OECD Handbook for Internationally Comparative Education Statistics 2018

CONCEPTS, STANDARDS, DEFINITIONS AND CLASSIFICATIONS

OECD

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OECD
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Foreword

International comparative analysis has increasingly become a key pillar in governments' education policy development. Through cooperation within the OECD framework, and other international bodies, countries are seeking to learn from each other about how to secure the benefits of education for all, how to foster competencies for the knowledge society, and how to manage teaching and learning in order to promote learning throughout life.

This attention has resulted in a major effort by the OECD to strengthen the collection and reporting of comparative statistics and indicators in the field of education. Over the past 25 years, the OECD has developed and published a broad range of comparative indicators that provide insights into the functioning of education systems, in particular through its flagship annual publication, *Education at a Glance*. These indicators reflect both the resources invested in education and their returns to individuals and societies. The OECD education indicators provide information on many important features of the operation, evolution and impact of education, from early childhood through formal education to learning and training throughout life. They provide an opportunity for each country to see its education system in the light of other countries' performance and view themselves compared with other countries' practices and resources.

Over the years, various methodologies and data collection instruments have been developed to facilitate international comparisons in the different educational areas. This handbook draws these methodologies together and so provides a reference source for the international standards, concepts, classifications and conventions being used in the regular core *Education at a Glance 2018* indicators.

This handbook's target audience includes users of OECD statistics and education indicators from the research community or national ministries involved in the compilation of international statistical comparisons of education. It provides the definitions and conventions used in the underlying data collections as well as the methodologies used to compile the published statistics and indicators derived from them. By also providing advice on data-quality issues, the handbook provides an essential aid to the effective use of the statistics and indicators on education that the OECD produces. Secondly, this handbook offers a unique reference source of standards and conventions for others to adopt in their own compilation of international statistics and indicators on education.

The handbook is the product of a long-standing collaborative effort between OECD member governments, the experts and institutions working within the framework of OECD's Indicators of Education Systems (INES) Programme, and the OECD Secretariat. It was prepared by the Innovation and Measuring Progress Division (IMEP) of the OECD Directorate for Education and Skills. Much of the material contained in it is adapted from data collection documentation developed over the years, and in co-operation with the INES team at the OECD: Deborah Roseveare (Head of Division), Marie-Helene Doumet (Head of the INES programme), Karinne Logez (Co-ordinator of the Handbook), Etienne

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Executive summary

The growing interest in international education statistics has created a need to maintain clear definitions of the concepts and methodologies which underlie them. This handbook presents in detail the methodologies used to calculate the regular core indicators in *Education at a Glance,* following commonly agreed definitions. It sets out the underlying conceptual framework used by the OECD as the basis for its international statistics and provides a reference for the international standards and conventions used in the collection and assimilation of educational data.

This edition updates previous editions of the *OECD Handbook for Internationally Comparative Education Statistics*. It sets out the concepts, definitions, classifications and methodologies that ground the OECD's work on regular core education statistics and indicators in the 2018 edition of *Education at a Glance* (EAG). The original handbook was released in May 2004, and the first update was released in September 2017, based on 2017 edition of *Education at a Glance*. Between 2004 and 2017, significant work had been carried out on the education indicators in the original handbook, existing indicators had been consolidated and new ones developed, while the methodologies and concepts underlying them have been clarified and the International Standard Classification of Education (ISCED) had also been revised to reflect the changes in education systems over the last 15 years.

Between 2017 and 2018, further significant work has been carried out to consolidate existing indicators, and this edition also clarifies their underlying methodologies and concepts This handbook provides a thorough understanding of how the methodologies work, and the limitations and interpretation of the resulting data. Each indicator is complemented by an analysis of its limitations and comparability, based on a thorough understanding of the calculation methodologies and frameworks and how they play out in the context of national educational systems.

- Chapter 1 introduces the purpose of the handbook, its target audience and the structure of the publication.
- Chapter 2 presents the conceptual framework used to collect the data used for education statistics and indicators. It outlines the development of international educational statistics and indicators, the organising framework used for OECD education indicators, and gives an overview of current regular data collections and data sources.
- Chapter 3 outlines the scope and coverage of the OECD's internationally comparable education statistics. Starting with a precise definition of the term "education", it clarifies the boundary issues: what the statistics cover, and specific inclusions and exclusions. It concentrates on early childhood programmes, special needs education, non-regular or adult education, and vocational and professional education. It also presents the challenges of identifying and classifying internationally mobile students.
- Chapter 4 catalogues the definitions and classifications used for the OECD's international education statistics. It covers students and graduates, educational

personnel, school organisation and curricula, educational institutions, and educational expenditure.

