.g. maintenance of school buildings, ancillary services and rental of school buildings): it represents a significant share of the VET spending, for example, in the Czech Republic and Finland. Capital expenditure in VET programmes, including spending on construction, buildings renovation and new or replacement equipment, is most relevant in Germany, Luxembourg, Norway and Turkey.

Figure 5.2. Share of upper secondary educational institutions, by resource category (2016)

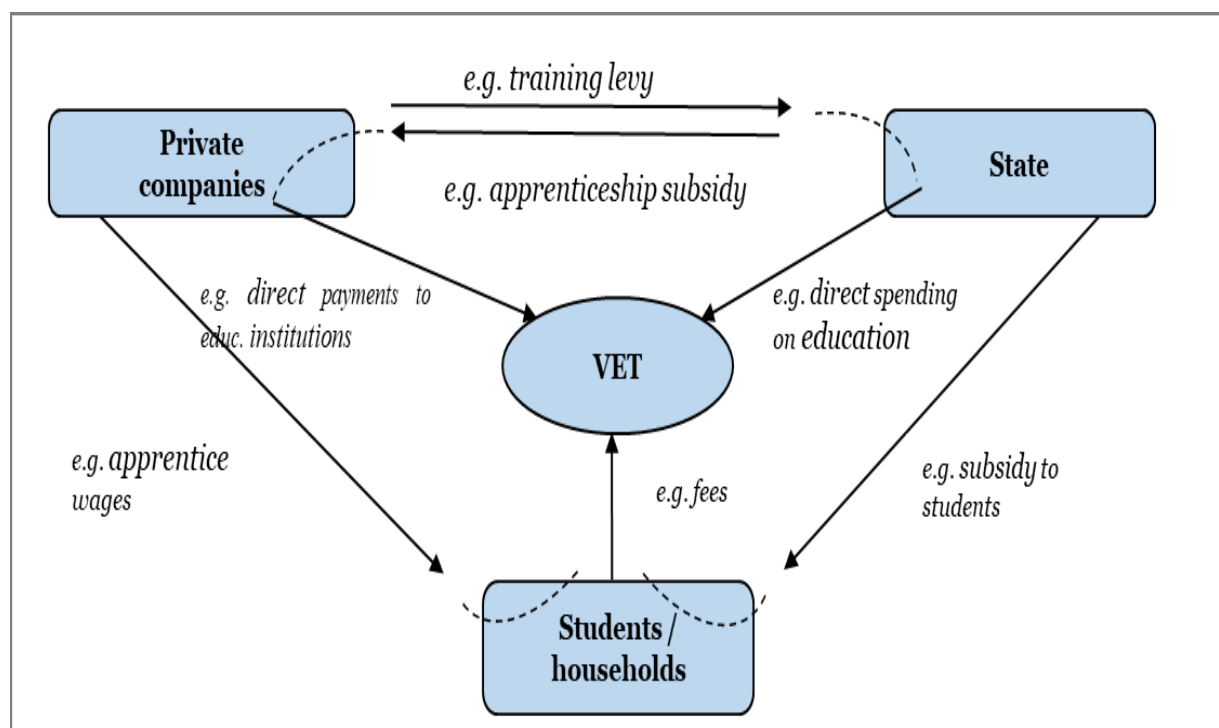
Source: Calculations based on (OECD, 2019^[40]), Education at a Glance Database, <https://doi.org/10.1787/f8d7880d-en>.

Existing data cover several issues relevant to VET

Figure 5.3 shows a simplified scheme of financial flows in VET. This figure illustrates common financial flows in the context of VET. For example in apprenticeships, private employers spend money to train apprentices, paying apprentice wages, instructor wages and material costs. At the same time they sometimes receive money from the state (e.g. apprenticeship subsidies in Austria and Norway), while in other cases they contribute to a public fund dedicated to VET (e.g. apprenticeship levy in England).

For several issues of interest in the context of VET, it is necessary to carefully examine the definitions, classifications and methodology used for the collection of comparative data. In particular in the case of apprenticeships (and other types of employer provided training), it is important to set out which types of expenditure are included in the data and how.

Figure 5.3. A simplified scheme of financial flows in VET



Expenditure on work-based learning is partially covered in UOE data

Expenditure on workplace training provided by private companies is covered in the UOE data only when it is part of “combined school- and work-based programmes” (i.e. programmes with 25-90% of the curriculum delivered in the workplace), see Table 5.1. It is considered expenditure on educational core goods and services. Other types of employer provided workplace training (e.g. employee training that takes place 95% at work) are excluded. Expenditure on workplace training offered to students in school-based programmes is not explicitly mentioned in the guidelines.

In the case of apprenticeships, apprentice wages and other compensations to students are excluded. This means that a large share of the costs of apprenticeship to employers are excluded: in countries with available data, apprentice wages account for over half of the total cost (for Austria see Schlögl and Mayerl (2017_[82]); for Germany see Jansen et al (2015_[55]); for Switzerland see Strupler, Wolter and Moser (2012_[56])).

Table 5.1. How data on work-based learning are included in UOE data

	Included	Source / transfer category
Employer spending on workplace training: salaries and other compensation of instructors, material and equipment costs	Yes	By other private entities – direct payments to educational institutions or expenditure by independent private educational institutions
Employer spending on workplace training: apprentice salaries, social security contributions and other compensation paid to apprentices	No	
Subsidies to employers that offer workplace training	Yes	Initial source: Public Final source: By other private entities – direct payments to educational institutions Transfer: public-private transfers to other private entities, specifically defined as non-educational institutions
Employer contributions to VET (e.g. apprenticeship levy)	Yes	By other private entities – direct payments to educational institutions.
Grants to students	Yes	Initial source: Public Final source: By households Transfer: public-private transfers to households

Note: Salaries are not included as expenditure on training as they represent the remuneration for the work carried out by students in the production process. The cost of work-based learning is the extra cost of material, equipment, and instructors' compensation.

Source: Author's elaboration based on definitions and methodology set out in OECD (2017^[8]), *OECD Handbook for Internationally Comparative Education Statistics: Concepts, Standards, Definitions and Classifications*, <https://dx.doi.org/10.1787/9789264279889-en>

The reporting of private expenditure on work-based learning is uneven

The UOE data collection on educational expenditure is based on a framework that covers all levels of education and not specific to VET programmes. The points of measurement of the framework are two: funding and spending for education.

- Funding is measured from the public actors, the international sector, households and other private entities, regardless of these actors' status as education providers or non-providers. In this particular classification, private companies are considered as other private entities.
- Spending is measured for public, government-dependent and independent private educational institutions (defined as entities providing either educational core or peripheral goods and services to individuals and other educational institutions). Non-educational institutions (e.g. private companies) are not specifically included in the classification of spending institutions as the framework only refers to educational institutions; they are nonetheless regarded by the UOE framework as independent private educational institutions for the purpose of tracking expenditure on the spending side.

Table 5.2 shows selected data and indicators on private expenditure on upper-secondary VET. In Column 1, the category “expenditure by other private entities” — “direct payments to educational institutions” refers to expenditure after transfers and includes:

- Expenditure by private companies on the training of apprentices and other participants in combined school and work-based programmes (excluding apprentice wages and other compensations to students).
- Public subsidies to other private entities for the provision of training at the workplace included as spending by other private entities (e.g. apprenticeship subsidies).

- Contributions or subsidies to vocational and technical schools from business or labour organisations (e.g. apprenticeship levy).
- Categories less relevant for VET (e.g. charitable donations and grants to educational institutions from foundations, rents paid by private organisations).

Table 5.2. Selected data and indicators on private expenditure

Upper-secondary vocational programmes (ISCED 35)

Country	Expenditure by other private entities – Direct payments to educational institutions	Public-private transfers to entities defined as non-educational institutions	Share of private expenditure in total expenditure on VET after transfers
	per full-time equivalent student, in USD PPP		%
	(1)	(2)	(3)
Australia	272	46	17
Austria	183	201	4
Belgium	11	75	3
Chile	13	0	7
Czech Republic	208	0	12
Estonia	15	0	4
Finland	0	23	2
France	1 294	0	16
Germany	m	0	37
Greece	210	223	3
Hungary	m	0	12
Iceland	78	n/a	10
Israel	1 304	0	23
Latvia	7	0	5
Lithuania	506	0	11
Luxembourg	54	0	1
Mexico	8	0	29
Netherlands	4 173	632	37
New Zealand	1 299	0	48
Norway	0	0	1
Poland	46	4	8
Russian Federation.	174	n/a	17
Slovak Republic	491	148	11
Slovenia	49	m	10
Spain	64	0	5
Switzerland	8 694	5	m
Turkey	253	0	13
United Kingdom	423	305	9

Source: Calculations based on OECD (2019^[40]), *Education at a Glance Database*, <https://doi.org/10.1787/f8d7880d-en>.

In Column 2, the category “public-private transfers to entities defined as non-educational institutions” includes:

- Subsidies to private companies for the provision of workplace training as part of combined school and work-based programmes (e.g. apprenticeship subsidies).
- Transfers to business or labour associations providing adult education within the scope of the data collection.

- Categories less relevant for VET (e.g. the cost of government of supporting loans paid to students by private financial institutions).

Finally, Column 3 shows the share of private expenditure in total expenditure on VET institutions after transfers (e.g. government subsidies to companies that provide apprenticeships are included in private expenditure). Private expenditure is probably underreported – for example, surprisingly, various countries with a sizeable apprenticeship system report no or limited private expenditure on VET (e.g. Norway).

In principle, Column 2 should capture apprenticeship subsidies and Column 1 employer expenditure on apprenticeships, including apprenticeship subsidies. Yet not all countries with apprenticeships report any expenditure in these categories and the omission is striking in some cases, when the transfers are known to be large. For example, Norway reports no public-private transfers to other non-educational private entities, despite having a universal apprenticeship subsidy of EUR 14 800 per apprentice for two years of work placement (Kuczera, 2017_[59]) – roughly the equivalent of one-year public expenditure on school-based VET. Uneven reporting across countries on public-private transfers and private expenditure leads to an underestimation of private expenditure on VET in comparative data for some countries. Some countries for example may report public direct expenditure in private institutions rather than a public transfer and then a private expenditure.

The complexities of apprenticeship finance mean that current data capture private expenditure in an uneven way. For example, the data collection excludes employer expenditure on apprentice wages but includes apprenticeship levies. However, in Denmark the apprenticeship levy paid by employers is recycled back to pay apprentice wages during the school-based component (Kuczera, 2017_[59]). This means that in effect, the data collected include the part of employer expenditure on apprentice wages that is channelled through the levy.