- Chapter 5 looks back at the definition and classification of educational programmes and the practical implementation of ISCED. It provides an overview of the latest standard, ISCED 2011, and how it defines and classifies educational programmes and the boundaries between them. It also covers how individual national programmes are mapped onto ISCED levels.
- Chapter 6 focuses on data quality issues. It presents the OECD *Quality Framework*, and eight quality considerations: relevance, accuracy, credibility, timeliness, accessibility, interpretability, coherence and cost-efficiency. It considers how data quality issues arise and how to tackle them, and suggests what estimations can be made where data are missing. It also examines the remaining areas for data quality improvement.
- Chapter 7 presents the concepts behind the current core Indicators of Education Systems (INES) indicators and how they are calculated. It looks at general/international averages, graduation analysis, educational attainment of the population, labour force participation, economic and social benefits of education, expenditure analysis, participation and access to education, participation of adults in education, learning environments and teachers' working conditions, the education and work status of young people, and equity in education. For each of these it considers the policy context and the relevance of the indicator, and explains the calculation methodology used. It also considers the limitations of the indicator, presenting, as needed, any measurement issues, technical definitions, notes on coverage and notes on interpretation, in order to improve understanding of how the indicators may be used.

Chapter 1. Introduction

Countries see a successful education system as a vital element of their social and economic development. Human capital has long been identified as a key factor in battling unemployment and low pay and there is also robust evidence that it is an important determinant of economic growth. Moreover, there is emerging evidence that it is associated with a wide range of non-economic benefits, including improvements in health, stronger civic and social engagement, and a greater sense of well-being.

The development of effective education policies is therefore a priority for national governments and they are increasingly looking to the international arena to inform and influence their policy reforms. As part of the drive to enhance the OECD's contribution in this area, the OECD's Directorate for Education and Skills devotes a major effort to the development and analysis of quantitative and qualitative indicators, the results of which are published in the flagship annual publication *Education at a Glance*. These enable governments to analyse their education system in light of other countries' performances. Together with other OECD publications, the indicators are designed to support and review efforts which governments are making towards policy reform.

Indicators from *Education at a Glance* reflect the progressive development of international comparisons in education that has taken place over the last 25 years or so. Fundamental to this development is the quality of the underlying data which is itself driven by the definition of clear concepts, conventions and methodologies which underlie the data collections and the calculations of the indicators. This handbook draws together all of these methodologies in a single publication which is annually aligned to the regular core indicators of *Education at a Glance*. In doing so, its aim is to facilitate a greater understanding of the statistics and indicators produced and hence allow for their effective use in policy analysis.

The handbook therefore provides answers to questions such as "What do we mean by a teacher?" and "What do we mean by public education expenditure?" as well as to questions concerning the use of the indicators such as "How should I interpret expenditure per student?" and "Are there data-quality issues I should be aware of?"

While much has been achieved in improving the international comparability of the statistics, there is still plenty to be done and the handbook acknowledges this. Through its networking with member countries and other international organisations, the OECD is progressively working to address the areas of ambiguity that remain. The OECD will publish further editions of the handbook as it makes updates and improvements.

1.1. Purpose of the handbook

This handbook has the following key objectives:

- To set out the conceptual framework used by the OECD as the basis for the international statistics and indicators it compiles and disseminates.

- To document the international standards for concepts, classifications, conventions and methodologies that the OECD applies in the collection and compilation of education statistics and indicators.
- To provide standards for others to follow in the collection, organisation and international comparison of education statistics and indicators.

The handbook is not intended as a data collection manual but rather as a reference from which such manuals can be compiled. For that reason it makes no detailed reference to the current OECD data collection instruments and how they should be completed by respondents. That task is fulfilled by the existing data collection manuals.

Importantly, the revision of the handbook has also provided an opportunity to review the existing definitions that are used in the OECD data collections and seek improvements where possible.

1.2. Target audience and using the handbook

It follows from these objectives that this handbook is intended for users of OECD international statistics and education indicators, and for those involved in compiling international data on education.

The users of the statistics and indicators will often be readers of *Education at a Glance* but will also be those who access OECD education data in other ways, for example via the OECD's Education at a Glance Database (http://stats.oecd.org/ (OECD, 2018[1])) or via the OECD data portal (https://data.oecd.org/education.htm (OECD, 2018[2])). For them, the handbook aims to create a better understanding of the educational statistics and indicators produced by the OECD and facilitate their use. The catalogue of data definitions and classifications used in the underlying data collections as well as the concepts and methodologies that are used to compile the statistics and indicators are vital in this regard. The descriptions of country reporting practices are also important, particularly the mappings of national educational programmes to the international classification, which are published in Annex 2. Also key is an appreciation of the data-quality controls that are applied in the collection and compilation of the statistics as well as knowledge of where data quality is weakest. The handbook meets all of these needs.

For those involved in collecting and compiling international data on education, the handbook provides a comprehensive reference for the established international standards and conventions used by the OECD in the regular core indicators from *Education at a Glance*, offering standards which they might follow. Greater consistency across international collections can only enrich the collective data that are available at the international level.

Finally, the transparency provided by explaining methodologies and highlighting remaining data-quality problems presents an opportunity for debate about what improvements can be made and how they can be achieved.

1.3. Structure of the handbook

Chapter 2 sets out the conceptual framework for international education statistics and indicators which have driven the development of definitions and the data collections. The chapter begins by giving a short historical perspective of the development of OECD-INES statistics and indicators on education and describes the organisation of the OECD

Indicators of Education Systems (INES) Programme, which produces these indicators. It also gives an overview of the latest data collection instruments and methods which provide the data underpinning the statistics and indicators.

Chapter 3 sets out the coverage of the OECD-INES internationally comparable statistics on education. It begins by defining education and proceeds to define the coverage of the statistics which follows from that. In order to clarify the coverage, it discusses various boundary issues around education, for instance in relation to early childhood programmes and vocational and technical education.

Chapter 4 sets out the definitions and classifications used in the collection of OECD-INES international education statistics, taking in turn students and graduates, educational personnel, school organisation and the curriculum, educational institutions, and educational expenditure. It provides key definitions along with discussion of the interpretation and practical implementation of these definitions. It also notes where work remains to be done to further clarify these definitions.

Chapter 5 covers the conceptual, definition and classification issues concerning educational programmes. It is organised in three parts. The first part begins with an overview of the International Standard Classification of Education (ISCED 2011) and sets out the related definitions and classifications that apply to educational programmes. The second part sets out in detail how to allocate educational programmes within each of the levels of the ISCED classification and is consistent with the OECD's "ISCED 2011 Operational Manual Guidelines for classifying national education programmes and related qualifications". Annex 2 contains diagrams mapping countries' national educational programmes to the ISCED framework, a key tool in interpreting the published statistics and indicators.

Chapter 6 examines issues surrounding the quality of the international education data. It begins with a declaration of the OECD's commitment to data quality and the quality framework used to collect, compile and disseminate data. It then discusses the types of data-quality problems that arise and why they arise, and describes how the OECD assesses and addresses these issues. It suggests some ways to make estimates for missing data and concludes with an account of the main international education data-quality issues that remain to be tackled.

Chapter 7 turns to the statistics and indicators that are derived from the raw data. It explains the concepts, methodologies and conventions used in the calculations, and the measurement issues that can arise. It focuses on the main types of indicators compiled from the data collected through the INES Programme. It does not seek to describe in detail every indicator that appears or ever has appeared in *Education at a Glance.* Instead it focuses on the key indicators or groups of indicators which have conceptual or methodological aspects worthy of explanation and can therefore be considered a catalogue of indicator methodologies rather than a catalogue of indicators.

References

OECD (2018), *OECD Data*, https://data.oecd.org/ (accessed on 26 July 2018). [2]

OECD (2018), *OECD Statistics*, https://stats.oecd.org/ (accessed on 26 July 2018). [1]

Chapter 2. Conceptual framework for data collection for education statistics and indicators

This chapter sets out the conceptual framework for international education statistics and indicators which have driven the development of definitions and the data collections. It begins with a short historical perspective of the development of OECD statistics and indicators on education and describes the organisation of the OECD Indicators of Education Systems (INES) Programme.