Some ambiguity around “educational institutions” in the context of work-based learning and apprenticeships

In terms of “funding education” and financial transfers between public and private sector, private companies are considered as private entities other than households or as “non-educational institutions”, as highlighted in the previous section. By contrast, in terms of “education spending”, financial resources can only be classified as expenditure on/by public and (government-dependent and independent) private educational institutions and this is because students are classified according to the institution they are enrolled in. The same classification used for spending (educational) institutions is used for students’ enrolment in educational institutions. As a result, apprentices are classified as enrolled in public or private institutions depending on where they pursue the school-based component. For example, an apprentice pursuing work-based learning in a private company and enrolled in a public school is counted under the ‘public institutions’ heading, while in the context of educational expenditure “companies providing apprenticeships” are considered “independent private educational institutions” (OECD, 2018_[83]). The definition of private companies as “educational institutions” with regard to education spending and as “non-educational institutions” with regard to funding highlights some scope for clarification.

In addition, the UOE questionnaire on educational expenditure aims to ensure comparability across countries; however, students/apprentices enrolment and expenditure statistics highlight some misalignment in terms of statistical coverage. For example, Norway does not report any independent private institutions’ expenditure (under which expenditure on apprenticeships by companies would fall) in upper secondary vocational

programmes, despite having a well-developed apprenticeship system at that level. Switzerland also has a large apprenticeship system, but information on “private educational institutions” and their expenditure is missing. In Germany, expenditure in upper secondary vocational education per full-time equivalent student in private institutions seems to be over 30 times as high as that in public institutions, highlighting a misalignment in expenditure and enrolment reporting. Similarly, the expenditure per student (Table 5.3) differs significantly between general and vocational programmes in a number of OECD countries (e.g. Australia, Iceland and Israel at upper secondary level).

Table 5.3. Expenditure on educational institutions per full-time equivalent student (2016)

From all sources, in equivalent USD converted using PPPs

Countries	Upper secondary			Post-secondary non-tertiary			Short-cycle tertiary
	General	Vocational	All programmes	General	Vocational	All programmes	All programmes
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Australia	13 543	4 529	10 199	n/a	4 778	4 778	7 200
Austria	14 190	17 827	16 351	n/a	5 436	5 436	17 837
Belgium	13 451	13 881	13 704	Included in col 2-3			12 833
Canada	Included in col. 3		13 856	n/a	m	m	18 228
Chile	4 801	5 000	4 857	n/a	Included in col 3		4 060
Czech Republic	7 236	8 629	8 257	2 189	6 838	2 759	16 908
Estonia	6 548	7 031	6 742	n/a	7 719	7 719	n/a
Finland	8 441	8 270	8 315	n/a	Included in col 2-3		n/a
France	13 431	15 392	14 132	9 504	9 365	9 389	14 502
Germany	11 893	16 323	14 094	15 074	10 872	11 211	10 783
Greece	5 836	8 930	6 704	n/a	m	m	n/a
Hungary	7 312	12 783	8 508	n/a	12 605	12 605	7 206
Iceland	8 878	14 043	10 360	n/a	15 653	15 653	10 015
Ireland	Included in col. 3		10 094	n/a	7 771	7 771	m
Israel	6 286	16 115	8 330	1 186	n/a	1 186	5 231
Italy	Included in col. 3		9 377	n/a	Included in col 3		6 318
Japan	Included in col. 3		11 863	Partially included in col 3			14 124
Korea	Included in col. 3		13 113	n/a	n/a	n/a	5 770
Latvia	6 816	7 295	7 006	n/a	7 816	7 816	9 322
Lithuania	5 660	5 651	5 657	n/a	5 593	5 593	n/a
Luxembourg	20 673	21 587	21 231	n/a	1 760	1 760	23 098
Mexico	3 935	4 617	4 187	n/a	n/a	n/a	m
Netherlands	10 593	14 530	13 196	n/a	n/a	n/a	10 815
New Zealand	11 157	13 935	11 765	Included in col. 6		9 885	10 557
Norway	16 242	15 565	15 901	n/a	17 381	17 381	17 361
Poland	6 158	7 863	7 114	n/a	3 964	3 964	24 012
Portugal	Included in col. 3		9 628	n/a	Partially included in col 3		8 954
Russian Federation	4 399	2 742	4 247	n/a	m	m	5 289
Slovak Republic	5 890	7 148	6 698	n/a	7 377	7 377	6 827
Slovenia	7 586	7 069	7 236	n/a	n/a	n/a	2 707
Spain	9 108	11 772	9 946	n/a	Included in col 2-3		9 339
Sweden	10 664	13 670	11 790	9 417	4 829	5 717	6 723
Turkey	4 896	5 573	5 213	n/a	n/a	n/a	m
United Kingdom	12 263	9 437	10 992	n/a	n/a	n/a	23 769
United States	Included in col. 3		14 566	n/a	14 496	14 496	m

Source: OECD (2019^[39]), Education at a Glance OECD Indicators, <https://doi.org/10.1787/f8d7880d-en>

Proposals for data development

Proposal 1: Expand the country coverage of private expenditure on VET

A more complete country coverage of private expenditure on VET in the UOE data collection would improve the comparability of existing data and indicators. Recognising that data availability at national level may be patchy, greater transparency in what is reported would help the interpretation of data. In particular, it would be helpful to flag:

- When countries report only part of what is supposed to be covered in the category “expenditure by other private entities” (e.g. apprenticeship subsidies, but not expenditure on the salaries of apprentice instructors).
- When countries do not report any expenditure by private companies on training provided as part as combined school and work-based programmes.

An alternative might be to address the issue of work-based learning finance separately – e.g. through an ad-hoc survey for a subset of countries with available data. Apprenticeship has many special features in terms of the complex flows of financial and non-financial resources between education and training institutions, employers and other actors. This may make it too difficult, and possibly unnecessary, to modify the data collection on education generally so as to meet the requirements of apprenticeship systems. In addition, a separate data collection may collect information on apprenticeships both within and outside the UOE scope.

Proposal 2: Create a mapping of financial transfer schemes in VET

Such a mapping could set out existing transfer schemes, including subsidies to companies that provide work-based learning and levy schemes, including eligibility criteria, the amount of transfer. Such a mapping could also include tax breaks, which do not involve direct financial transfers but are commonly used financial incentives in VET. A mapping would allow the identification of countries that have transfers in VET, even though those might not be yet reported in comparative data. It could also put data that are report into policy context.

Part 2: VET teachers and trainers

The issue

Why this matters for high-quality VET

As in general education, the quality of the teacher and trainer workforce is critical to effective learning in vocational programmes. Many countries are facing a wave of retirements among teachers, or expect have one soon – in the majority of OECD countries over a third of the VET teacher workforce are aged 50 and over (Figure 5.4). Recruiting new teachers is often hard, as schools/colleges struggle to compete with salaries in the private sector. The challenge is particularly great in occupations that offer the best career prospects where skilled workers (and therefore potential teachers or trainers) are in high demand (OECD, 2010^[84]). The second challenge is to ensure that teachers have a combination of up-to-date technical skills and pedagogical skills. Full-time teachers in schools/colleges often lack industry experience and opportunities to update their technical skills, while those recruited from industry often lack pedagogical skills. Teachers may also lack the digital skills they need to keep up-to-date with industry and pedagogical changes (OECD, 2010^[84]; Cedefop, 2016^[85]).

In the workplace, trainers who supervise apprentices/trainees play a key role. They pass on practical skills and theoretical knowledge, and help apprentices/trainees get used to the codes of the workplace. Some targeted preparation of trainers (including pedagogical training) can improve the quality of work placements (BIBB, 2009^[86]). When a substantial part of the programme is delivered in a workplace (e.g. apprenticeships), the learning experience at work is crucial and in many countries offer mandatory (e.g. Netherlands, Switzerland) or optional (e.g. Norway) targeted training for trainers (Smulders, Cox and Westerhuis, 2016^[87]; Haukås and Skjervheim, 2018^[52]). But in the case of shorter work placements, training for trainers is often not necessary – minimum requirements are best defined in a way that recognises the additional burden for companies, ensuring that such requirements do not discourage employers from offering work-based learning (OECD, 2010^[1]).

Why comparative data are useful

Better data would shed light on the supply of teachers and extent of the recruitment challenge across countries – for example giving a picture of the age distribution of different types of teachers in VET. Comparative data on policy and practice would shed light on how countries use entry and continuing professional development requirements to ensure the right competences among teachers and trainers. First, teachers need to hold a relevant technical qualification, ensuring that they have the required occupation-specific skills and knowledge. Second, they need pedagogical skills, recognising that effectively conveying vocational skills requires more than the capacity to practice them. Third, having relevant work experience (e.g. from industry) ensures a degree of familiarity with the requirements of workplaces in their field. Fourth, having solid digital skills is becoming of growing importance for teachers, in light of the increased use of digital technologies for teaching and in the workplace. Finally, professional development requirements (e.g. requiring teachers to regularly spend some time working in industry) can ensure that they keep their technical skills up-to-date (OECD, 2010^[1]).

The challenges of adequate supply and quality are interrelated, with policies often having implications for both. For example, strict pedagogical requirements designed to ensure quality can discourage entrants into the teacher profession. To avoid this, some countries (e.g. Czech Republic, Denmark, United Kingdom) offer flexible ways of acquiring pedagogical skills. Conversely, some policy tools that can help both alleviate shortages and contribute to the quality of the VET teacher workforce. For example encouraging working part-time in a VET college/school and part-time in industry helps facilitate recruitment. Continuing to work in industry part-time can help teachers continuously update their technical skills. Data would shed light on policy and practice in this area can tackle the challenges of supply and quality.

Finally, in the case of apprenticeships, data on requirements for trainers could underpin indicators of quality, as well-prepared trainers can improve the quality of the learning experience at work – essential in the case of apprenticeships, where a large share of learning time is spent at work.

Existing comparative data, gaps and opportunities

The priority rating exercise within the INES Working Group identified Teachers and trainers as one of two top priorities for *Education at a Glance 2020*. Ongoing efforts in the light of this will lead to the collection of new data over the next years. The subject received a similarly high estimation at the 2019 OECD Group of National Experts on VET workshop on data and indicators.

The Teaching and Learning International Survey (TALIS), established in 2008, is an OECD international survey of teachers and school leaders on their working conditions and the learning environments at their schools. The study, through its different rounds, surveyed lower secondary schools in about 50 OECD countries and non-member economies. Although the focus is primarily on lower secondary education, some countries also participate in the survey at the primary and upper secondary levels. As a result, the survey has information on VET teachers and their practices at the upper secondary level only for a small subset of participating countries.