2.1. The development of international educational statistics and indicators

During the 1980s, there was increasing demand for information on education and the need for improved knowledge about the functioning of education systems. This raised many questions not only about data collection but also about the organisation, reporting and interpretation of the data. These questions led authorities in the OECD member countries to consider new ways of comparing their education systems. They reached agreement on the feasibility and utility of developing an international set of indicators that would present, in statistical form, key features of their education systems.

The OECD's Centre for Educational Research and Innovation (CERI) responded to this demand for comparative information by initiating the OECD's Indicators of Education Systems (INES) Programme. The programme developed a provisional framework for organising the indicators, proposing a set of indicators and the methodologies for measuring them. This framework has been considerably developed since then and is presented in the next section of this chapter.

The first set of indicators was published in *Education at a Glance* in 1992 (OECD, 1992[1]) and drew mainly on existing data sources. The work to produce the first *Education at a Glance* exposed weaknesses both in the underlying statistical classification (the International Standard Classification of Education, ISCED, (OECD/Eurostat/UNESCO Institute for Statistics, 2015[2])) and in the data collections themselves. Since then much work has been put into revising ISCED and improving the methods and instruments for the international data collection on education (OECD, 2004[3]) (OECD, 2017[4]). This handbook describes the concepts, classifications and definitions that are the result of that work to date.

The OECD education indicators are clearly the product of an ongoing process of conceptual development and data collection. The objective is to link a broad range of policy needs with the best available international data. In each area of work, the following considerations have, traditionally, guided the indicator activities:

- First, emphasising those education issues where the international comparative perspective can offer significant added value over and above what can be achieved through national analysis and evaluation.
- Second, seeking to strike an appropriate balance between focusing new developments on areas where the feasibility of data development is promising, and not neglecting important areas where substantial investment in conceptual and empirical work is needed to further the policy debate.
- Third, continually reviewing the work to ensure that the outcomes are cross-nationally valid and reliable.

The indicator programme places increasing emphasis on integrating its work through the perspective of lifelong learning, with the aim of progressing from a model of education built around institutions to one that looks more broadly at the extent and benefits of learning throughout life. In addition, various activities within the programme are seeking to better reflect equity-related issues, through assessing differences and inequalities among individuals and groups of individuals.

The OECD's INES programme is overseen and co-ordinated by the following bodies:

- The **Education Policy Committee** oversees the strategic direction, coherence and quality of the OECD's overall work on education.

- The **INES Working Party** oversees and co-ordinates the statistical work as well as the development of indicators and quantitative analyses needed to meet the requirements and priorities of the Education Policy Committee. The working party also sets priorities and standards for data development, analysis and reporting for INES, and provides direction on the dissemination of the programme's policy advice, analysis and research to a wide range of stakeholders.

In addition, two networks of technical experts from member and partner countries develop and refine indicators for the INES programme:

- The INES Network for the Collection and Adjudication of System-Level Descriptive Information on Educational Structures, Policies and Practices (**NESLI**) focuses on system-level indicators in education.
- The INES Network on Data Collection and Development on Economic, Labour Market and Social Outcomes of Education (**LSO**) focuses on developing indicators on various outcomes of education, including labour market, economic and social outcomes.

Each of these groups meets biannually and is made up of national representatives from some of the OECD's member and partner countries. The European Centre for the Development of Vocational Training (CEDEFOP), Eurydice, Eurostat, the European Commission and the UNESCO Institute for Statistics are also observers to the INES programme.