Definitions of types of teachers and trainers

Within VET systems in individual countries, many people are formally and informally involved in the transmission of skills and knowledge. Typically, this involves more categories of staff than in general education. The UOE data collection covers all the teachers involved in the school-based part of VET programmes without further distinctions between the subjects they teach (in particular general vs. vocational subjects). Further distinctions between subcategories within this broad category would be helpful, as the challenges and policy tools vary across different categories of staff. For example, when trying to recruit teachers with a qualification and work experience in CAD programming, schools compete with private employers and new recruits from industry often need training in pedagogical skills. These challenges are very different from those that arise when recruiting a maths teacher, in which case the challenges of recruitment and skills updating will be similar to those in general education. Definitions of different categories of staff among teachers in vocational programmes could create a foundation for further data collections.

Box 5.2 provides an overview of typologies that have been used in comparative policy analysis. These typically distinguish alongside two criteria:

- location: schools or colleges vs. workplace (e.g. company that provides work-based learning)
- content: general subjects, vocational theory, vocational practice.

This report will use the following terminology, consistent with the concepts in Cedefop (2016^[88]) and OECD (2010^[1]):

- teachers of general subjects in schools (or other education institutions)
- teachers of vocational theory in schools (or other education institutions)
- teachers of vocational practice in schools (or other education institutions)
- trainers in workplaces that offer work-based learning.

Data are available on the supply of personnel in education institutions

The UOE data collection yields several variables on personnel with breakdown for VET vs. general education. Table A.B 5 in Annex B provides an overview of existing indicators and indicators that can be calculated based on existing data. It does not provide further distinction between different categories of teaching staff in vocational programmes. For example, data on teachers' age and gender highlights that OECD countries have very different teaching workforces in VET; however, their characteristics are relatively similar to the ones of general programmes, except for a small number of countries where VET teachers are, on average, slightly older and include a higher share of male teachers (Figure 5.4).

Box 5.2. Types of teachers and trainers in VET in comparative analysis

Cedefop (2016^[88]): In 2015, the European Union called for systematic approaches for initial and continuous professional development of VET teachers, trainers and mentors in both school- and work-based settings. In the attempt to approach the professional development of these categories in a unified way, the CEDEFOP policy learning forum defined following categories:

- teachers of general subjects in schools and centres
- teachers of vocational theoretical subjects in schools and centres
- teachers of practical subjects in school workshops or simulated learning environments (such as inter-company training centres)
- trainers in companies: often called apprentice tutors or mentors or practical training instructors who accompany students during apprenticeships or different types of placements in companies as part of school-based VET.

Learning for Jobs OECD Reviews of VET (OECD, 2010^[11]) reviewed upper secondary VET systems and provided targeted policy recommendations to countries. It defined the following categories when looking at teachers and trainers:

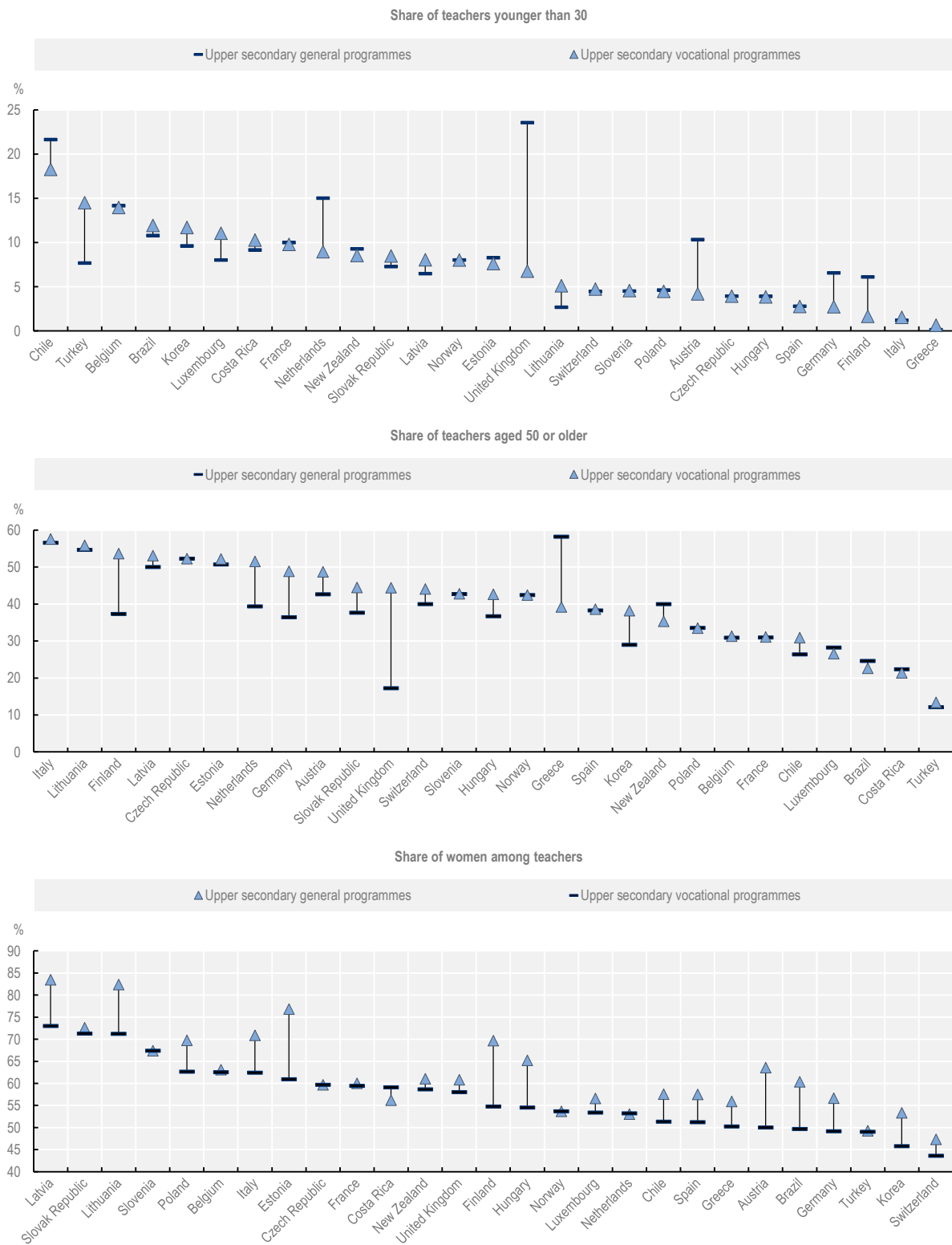
- vocational teachers in schools/colleges: responsible for theoretical vocational skills – often in a classroom setting
- general teachers in schools/colleges: responsible for general subjects (e.g. mathematics, second languages) that may be part of vocational programmes
- vocational trainers in schools/colleges: responsible for imparting practical vocational skills – often in a workshop setting
- vocational trainers or supervisors in workplaces: (e.g. private companies or public entities in the case of public sector apprenticeships).

Eurostat data collection (suspended, (Eurostat, 2000^[50]): The Eurostat VET data collection was a standardised collection of VET programmes in the EU that was started in 1995 and discontinued in 2000. The methods and definitions used by this data collection were a starting point in reaching a consensus and harmonising the concepts around vocational education and training. Eurostat's VET data collection considered the following categories of teachers and trainers.

- Those delivering theoretical courses, lectures and basic knowledge in education/training institutions.
- Those delivering practical training, simulation of work experience in education and training institutions.
- Those delivering theoretical courses, lectures and basic knowledge in enterprises.
- Those supervising work experience in enterprises.

Source: (OECD, 2010^[11]), Learning for Jobs <http://www.oecd.org/education/innovation-education/learningforjobs.htm>, (Cedefop, 2016^[88]), Professional development for VET teachers and trainers, https://www.cedefop.europa.eu/files/9112_en.pdf, (Eurostat, 2000^[50]), Vocational Education and Training Data Collection. Methods and definitions, <https://ec.europa.eu/eurostat/web/education-and-training/methodology>

Figure 5.4. Share of teachers younger than 30, older than 50 and women among teachers (2017)



Source: OECD (2019^[40]). Education at a Glance Database, <https://doi.org/10.1787/f8d7880d-en>

The now suspended Eurostat VET data collection collected data on head counts for the four categories of teaching staff mentioned in Box 5.2 full-time equivalents and working time of teachers in the school-based part of vocational programmes (including general subjects) (Eurostat, 2000^[50]).

Trainers in workplaces are not covered by current data collections

The UOE data collection on educational personnel excludes those involved in the work-based component of combined school- and work-based programmes. The aim of this is to ensure comparability, because the availability of data at national level on educational personnel in the work-based component is very limited (OECD, 2017^[8]).

Comparative data on policy and practice for VET teachers are limited

Until now comparative data collections on qualification requirements and working conditions of teachers have excluded teaching staff in vocational programmes.

- The Eurydice-NESLI data collection on the salaries (statutory and actual amounts) and allowances of teachers and school heads excludes those with teaching responsibilities in vocational programmes.
- The Eurydice-NESLI data collection on instruction time covers programmes from the first year of primary education to the end of full-time compulsory education. In grades where vocational and general programmes co-exist, it only collects data for general programmes.

Work is currently ongoing to expand the coverage of the Eurydice-NESLI data collection and include data collection on VET. Given the role of VET in education and training systems and the key role of teachers and trainers in the quality of provision, these developments are essential to start filling data gaps.

Some information on policy used to be collected from a European survey

The Eurostat VET data collection used to include questions regarding requirements for four types of teachers and trainers in VET. The questionnaire collected data on the required qualification and whether a pedagogical qualification was required. Cedefop collected information on professional development for VET teachers and trainers, yielding some information on policy and practice in Europe (see Box 5.3).

Box 5.3. Entry requirements for teachers in VET

Most EU countries require tertiary education to enter the teaching profession, in some countries combined with pedagogical education (e.g. Estonia, Spain, Hungary, Slovenia). In several countries (e.g. Czech Republic, Denmark, United Kingdom), VET teachers are given some time to acquire a pedagogical qualification through in-service training. In many countries, hiring arrangements and qualification requirements allow for the recruitment of professionals from the labour market as part-time teachers. Some countries (e.g. Croatia, Lithuania, Slovak Republic, Slovenia) require new teachers to complete a pedagogical training course.

- General subjects: teachers are typically trained in a general teacher-training programme.
- Vocational theory: teachers are typically qualified in a professional field. Some countries (e.g. Austria, Czech Republic, Denmark, Estonia, Germany, Norway, Slovak Republic, Sweden) have specific VET teacher training programmes.

- Practical subjects in VET institutions: lower levels of qualification combined with relevant work experience are sometimes required (e.g. Germany, Hungary, Iceland, Latvia, Poland, Slovak Republic Slovenia).

Source: Cedefop (2016^[88]), *Professional Development for VET Teachers and Trainers*, https://www.cedefop.europa.eu/files/9112_en.pdf

Data on policy regarding workplace trainers are limited

Comparative data on policy regarding workplace trainers are lacking. The extent of regulation for workplace trainers and data availability at national level is likely to be patchy, reflecting the importance of workplaces in terms of developing vocational skills in VET. In countries that make extensive use of apprenticeships, which involve a large component of work-based learning, typically regulations ensure that apprentice supervisors are adequately prepared in terms of technical and pedagogical skills (e.g. Germany, Netherlands, Norway, Switzerland). But in systems that make limited use of work-based learning and apprenticeships are small or non-existent, regulations and data are likely to be limited or non-existent Box 5.4 describes some country examples of targeted training for workplace trainers.

Box 5.4. Targeted training for workplace trainers

Online training for workplace trainers in Sweden

This programme is designed for current and prospective trainers in enterprises that offer WBL as part of VET programmes, and for VET teachers in schools. It involves the equivalent of two days coursework, with four introductory general modules and one module on apprenticeship. Each module contains short film scenes followed by interactive exercises. All theoretical content is presented in short films. The programme can be followed online in a flexible way and on different devices. The training is funded by the National Agency for Education and is available free of charge to participants. As of November 2018, more than 28 000 employer-based trainers had completed the programme, as well as 3 700 VET teachers (*about half of the total*).

Source: Ministry of Education (2018^[89]), *Review of VET in Sweden. Background Report*.

Mandatory training for apprentice supervisors in Switzerland

Trainers who supervise apprentices in host-companies must hold a relevant vocational diploma, at least two years of relevant work experience and a trainer qualification, which focuses on pedagogical skills. The trainer qualification may be obtained by completing a 40-hour course (leading to a cantonal certificate) or a 100-hour course (leading to a diploma). Both qualifications are recognised by the confederation. Cantons are responsible for training trainers and training courses are recognised across cantons.

Source : Portail Formationprof.ch (2019^[90]) , Manuel pour la formation en entreprise, <https://www.berufsbildung.ch/dyn/3493.aspx>

Proposals for data development

Proposal 1: Define categories of teachers and trainers in VET

Countries could be invited to provide information on categories of personnel used in their own VET system. Based on this, a set of categories should be defined for the purposes of

international data collection. These might be defined based on the targeted content and the place of delivery:

- teachers of general subjects in education and training institutions (e.g. schools, colleges)
- teachers of vocational theory in education and training institutions (e.g. schools, colleges)
- teachers of vocational practice in education and training institutions (e.g. schools, colleges)
- trainers in workplaces that deliver work-based learning.

This three-way distinction for staff in education and training institutions, and a separate category for workplace trainers is commonly found across countries (Cedefop, 2016^[88]).

It is helpful to consider teachers in education and training institutions and those in workplaces separately. Workplace trainers typically teach vocational practice and sometimes also vocational theory in workplaces – often within private companies, but sometimes also public employers (e.g. apprenticeships in the public sector). Data availability is likely to be patchy in the case of workplace trainers: countries that make extensive use of apprenticeships are likely to have more data than those with little or no apprenticeship.

In practice, the boundaries between different types of staff can be blurred and categories are often different across countries. In Norway, for example, the teaching of theoretical and practical vocational skills is increasingly combined, while in Switzerland general subjects (e.g. sciences) are often adapted to the relevant vocational field (e.g. physics for electricians) (OECD, 2010^[11]). In some subjects (e.g. journalism, accountancy), the absence of a workshop element means that the distinction between vocational theory and practice falls away. Finally, discussed in Chapter 4. , learning can take place in a variety of settings other than “schools” and “workplaces” – such as inter-company training centres (e.g. Austria, Germany, Switzerland) or training offices (Norway). Guidelines would need to clarify which settings are included in the definition of education and training institutions and how those teaching at the boundary of theory and practice, or general and vocational content, should be classified.

The initial mapping of categories used in national systems would help defining criteria for categories of staff in international data collections. These categories could, in turn, create a foundation for further data collection across relevant networks (e.g. NESLI, UOE).

This proposal might be implemented in the short term. It would require countries to engage in providing information on categories of personnel used in their own system and agree on categories suitable for comparative data collection.

Proposal 2: Collect data on teachers in VET

For each category of teacher in VET agreed for the purposes of comparative data collection, data should be collected on the number of teachers and their key characteristics.⁹ In addition, it would be helpful to collect data on entry and professional development

⁹ In addition to information on key characteristics, such as age, salary and qualification requirements, comparative data on digital skills of teacher would also be of interest in light of their growing importance for teaching and in the workplace. However, such data collection would require a substantial expansion of existing surveys that assess adults’ proficiency in certain skills (e.g. PIAAC) or the creation of a new dedicated survey (potentially as an add-on to existing teacher surveys).

requirements for each category of teacher in VET, agreed for the purposes of comparative data collection, including:

- technical qualification
- pedagogical qualification
- relevant work experience
- requirements for professional development (e.g. updating technical skills).

This may be implemented through existing data collections (i.e. UOE, NESLI). This would yield data on variables covered in the current data collection (e.g. age, part-time vs. full-time work, salary, qualification requirements), allowing more precise insights.

Proposal 3: Collect data on trainers

In the short-term, better data might be available in the short term for some countries only, due to differences in data availability at national level. Focusing on apprenticeships in data development efforts on trainers would be a pragmatic approach: apprenticeships and apprentice supervisors are typically subject to extensive regulation. At least in countries where apprenticeships involve clearly designated in-company apprentice supervisors, national data are likely to be available.

Data collection might start with basic information on supervisors, such as numbers. In addition, data might be collected on requirements for trainers (e.g. technical qualification, targeted training mandatory / optional / not systematically offered). Data collection on trainers in apprenticeships hinges on agreeing on a definition of apprenticeship for the purposes of comparative data collection, as discussed in Chapter 4. One way to collect information on trainers in the workplace would be to expand existing employer surveys that already look at the topic of training, to also include questions on trainers. The European Continuing Vocational Training Survey (CVTS), for example, already collects information on training in enterprises in EU countries, but does currently not contain questions on trainers.

Chapter 6. Synthesis of potential indicators and proposed data developments

This chapter presents first a selected set of indicators of VET systems that can be calculated based on existing data. Second, it summarises proposals for data development identified in Chapter 2. to Chapter 5. , which could fill many current data gaps. The capacity to act upon those proposals lies within relevant bodies in international organisations, which have the required links with national statistical agencies. The third part of this chapter describes potential new indicators that might build on data developments.

Selected indicators of VET systems

Table 6.1 provides an overview of proposed indicators of key features of VET systems that can be calculated with currently existing administrative data. These indicators can be calculated for general and vocational programmes at upper secondary and postsecondary non-tertiary levels (ISCED levels 3 and 4). For short-cycle tertiary programmes (ISCED level 5) all of the indicators can be calculated, but in some cases distinction by programme orientation is not possible due to data availability. Further information on each indicator, including a description and further information (e.g. data sources, quality issues, data availability by ISCED category) are provided in Annex A.

Table 6.1. Selected indicators of VET systems

Indicators based on existing comparative data

Key features of VET systems	Indicator
The structure of VET systems	
VET as a potential pathway to tertiary education	Share of students enrolled in VET programmes that provide direct access to tertiary education
How are programmes and qualifications organised?	Typical duration of programmes
	Expected years in education by programme orientation (ISCED 3)
	Number of vocational programmes
	Number of qualification types delivered by VET programmes
Skills targeted by vocational programmes	
Fields of study	Share of entrants to VET by field of study
	Share of enrolment in VET by field of study
	Share of VET graduates by field of study

Students and participation in VET	
The age of VET students	Average age of entry into VET Average age of VET students Typical age of enrolment in VET
VET in lifelong learning: the share of 'older' students	Share of enrolment in VET programmes above age 20 for ISCED 3, age 25 for ISCED 4 Share of new entrants to VET above country-specific typical age
Gender of VET students	Share of new entrants to VET by gender Share of first-time VET graduates by gender
Overrepresentation of males (or females) in different fields of study	Share of women among new entrants to VET: overall and by selected fields of study
Part-time vs. full-time students	Share of VET graduates by gender: overall and by selected fields of study Share of part-time students in VET Share of part-time VET students in combined school and work-based programmes Share of part-time VET students in school-based programmes
Take-up of VET by specific age groups	Enrolment rate by programme orientation (age 15-19, 20-24, 25+)
Take-up of VET by programme level	Share of entrants to ISCED level by programme orientation (vocational vs. general) Share of students by programme orientation Share of graduates by programme orientation
Completion	Upper secondary completion rates
Transitions to tertiary education	Tertiary completion rates, by students' upper secondary orientation
Venues for learning: work-based learning in mainly school-based programmes and apprenticeships	
School-based vs. combined programmes	Share of VET students enrolled in combined school- and work-based programmes
Public vs. private institutions	Share of enrolment by type of institution (public, government-dependent and independent private) in school-based vs. combined school and work-based programmes
Resources for learning	
How much is spent on VET?	Total expenditure by programme orientation as a percentage of GDP Total expenditure per FTE student by programme orientation Cumulative expenditure per student in vocational vs. general programmes
Who pays for VET?	Expenditure on VET before transfers by source of funds (public, private, international)
How much do governments spend on VET?	Public expenditure on VET per full-time equivalent student before transfers by programme orientation Public expenditure on VET per full-time equivalent student by type of institution (public, government-dependent and independent private)
How much do governments transfer to firms for VET?	Public-private transfers to other private entities (e.g. firms, non-profit organisations) as percentage of total expenditure
How much do governments transfer to students in VET?	Public-private transfers to households as percentage of total expenditure Household expenditure on VET on educational institutions as percentage of total expenditure
How much do employers spend on VET?	Expenditure by other private entities (e.g. firms, non-profit organisations) as percentage of total expenditure
The profile of teachers in VET	Average age of VET teachers Share of teachers aged less than 30 Share of teachers aged 50 and over

Summary of proposals for data development

Table 6.2 describes key proposals for data development, set out in more detail in Chapter 2. to Chapter 5. The proposals include four ways of developing comparative data:

- Adjusting guidelines to clarify existing definitions to improve the comparability of existing data and indicators.
- Agreeing on new definitions or taxonomies to support future data collections (e.g. apprentices, categories of vocational teachers).

- Collecting information on policy and practice (e.g. optional or mandatory work-based component in the programme, qualification requirements for VET teachers).
- Collecting new data (e.g. age and gender of current apprentices).

In many cases, it is possible to implement proposed developments in a way that builds on comparative data and information that has already been collected, at least for some countries, to maximise added value in terms of better comparative data and indicators and minimise cost for countries. For example, new definitions or taxonomies can build on those used in earlier comparative analysis, but not currently used to underpin international data collections. Similarly, information collection on policy and practice can build on existing mappings (e.g. mappings of apprenticeship schemes in Europe). The collection of new data can take into account data already available in national or international data collections (e.g. OECD ad-hoc surveys of completion rates, European labour force surveys).

The proposed data developments may add value in different ways: some would improve the comparability of existing indicators, others might underpin future indicators or be used for ad-hoc research purposes.

Table 6.2. Proposals for data development

Indicator	Proposed form on data development
The structure of VET systems	
Collect data on the balance of general vs. vocational content of programmes	Ad-hoc survey
Collect data on the types of qualifications and qualifications offered	Ad-hoc survey
Collect information on institutions that provide vocational programmes	Ad-hoc survey
Agree on a definition for professional orientation at ISCED levels 6-8	No data collection – definition / taxonomy.
Participation in VET and the profile of students	
Collect data that on the use of progression pathways (e.g. share of entrants to tertiary education by the highest qualification level attained)	Regular / cyclical data collection
Work-based learning in school or college-based programmes	
Refine the definition of 'work-based'	No data collection – definition / taxonomy.
Collect data on the features of work-based learning	Ad-hoc survey
Collect data on participation in work-based learning	Regular / cyclical data collection
Apprenticeships	
Agree on a definition for apprenticeships for use in international data collections	No data collection – definition / taxonomy.
Collect data on the characteristics of apprentices	Regular / cyclical data collection
Create a mapping of key features of apprenticeship schemes	Ad-hoc survey
Support countries in the implementation of a cost-benefit survey of apprenticeships using a common methodology	
Finance	
Expand the country coverage of private expenditure on VET	Development of existing data collection.
Create a mapping of financial transfer schemes in VET	Ad-hoc survey
VET teachers and trainers	
Define categories of teachers and trainers in VET	No data collection – definition / taxonomy.
Collect data on teachers in VET (numbers, qualifications, salaries)	Regular / cyclical data collection
Collect data on trainers	Regular / cyclical data collection

At the moment of drafting this report, the OECD INES Working Party and its LSO and NESLI networks had launched an international survey that includes some of the variables mentioned in Table 6.2 and planned to release the information collected with the 2020 edition of *Education at a Glance*.

Potential new indicators

Table 6.3 describes potential new indicators. These are examples of potential new indicators, giving a flavour of the kind of indicators that data developments set out in Table 6.2 may underpin.

Table 6.3. Potential new indicators

Key features of VET systems	Indicator
The structure of VET systems	
How specialised are schools that deliver VET?	VET typically delivered in dedicated institutions vs. within the same institution as general programmes at the same level
	Institutions that deliver VET typically specialised in one field of study vs. several ones
Balance of general-vocational content	The share of vocational vs. general content (by programme)
School size	Average school size
Students and participation in VET	
VET as a potential pathway to tertiary education	Share of students enrolled in tertiary programmes who have completed upper secondary VET or a bridging programme for VET graduates
	Share of entrants to tertiary education holding a vocational upper secondary qualification
Venues for learning	
Nature of work-based learning	Mandatory / optional but recognised in the curriculum / not recognised in the curriculum
Duration of work-based learning	Share of the curriculum delivered through work-based learning
Sequencing of work-based learning	One vs. several blocks
Participation in work-based learning	Share of school-based VET students who participate in work-based learning in the course of the programme
Profile of apprentices	Average age of apprentices
	Share of female apprentices
	Apprentices by field of study
	Share of incumbent workers among apprentices
	Highest prior qualification of apprentices
Features of apprenticeship schemes	Form of alternation (e.g. days within a week, blocks of several weeks or years)
	ISCED levels at which apprenticeships are offered
	Average programme duration
	Legal status of apprentices
	Apprentice wages (e.g. as % of minimum wage or skilled worker wage)
	Financial incentives to employers (e.g. universal subsidy, targeted subsidy, universal tax break, targeted tax break)
Resources for learning	
Requirements for teachers in VET	Technical qualification required
	Technical professional development required
	Pedagogical qualification required
	Relevant work experience required
Trainers in workplaces	Targeted training required / optional / not systematically offered

Annex A. Information on selected VET indicators

Table A A.1. Information on selected VET indicators

Indicators to be calculated for: ISCED 34, 35, 44, 45, 54, 55 (for some indicators no distinction is possible by programme orientation for ISCED 5). Data are available from the UOE data collection unless otherwise stated.			
Key features of VET systems	Indicator	Description	Comments (potential sources, quality issues)
The structure of VET systems			
VET as a potential pathway to tertiary education	Share of students enrolled in VET programmes that provide direct access to tertiary education	Number of students enrolled in programmes that provide direct access to tertiary education divided by the number of students in all VET programmes	UOE
How are programmes and qualifications organised?	Typical duration of programmes		ISCED mappings
	Expected years in education by programme orientation (ISCED 3)	Sum of the age-specific probabilities of enrolment of the total population between age 5 and 39	UOE. Comment: difficult interpretability, metric not comparable to the typical duration of a programme, as figures would be lower because of youth not in school or enrolled in other programmes
	Number of vocational programmes		ISCED mappings
	Number of qualification types delivered by VET programmes		ISCED mappings
Skills targeted by vocational programmes			
Fields of study	Share of entrants to VET by field of study	Number of entrants in a particular field of study as a share of entrants in all fields of study at that level	UOE

	Share of enrolment in VET by field of study	Number of students in a particular field of study as a share of students in all fields of study at that level	UOE
	Share of VET graduates by field of study	Number of graduates from a particular field of study as a share of graduates from all fields of study at that level	UOE
Students and participation in VET			
The age of VET students	Average age of entry into VET	Weighted average of entrants' ages	UOE
	Average age of VET students	Weighted average of students' ages	UOE
	Typical age of enrolment in VET	Shortest age interval that includes 50% of students	UOE. It indicates the (eventual) concentration of students in a particular age interval
VET in lifelong learning: the share of 'older' students	Share of enrolment in VET programmes above age 20 for ISCED 3, age 25 for ISCED 4	Share of students enrolled in a particular ISCED level above age thresholds that are common to all countries	UOE
	Share of new entrants to VET above country-specific typical age	Share of entrants in a particular ISCED level above country-specific age thresholds	UOE
Gender of VET students	Share of new entrants to VET by gender	Number of male/female entrants as a share of all entrants at that level	UOE
	Share of first-time VET graduates by gender	Number of male/female first-time graduates as a share of all first-time graduates at that level	UOE
Overrepresentation of males (or females) in different fields of study	Share of women among new entrants to VET: overall and by selected fields of study	Number of female new entrants divided by the number of all new entrants, overall or in a particular field of study	UOE
	Share of VET graduates by gender: overall and by selected fields of study	Number of male/female graduates divided by the Number of all new entrants, overall or in a particular field of study	UOE
Part-time vs. full-time students	Share of part-time students in VET	Number of part-time students divided by the number of all students in VET programmes	UOE
	Share of part-time VET students in combined school and work-based programmes	Number of part-time students divided by the Number of all students in combined school- and work-based programmes	UOE

	Share of part-time VET students in school-based programmes	Number of part-time students divided by the number of all students in VET school-based programmes	UOE
Take-up of VET by specific age groups	Enrolment rate by programme orientation (age 15-19, 20-24, 25+)	Number of students of a particular age group and /or programme as a share of the population of that age group	UOE
Take-up of VET by programme level	Share of entrants to ISCED level by programme orientation (vocational vs. general)	Number of entrants in general/vocational programmes at a particular ISCED level, divided by the number of entrants in all programmes at that ISCED level	UOE
	Share of students by programme orientation	Number of students in general/vocational programmes at a particular ISCED level, divided by the number of students in all programmes at that ISCED level	UOE
	Share of graduates by programme orientation	Number of graduates from general/vocational programmes at a particular ISCED level, divided by the number of graduates from all programmes at that ISCED level	UOE
Completion	Upper secondary completion rates	The percentage of students who graduate from a certain educational programme a given number of years after they entered (corresponding to the theoretical duration and the theoretical duration plus two years), as a share of those who entered.	Cyclical ad-hoc survey (INES)
Transitions to tertiary education	Tertiary completion rates, by students' upper secondary orientation	The percentage of students who graduate from a certain educational programme a given number of years after they entered (corresponding to the theoretical duration and the theoretical duration plus two years), as a share of those who entered, by students' upper secondary general/vocational orientation.	Cyclical ad-hoc survey (INES)

Venues for learning: work-based learning in mainly school-based programmes and apprenticeships			
School-based vs. combined programmes	Share of VET students Enrolled in combined school and work-based programmes	Number of students in combined school- and work-based programmes divided by the number of students in all vocational programmes	UOE
Public vs. Private institutions	Share of enrolment by type of institution (public, government-dependent and independent private) in school-based vs. combined school and work-based programmes	Number of students enrolled in school-based or combined programmes in public, or independent private institutions divided by the number of students in all institutions at that level	UOE
Resources for learning			
How much is spent on VET?	Total expenditure by programme orientation as a percentage of GDP	Annual expenditure by public, international and private sources on public and private educational institutions as a percentage of GDP	UOE. Excludes household expenditure outside educational institutions.
	Total expenditure per FTE student by programme orientation	Annual expenditure by public, international and institutions per full-time equivalent student, in USD PPP	UOE
	Cumulative expenditure per student in vocational vs. general programmes	Annual expenditure on general/vocational programmes per full-time equivalent student at a particular level multiplied by the expected years in education at that level, in USD PPP	UOE
Who pays for VET?	Expenditure on VET before transfers by source of funds (public, private, international)	Expenditure by public, international or private sources as a share of expenditure on educational institutions by all funding sources	UOE
How much do governments spend on VET?	Public expenditure on VET per full-time equivalent student before transfers by programme orientation	Annual expenditure by public sources on general/vocational programmes per full-time equivalent student, in USD PPP	UOE. Includes public transfers to the private sector.

	Public expenditure on VET per full-time equivalent student by type of institution (public, government-dependent and independent private)	Annual expenditure by public sources on public, government-dependent and independent private institutions and public transfers to the private sector (households and other private entities) per full-time equivalent student, in USD PPP	UOE
How much do governments transfer to firms for VET?	Public-private transfers to other private entities (e.g. firms, non-profit organisations) as percentage of total expenditure	Public transfers to other private entities (i.e. private sector excluding households) as a percentage of expenditure on educational institutions from all sources	UOE
How much do governments transfer to students in VET?	Public-private transfers to households as percentage of total expenditure	Public transfers to households as a percentage of expenditure on educational institutions from all sources	UOE
	Household expenditure on VET on durational institutions as percentage of total expenditure	Expenditure by households on educational institutions as a share of expenditure from all sources on VET programmes	UOE
How much do employers spend on VET?	Expenditure by other private entities (e.g. firms, non-profit organisations) as percentage of total expenditure	Expenditure by other private entities (private sector excluding households) on educational institutions as a share of expenditure from all sources on VET programmes	UOE
The profile of teachers in VET	Average age of VET teachers	Weighted average of VET teachers' age	UOE. It is an estimation as data on teachers are collected by age groups rather than by individual ages.
	Share of teachers aged less than 30	Share of teachers younger than 30 divided by the number of teachers of all ages	UOE
	Share of teachers aged 50 and over	Share of teachers aged 50 and older divided by the number of teachers of all ages	UOE

Annex B. The availability of UOE data to underpin indicators

Table A B.1. Enrolment indicators

Enrolment indicators	Upper secondary		Post-secondary non-tertiary			Short-cycle tertiary			Bachelor's professional programmes	Master's professional programmes	All tertiary vocational/ professional programmes
	vocational programmes	combined school- and work-based programmes	vocational programmes	combined school- and work-based programmes	all programmes	vocational programmes	combined school- and work-based programmes	all programmes			
Enrolment rates, by sex	Calculated	Calculated	Calculated	Calculated	Calculated	Calculated	Calculated	Calculated	Calculated	Calculated	
Share by sub-category (full/partial completion and access to tertiary)	Calculated	Calculated	Calculated	Calculated	Calculated	Calculated	Calculated	Calculated	Calculated	Calculated	
Share by institution (public, government-dependent and independent private)	Calculated	Calculated	Calculated	Calculated	Calculated	Calculated	Calculated	Calculated	Calculated	Calculated	
Share by intensity (full/part-time), by sex	Calculated	Calculated	Calculated	Calculated	Calculated	Calculated	Calculated	Calculated	Calculated	Calculated	
Share of part-time by age, by sex	Calculated	Calculated	Calculated	Calculated	Calculated	Calculated	Calculated	Calculated	Calculated	Calculated	
Expected years in education (5-39 year-olds), by sex	Calculated	Calculated	Calculated	Calculated	Calculated	Calculated	Calculated	Calculated	Calculated	Calculated	
Average age, by sex	Calculated	Calculated	Calculated	Calculated	Calculated	Calculated	Calculated	Calculated	Calculated	Calculated	
Typical ages of enrolment	Calculated	Calculated	Calculated	Calculated	Calculated	Calculated	Calculated	Calculated	Calculated	Calculated	
Share by (general/vocational) category, by sex and intensity	Calculated	Calculated	Calculated	Calculated	Calculated	Calculated	Calculated	Calculated	Calculated	Calculated	
Share by (general/vocational) category, by age (15-19, 20-24, 25 and older)	Calculated	Calculated	Calculated	Calculated	Calculated	Calculated	Calculated	Calculated	Calculated	Calculated	
Share above typical age 20 at ISC3 and age 25 at ISC4, by sex	Calculated	Calculated	Calculated	Calculated	Calculated	Calculated	Calculated	Calculated	Calculated	Calculated	
Number of years of full enrolment (above 90%)	Calculated	Calculated	Calculated	Calculated	Calculated	Calculated	Calculated	Calculated	Calculated	Calculated	
Distribution of mobile students by country of origin	Calculated	Calculated	Calculated	Calculated	Calculated	Calculated	Calculated	Calculated	Calculated	Calculated	
Distribution of students by field (2-digit codes)	Calculated	Calculated	Calculated	Calculated	Calculated	Calculated	Calculated	Calculated	Calculated	Calculated	
Distribution of mobile students by field (2-digit codes)	Calculated	Calculated	Calculated	Calculated	Calculated	Calculated	Calculated	Calculated	Calculated	Calculated	
Share of mobile students among all students, by field and sex (2-digit codes)	Calculated	Calculated	Calculated	Calculated	Calculated	Calculated	Calculated	Calculated	Calculated	Calculated	
Share of students by VET type	Calculated	Calculated	Calculated	Calculated	Calculated	Calculated	Calculated	Calculated	Calculated	Calculated	
Share of VET by ISCED level	Calculated	Calculated	Calculated	Calculated	Calculated	Calculated	Calculated	Calculated	Calculated	Calculated	

Table A B.2. New entrants indicators

	Upper secondary		Post-secondary non-tertiary			Short-cycle tertiary			Bachelor's professional programmes	Master's professional programmes	All tertiary vocational/ professional programmes
	vocational programmes	combined school- and work-based programmes	vocational programmes	combined school- and work-based programmes	all programmes	vocational programmes	combined school- and work-based programmes	all programmes			
New entrants indicators											
Entry rates, by sex								Calculated			
Entry rates, excl. mobile students, by sex								Calculated			
Share by gender								Calculated			
Share by gender (international new entrants)								Calculated			
Share by field, by sex								Calculated			
Share by gender, by field								Calculated			
Share by field of long first degrees or master's following a bachelor's								Calculated			
Share by sub-category								Calculated			
Average age, by sex								Calculated			
Share below typical age								Calculated			
Share of international new entrants, by sex								Calculated			
Share of first time new entrants on tertiary, by sex								Calculated			

Table A B.3. Graduation indicators

Calculated
 Could be calculated

Graduation indicators	Upper secondary		Post-secondary non-tertiary			Short-cycle tertiary			Bachelor's professional programmes	Master's professional programmes	All tertiary vocational/ professional programmes
	vocational programmes	combined school- and work-based programmes	vocational programmes	combined school- and work-based programmes	all programmes	vocational programmes	combined school- and work-based programmes	all programmes			
First-time graduation rates, by sex	■		■		■			■			
First-time graduation rates below 25 (ISC3), 30 (ISC4, 5, 6) and 35 (ISC7, 8), by sex					■			■			
First-time graduation rates (excl. mobile students), by sex								■			
First-time graduation rates (excl. mobile students) below 30 (ISC4, 5, 6) and 35 (ISC7, 8), by sex								■			
Share of graduates by field, by sex	■		■					■			
Share of mobile graduates by field, by sex								■			
Average entry age, by gender	■		■		■			■			
Share below typical age	■		■		■			■			
Share by gender, by field	■							■			
Share of first-time graduates, by gender								■			
Share of mobile graduates, by gender								■			
Share by institution (public, government-dependent and independent private)	■		■					■			

Table A B.4. Finance indicators

■ Calculated ■ Could be calculated

Finance indicators	Upper secondary		Post-secondary non-tertiary			Short-cycle tertiary			Bachelor's professional programmes	Master's professional programmes	All tertiary vocational/ professional programmes
	vocational programmes	combined school- and work-based programmes	vocational programmes	combined school- and work-based programmes	all programmes	vocational programmes	combined school- and work-based programmes	all programmes			
Expenditure on educational institutions per full-time equivalent student	■	■	■	■	■	■	■	■	■	■	
Expenditure on educational institutions per full-time equivalent student, by type of institutions (public, government-dependent and independent private)	■	■	■	■	■	■	■	■	■	■	
Expenditure on educational institutions per full-time equivalent student, by type of service (core, ancillary, R&D)	■	■	■	■	■	■	■	■	■	■	
Expenditure on educational institutions per full-time equivalent student before transfers	■	■	■	■	■	■	■	■	■	■	
Expenditure per student as share of GDP per capita (incl. or excl. R&D)	■	■	■	■	■	■	■	■	■	■	
Cumulative expenditure per student	■	■	■	■	■	■	■	■	■	■	
Expenditure as a percentage of GDP, by source of funds	■	■	■	■	■	■	■	■	■	■	
Expenditure as a percentage of GDP before transfers, by source of funds	■	■	■	■	■	■	■	■	■	■	
Expenditure as a percentage of GDP excluding R&D	■	■	■	■	■	■	■	■	■	■	
Relative shares of public, private and international expenditure	■	■	■	■	■	■	■	■	■	■	
Relative shares of public, private and international expenditure, before and after transfers	■	■	■	■	■	■	■	■	■	■	
Expenditure on education as a share of total government expenditure, by level of government	■	■	■	■	■	■	■	■	■	■	
Relative shares of public expenditure on education by level of government, before and after transfers	■	■	■	■	■	■	■	■	■	■	
Relative shares of current and capital expenditure, by institution type	■	■	■	■	■	■	■	■	■	■	
Relative shares of staff compensation and other types of current expenditure (compensation of teachers, other staff, other), by institution type	■	■	■	■	■	■	■	■	■	■	
Index of change in expenditure, number of students and expenditure per full-time equivalent student	■	■	■	■	■	■	■	■	■	■	
Index of change of expenditure on education as a share of GDP	■	■	■	■	■	■	■	■	■	■	
Index of change in relative shares of public and private expenditure	■	■	■	■	■	■	■	■	■	■	
Index of change in total government expenditure and expenditure on education as a share of total government expenditure	■	■	■	■	■	■	■	■	■	■	

Table A B.5. Personnel indicators

Calculated
 Could be calculated

Personnel indicators	Upper secondary		Post-secondary non-tertiary			Short-cycle tertiary			Bachelor's professional programmes	Master's professional programmes	All tertiary vocational/ professional programmes
	vocational programmes	combined school- and work-based programmes	vocational programmes	combined school- and work-based programmes	all programmes	vocational programmes	combined school- and work-based programmes	all programmes			
Share of teachers by age range, by sex											
Share of teachers by gender											
Share of teachers by gender, less than 30											
Share of teachers by gender, 50 and over											
Ratio of students to teaching staff by type of institution											
Ratio of students to total teaching staff											

Annex C. EU-LFS ad-hoc module “young people on the labour market”

The EU-LFS ad hoc module 2016 covers persons aged 15-34 living in private households. The variable work experience while studying in the tables is a composite of the two regulation variables WORKEXP and WORKSTUD. Curriculum/education/qualification always refers to the respondent's highest completed education (HATLEVEL). There are two types of breakdowns of this variable: one based on payment and one based on links to education. It should be noted that the definitions in the 2009 data collection were slightly different.

The work/education breakdown is:

- No work experience: not carried out any form of work (neither paid nor unpaid) while being a student or pupil.
- Outside curriculum: did carry out work while being a student or pupil, but the work was not connected to the person's ongoing studies.
- Apprenticeship: had working experience which was a mandatory part of the curriculum, the work lasted at least six months and it was paid.
- Mandatory traineeship: had working experience which was a mandatory part of the curriculum, the work lasted at least six months and it was not paid.
- Mandatory work-based learning: had working experience which was a mandatory part of the curriculum, but we have no further information on the length of time, or if it was paid or not.
- Optional traineeship: had working experience which was an optional part of the curriculum, and we have no further information on the length of time, or if it was paid or not.

The category work-based learning is the sum of apprenticeship, mandatory traineeship, mandatory work-based learning, and optional traineeship.

The payment breakdown is:

- No work experience: not carried out any form of work (neither paid nor unpaid) while being a student or pupil.
- Paid work experience.
- Unpaid work experience.
- Both paid and unpaid work experience.

References

- Acemoglu, D. and J. Pischke (1999), “Beyond Becker: Training in Imperfect Labour Markets”, *The Economic Journal*, Vol. 109/453, pp. 112-142, <http://dx.doi.org/10.1111/1468-0297.00405>. [58]
- Acemoglu, D. and J. Pischke (1996), “Why Do Firms Train?”, in *Why Do Firms Train? Theory and Evidence*, <http://www.nber.org/papers/w5605>. [57]
- Andrews, D., G. Nicoletti and C. Timiliotis (2018), “Digital technology diffusion: A matter of capabilities, incentives or both?”, *OECD Economics Department Working Papers*, No. 1476, OECD Publishing, Paris, <https://doi.org/10.1787/7c542c16-en>. (accessed on 17 December 2019). [14]
- AoC (2017), *College Key Facts 2016/17*, <https://indd.adobe.com/view/2ecfd04e-047c-49cc-91d3-18f9bdb9ca73> (accessed on 20 June 2019). [27]
- Bergseng, B., E. Degler and S. Lüthi (2019), *Unlocking the Potential of Migrants in Germany*, OECD Reviews of Vocational Education and Training, OECD Publishing, Paris, <https://dx.doi.org/10.1787/82ccc2a3-en>. [17]
- BIBB (2019), *Datenreport zum Berufsbildungsbericht 2019*, Bundesinstitut für Berufsbildung, Bonn, https://www.bibb.de/dokumente/pdf/bibb_datenreport_2019.pdf. [38]
- BIBB (2011), *Datenreport zum Berufsbildungsbericht 2011*, Bundesinstitut für Berufsbildung, Bonn, https://datenreport.bibb.de/media2011/Datenreport_2011.pdf. [28]
- BIBB (2009), “Ausbilder-Eignungsverordnung Vom 21 Januar 2009”, *Bundesgesetzblatt* 5, http://www.bibb.de/dokumente/pdf/ausbilder_eignungsverordnung.pdf. [86]
- Cedefop (2019), *VET in Europe country reports*, <https://www.cedefop.europa.eu/en/publications-and-resources/country-reports/vet-in-europe-country-reports> (accessed on 26 August 2019). [4]
- Cedefop (2018), *Apprenticeship schemes in European countries A cross-nation overview*, European Centre for the Development of Vocational Training, Luxembourg, https://www.cedefop.europa.eu/files/4166_en.pdf. [61]
- Cedefop (2018), “How many IVET students have direct access to tertiary education? Indicator 1025: IVET students with direct access to tertiary education”, in *Statistics and indicators: Statistics and graphs*, <http://www.cedefop.europa.eu/en/publications-and-resources/statistics-and-indicators/statistics-and-graphs/03-how-many-ivet-students>. [21]
- Cedefop (2018), *The changing nature and role of vocational education and training in Europe. Volume 4: changing patterns of enrolment in upper secondary initial vocational education and training.*, Publications Office of the European Union, Luxembourg, <http://dx.doi.org/10.2801/45684>. [24]

- Cedefop (2016), *Professional development for VET teachers and trainers*, European Centre for the Development of Vocational Training, <https://www.cedefop.europa.eu/en/publications-and-resources/publications/9112> (accessed on 8 July 2019). [88]
- Cedefop (2016), *Professional development for VET teachers and trainers*, European Centre for the Development of Vocational Training, <https://www.cedefop.europa.eu/en/publications-and-resources/publications/9112> (accessed on 8 July 2019). [85]
- Cedefop (2014), “Attractiveness of initial vocational education and training: identifying what matters”, *Research Paper*, No. 39, European Centre for the Development of Vocational Training, Luxembourg, https://www.cedefop.europa.eu/files/5539_en.pdf. [30]
- Cedefop (2014), *Terminology of European education and training policy*, Publications office of the European Union, Luxembourg, <http://dx.doi.org/10.2801/15877>. [48]
- Cedefop (2008), “Evaluation of Eurostat education, training and skills data sources”, *Panorama Series*, Cedefop European Centre for the Development of Vocational Training, https://www.cedefop.europa.eu/files/5185_en.pdf (accessed on 8 July 2019). [11]
- Condon, N. and McNaboe Joan (2016), *Monitoring Ireland’s Skills Supply: Trends in Education and Training Outputs*, SOLAS, Expert Group on Future Skills Needs, <http://www.skillsireland.ie> (accessed on 22 May 2019). [72]
- Council of the European Union (2018), *Recommendation on a European Framework for Quality and Effective Apprenticeships*, <http://data.consilium.europa.eu/doc/document/ST-6779-2018-INIT/en/pdf>. [62]
- Department for Education - England (2017), *Longitudinal Education Outcomes study: how we use and share personal data*, https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/664729/LEO_privacy_notice_Dec17_v1.0.pdf (accessed on 10 December 2019). [45]
- Department of Education and Skills, I. (2017), *Action plan to expand apprenticeship and traineeship in Ireland 2016-2020*, <https://epale.ec.europa.eu/en/resource-centre/content/action-plan-expand-apprenticeship-and-traineeship-ireland-2016-2020> (accessed on 5 May 2020). [79]
- DGT (2019), *Frequently Asked Questions*, <https://www.dgt.org.au/jobseekers/faqs.html> (accessed on 20 August 2019). [68]
- DOL (2018), *United States Department of Labor - Data and Statistics website*, https://doleta.gov/oa/data_statistics.cfm (accessed on 6 March 2018). [77]
- European Commission (2017), *Mapping of VET graduate tracking measures in EU Member States*, <https://op.europa.eu/en/publication-detail/-/publication/00d61a86-48fc-11e8-beld-01aa75ed71a1/language-en>. [46]
- European Commission (n.d.), *Platforms of Centres of Vocational Excellence*, <https://ec.europa.eu/social/main.jsp?catId=1501> (accessed on 2020). [13]
- European Union (2020), *Qualifications*, <https://ec.europa.eu/esco/portal/qualification#eqfFilters=2,3,4&sorting=alphabetical&page=1>. [91]

- Eurostat (2020), “ISCED Mappings 2017 Ireland”, [19]
https://ec.europa.eu/eurostat/cache/metadata/EN/educ_uae_enr_esqrs_ie.htm.
- Eurostat (2016), *LFS Database*, <https://ec.europa.eu/eurostat/web/lfs/data/database>. [37]
- Eurostat (2000), “Education and training Methodology”, [50]
<https://ec.europa.eu/eurostat/web/education-and-training/methodology>.
- Eurostat (2000), “Vocational Education and Training Data Collection. Methods and definitions”, [64]
Unpublished, Eurostat.
- Eurostat, (2018), *The ad-hoc module “young people on the labour market”*, [63]
https://ec.europa.eu/eurostat/cache/metadata/en/lfs_16_esms.htm.
- Eurydice (2019), *National Descriptions of Education Systems. Guide to content.. Extract: 2.8 Statistics on Educational Institutions*, https://eacea.ec.europa.eu/national-policies/eurydice/estonia/28-statistics-educational-institutions_en. [29]
- Fazekas, M. and S. Field (2013), *A Skills beyond School Review of Germany*, OECD Reviews of Vocational Education and Training, OECD Publishing, Paris, [35]
<https://dx.doi.org/10.1787/9789264202146-en>.
- Fazekas, M. and S. Field (2013), *A Skills beyond School Review of Switzerland*, Organisation for Economic Co-operation and Development, Paris, <https://doi.org/10.1787/9789264062665-en>. [36]
- Flisi, S. (2020), “Building up evidence on work-based learning in VET - A reflection on sources for possible indicators or benchmarks on work-based learning”, *JRC Technical Reports*, European Commission – Joint Research Centre, <http://dx.doi.org/10.2760/645199>. [49]
- Flisi, S. (2019), *Building up evidence on work-based learning in VET*, Publications Office of the European Union, Luxembourg, <http://dx.doi.org/10.2760/645199>. [9]
- FSO (2019), *Vocational education and training (VET) - Apprenticeships*, [80]
<https://www.bfs.admin.ch/bfs/en/home/statistics/education-science/pupils-students/upper-secondary/vocational-training-apprenticeships.html> (accessed on 24 September 2019).
- Hargreaves, J., J. Stanwick and P. Skujins (2017), *The changing nature of apprenticeships: 1996-2016*, National Centre for Vocational Education Research, Adelaide, https://www.ncver.edu.au/_data/assets/pdf_file/0028/367255/The-changing-nature-of-apprenticeships-1996-2016.pdf (accessed on 17 April 2018). [70]
- Haukås, M. and K. Skjervheim (2018), “Vocational education and training in Europe - Norway”, [52]
Cedefop ReferNet VET in Europe,
http://libserver.cedefop.europa.eu/vetelib/2019/Vocational_Education_Training_Europe_Norway_2018_Cedefop_ReferNet.pdf.
- IAG-TVET (2014), *Proposed indicators for assessing technical and vocational education and training: Working document*. [5]

- ICF (2017), *Mapping of VET graduate tracking measures in EU Member States*, European Commission, Brussels, [http://file:///C:/Users/kome_c/Downloads/VET%20graduate%20tracking%20study%20FINAL%20\(18\).pdf](http://file:///C:/Users/kome_c/Downloads/VET%20graduate%20tracking%20study%20FINAL%20(18).pdf). [43]
- ILO (2019), “A framework for quality apprenticeships”, *International Labour Conference, 110th Session, 2021*, International Labour Organisation, <http://www.ilo.org/publns>. (accessed on 10 August 2020). [76]
- ILO (2017), *ILO Toolkit for Quality Apprenticeships*, <http://www.ilo.org/skills> (accessed on 22 May 2019). [65]
- Jansen, A. et al. (2015), *Apprenticeship training in Germany remains investment-focused – results of BIBB Cost-Benefit Survey 2012/13*, Bundesinstitut für Berufsbildung, Bonn, <https://www.bibb.de/en/25852.php>. [55]
- Jeon, S. (2019), *Unlocking the Potential of Migrants: Cross-country Analysis*, OECD Reviews of Vocational Education and Training, OECD Publishing, Paris, <https://dx.doi.org/10.1787/045be9b0-en>. [16]
- Kis, V. (2016), “Work-based Learning for Youth at Risk: Getting Employers on Board”, *OECD Education Working Papers*, No. 150, OECD Publishing, Paris, <https://dx.doi.org/10.1787/5e122a91-en>. [18]
- Kis, V. (2011), *OECD Reviews of Vocational Education and Training: A Learning for Jobs Review of the United States, Texas 2011*, OECD Reviews of Vocational Education and Training, OECD Publishing, Paris, <https://dx.doi.org/10.1787/9789264114029-en>. [32]
- Kis, V. and H. Windisch (2018), “Making Skills Transparent: Recognising Vocational Skills Acquired through Work-Based Learning”, *Education Working Paper*, No. 180, OECD, Paris, [http://www.oecd.org/officialdocuments/publicdisplaydocumentpdf/?cote=EDU/WKP\(2018\)16&docLanguage=En](http://www.oecd.org/officialdocuments/publicdisplaydocumentpdf/?cote=EDU/WKP(2018)16&docLanguage=En). [25]
- Kuczera, M. (2017), “Incentives for apprenticeship”, *OECD Education Working Papers*, No. 152, OECD Publishing, Paris, <https://dx.doi.org/10.1787/55bb556d-en>. [59]
- Kuczera, M. (2017), “Striking the right balance: Costs and benefits of apprenticeship”, *OECD Education Working Papers*, No. 153, OECD Publishing, Paris, <https://dx.doi.org/10.1787/995fff01-en>. [75]
- Kuczera, M. (2011), *OECD Reviews of Vocational Education and Training: A Learning for Jobs Review of the United States, South Carolina 2011*, OECD Reviews of Vocational Education and Training, OECD Publishing, Paris, <https://dx.doi.org/10.1787/9789264114012-en>. [33]
- Kuczera, M., T. Bastianići and Field S (2018), *Apprenticeship and Vocational Education and Training in Israel*, OECD, Paris, <https://doi.org/10.1787/9789264302051-en>. [66]
- Lanning, T. (2011), “Why rethink apprenticeships?”, in Dolphin, T. and T. Lanning (eds.), *Rethinking apprenticeships*, Institute for Public Policy Research, London, https://www.ippr.org/files/images/media/files/publication/2011/11/apprenticeships_Nov2011_8028.pdf (accessed on 17 April 2018). [71]

- Ministry of Education (2018), *Review of VET in Sweden Background Report*. [89]
- Mirza-Davies, J. (2015), “Apprenticeships Policy, England 2010-2015”, *Briefing Paper*, No. 7278, House of Commons Library, [https://researchbriefings.parliament.uk > CBP-7278](https://researchbriefings.parliament.uk/CBP-7278). [67]
- Moretti, L. et al. (2017), “So Similar and yet So Different: A Comparative Analysis of a Firm’s Cost and Benefits of Apprenticeship Training in Austria and Switzerland”, <http://ftp.iza.org/dp11081.pdf> (accessed on 26 October 2017). [81]
- Moso-Díez, M. (2019), “EU research and innovation policy and VET: Concepts, development and challenges”, in Stalder, B. and C. Nägele (eds.), *Trends in vocational education and training research, Vol. II. Proceedings of the European Conference on Educational Research (ECER)*, <https://doi.org/10.5281/zenodo.3371559>. [15]
- MSZOE (2019), *Tanulószerződéses gyakorlati képzés 2017*, <https://www.mszoe.hu/index.php?oldal=alap.php&id=175&v=igen&hol=bal> (accessed on 27 August 2019). [51]
- Muehleemann, S. (2016), *The Cost and Benefits of Work-based Learning*, <http://www.oecd-ilibrary.org/content/workingpaper/5j1pl4s6g0zv-en>. [53]
- Musset, P. (2019), “Improving work-based learning in schools”, *OECD Social, Employment and Migration Working Papers*, No. 233, OECD Publishing, Paris, <https://dx.doi.org/10.1787/918caba5-en>. [47]
- Musset, P. et al. (2013), *A Skills beyond School Review of Austria*, OECD Reviews of Vocational Education and Training, OECD Publishing, Paris, <https://dx.doi.org/10.1787/9789264200418-en>. [34]
- OECD (2020), *OECD Employment Outlook 2020: Worker Security and the COVID-19 Crisis*, OECD Publishing, Paris, <https://dx.doi.org/10.1787/1686c758-en>. [7]
- OECD (2019), *Education at a Glance 2019: OECD indicators*, OECD Publishing, Paris, <https://dx.doi.org/10.1787/eag-2019-en>. [39]
- OECD (2019), *Education at a Glance 2019: OECD Indicators*, OECD Publishing, Paris, <https://dx.doi.org/10.1787/f8d7880d-en>. [42]
- OECD (2019), *Education at a Glance Database*, <https://doi.org/10.1787/f8d7880d-en> (accessed on 6 July 2018). [40]
- OECD (2018), *OECD Handbook for Internationally Comparative Education Statistics 2018: Concepts, Standards, Definitions and Classifications*, OECD Publishing, Paris, <https://dx.doi.org/10.1787/9789264304444-en>. [83]
- OECD (2018), *Seven Questions about Apprenticeships: Answers from International Experience*, OECD Reviews of Vocational Education and Training, OECD Publishing, Paris, <https://dx.doi.org/10.1787/9789264306486-en>. [3]
- OECD (2018), *Seven Questions about Apprenticeships: Answers from International Experience*, OECD Publishing Paris, <https://dx.doi.org/10.1787/9789264306486-en>. [73]

- OECD (2017), *Education at a Glance 2017: OECD Indicators*, OECD Publishing, Paris, [41]
<https://dx.doi.org/10.1787/eag-2017-en>.
- OECD (2017), *OECD Handbook for Internationally Comparative Education Statistics: Concepts, Standards, Definitions and Classifications*, OECD Publishing, Paris, [8]
<https://dx.doi.org/10.1787/9789264279889-en>.
- OECD (2016), *PISA 2015 Results (Volume I): Excellence and Equity in Education*, PISA, OECD Publishing, Paris, [31]
<https://dx.doi.org/10.1787/9789264266490-en>.
- OECD (2016), *PISA 2015 Results (Volume II): Policies and Practices for Successful Schools*, PISA, OECD Publishing, Paris, [10]
<https://dx.doi.org/10.1787/9789264267510-en>.
- OECD (2014), *Skills Beyond School: Synthesis Report*, OECD Publishing, Paris, [2]
<http://http://dx.doi.org/10.1787/9789264214682-en>.
- OECD (2012), *INES Indicators of Education Systems*, OECD, Paris, [12]
<https://www.oecd.org/education/skills-beyond-school/49338320.pdf>.
- OECD (2010), *Learning for Jobs*, OECD Publishing, Paris, [1]
<https://doi.org/10.1787/9789264087460-en>.
- OECD (2010), *Learning for Jobs*, OECD Publishing, Paris. [84]
- OECD and World Bank (2013), “Indicators of skills for employment and productivity: a conceptual framework and approach for low-income countries”, *A report for the human resource development pillar of the g20 multi-year action plan on development*. [60]
- Portail Formationprof.ch (2019), *Manuel pour la formation en entreprise*, [90]
<http://cffe.formationprof.ch/dyn/7154.aspx>.
- Quintini, G. (2015), “Working and learning: A diversity of patterns”, *OECD Social, Employment and Migration Working Papers*, No. 169, OECD Publishing, Paris, [74]
<https://dx.doi.org/10.1787/5jrw4bz6hl43-en>.
- Šćepanović, V. and A. Martín Artiles (2020), “Dual training in Europe: a policy fad or a policy turn?”, *Transfer*, Vol. 26/1, pp. 15-26, <http://dx.doi.org/10.1177/1024258919898317>. [54]
- Schlögl, P. and M. Mayerl (2017), *Betriebsbefragung zu Kosten und Nutzen der Lehrausbildung in Österreich. Teilbericht im Rahmen der ibw-öibf-Studie „Hintergrundanalyse zur Wirksamkeit der betrieblichen Lehrstellenförderung (gemäß §19c BAG)“*, [82]
http://www.bmwf.gv.at/Berufsausbildung/Ingenieurwesen/Documents/endbericht_betriebsbefragung_oeibf.pdf.
- Smulders, H., A. Cox and A. Westerhuis (2016), “Vocational education and training in Europe – Netherlands”, *Cedefop ReferNet VET in Europe reports*, [87]
<https://www.cedefop.europa.eu/en/tools/vet-in-europe/systems/netherlands>.
- Smulders, H., A. Cox and A. Westerhuis (2016), “Vocational Education and Training in Europe - Netherlands”, *Cedefop ReferNet VET in Europe reports.*, Cedefop, [26]
<https://www.cedefop.europa.eu/en/tools/vet-in-europe/systems/netherlands> (accessed on 20 June 2019).

- Statistics Canada (2018), *Pathways and earnings indicators for registered apprentices in Canada*, Statistics Canada, <https://www150.statcan.gc.ca/n1/pub/37-20-0001/372000012018002-eng.htm>. [44]
- Strupler, M., S. Wolter and M. Moser (2012), *Die duale Lehre : eine Erfolgsgeschichte - auch für die Betriebe : Ergebnisse der dritten Kosten-Nutzen-Erhebung der Lehrlingsausbildung aus der Sicht der Betriebe*, Rüegger, <https://pdfs.semanticscholar.org/a1b6/5304e571576e6004d921621621131ce3d03a.pdf> (accessed on 31 October 2017). [56]
- UNESCO (2020), “ISCED Mapping Switzerland”, http://uis.unesco.org/sites/default/files/documents/isced_2011_mapping_en_switzerland_0.xls. [20]
- Unesco (2019), *ISCED Mappings*, <http://uis.unesco.org/en/isced-mappings> (accessed on 26 August 2019). [69]
- UNESCO-UIS (2012), *International Standard Classification of Education ISCED 2011*, <http://www.uis.unesco.org>. [22]
- UNESCO-UIS/OECD/EUROSTAT (2019), *UOE data collection on formal education Manual on concepts, definitions and classifications UNESCO-UIS / OECD / EUROSTAT Data Collection on formal education Manual on concepts, definitions and classifications*, <http://uis.unesco.org/sites/default/files/documents/uoec-data-collection-manual-2019-en.pdf> (accessed on 30 April 2020). [23]
- Vandeweyer, M. and A. Verhagen (2020), “The changing labour market for graduates from medium-level vocational education and training”, *OECD Social, Employment and Migration Working Papers*, No. 244, OECD, https://www.oecd-ilibrary.org/social-issues-migration-health/the-changing-labour-market-for-graduates-from-medium-level-vocational-education-and-training_503bcecb-en (accessed on 11 August 2020). [6]
- Watson, D., S. McCoy and S. Gorby (2006), “The Post-Leaving Certificate Sector in Ireland: A Multivariate Analysis of Educational and Employment Outcomes”, *Research Series*, <https://ideas.repec.org/b/esr/resser/bmi189.html> (accessed on 18 April 2018). [78]