2.2. The organising framework for the OECD education indicators

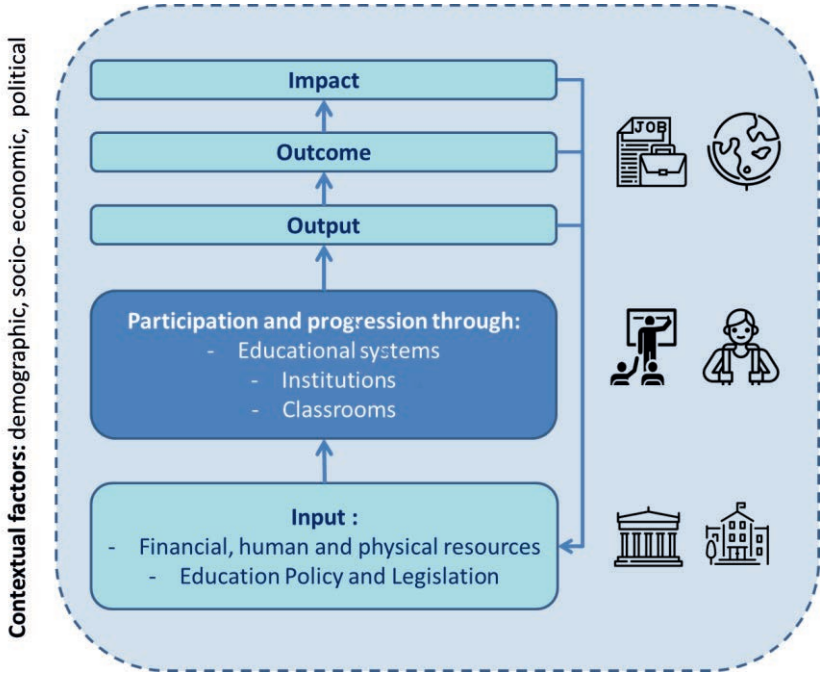
The OECD's education indicators represent the consensus of professional thinking on how to measure the current state of education internationally. They provide information on the human and financial resources invested in education, how education and learning systems operate and evolve, and the returns to investments in education. They are organised thematically, each accompanied by information on the policy context and interpretation of the data.

The education indicators are organised thematically and each is accompanied by relevant background information. The indicators are presented within an organising framework which:

- distinguishes between the actors in education systems: individual learners, instructional settings and learning environments, educational service providers, and the education system as a whole
- groups the indicators according to types of issues they address, and examines contextual factors that influence policy (Figure 2.1).

In addition to these dimensions, the time perspective makes it possible to visualise dynamic aspects of the development of education systems.

Figure 2.1. Organising framework of indicators in Education at a Glance



Actors in education systems

The OECD/INES programme seeks to gauge the performance of national education systems as a whole, rather than to compare individual institutions. To supplement these national data and facilitate more detailed policy discussions, OECD compiles some information on subnational entities (OECD/NCES, 2017[5]). However, there is increasing recognition that many important features of the development, functioning and impact of education systems can only be assessed through an understanding of learning outcomes and their relationships to inputs and processes at the level of individuals and institutions.

To account for this, the first dimension of the organising framework distinguishes the three levels of actors in education systems:

- education systems as a whole
- providers of educational services (institutions, schools), as well as the instructional setting within those institutions (classrooms, teachers)
- individual participants in education and learning, the students. These can be either children or young adults undergoing initial schooling and training or adults pursuing lifelong learning programmes.

Indicator groups

The second dimension of the organising framework further groups the indicators into three categories:

- *Indicators on the output, outcomes and impact of education systems*: Output indicators analyse the characteristics of those exiting the system, such as their educational attainment. Outcome indicators examine the direct effect of the output of education systems, such as the employment and earning benefits of pursuing

higher education. Impact indicators analyse the long-term indirect effect of the outcomes, such as knowledge and skills acquired, contributions to economic growth and societal well-being, and social cohesion and equity.

- *Indicators on the participation and progression within education entities*: These indicators assess the likelihood of students accessing, enrolling in, and completing different levels of education, as well as the various pathways followed between types of programmes and across education levels.
- *Indicators on the input into education systems or the learning environment*: These indicators provide information on the policy levers that shape the participation, progression, outputs and outcomes at each level. Such policy levers relate to the resources invested in education, including financial, human (such as teachers and other school staff), or physical resources (such as buildings and infrastructure). They also relate to policy choices regarding the instructional setting of classrooms, pedagogical content and delivery of the curriculum. Finally, they analyse the organisation of schools and education systems, including governance, autonomy, and specific policies to regulate participation of students in certain programmes.

2.2.2. Contextual factors that influence policy

Policy levers typically have antecedents, external factors that define or constrain policy but are not directly connected to the policy topic at hand. Demographic, socio-economic and political factors are all important national characteristics to take into account when interpreting indicators. The recent financial crisis, for example, had a significant impact on public funds available to education.

The characteristics of the students themselves, such as their gender, age, socio-economic status, or cultural background, are also important contextual factors that influence the outcomes of education policy.

2.2.3. Indicator analysis using the framework

This versatile framework can be used to understand the operation and functioning of any educational entity, from an education system as a whole to a specific level of education or programme, or even a smaller entity, such as a classroom.

This versatility is important because many features of education systems have varying impacts at different levels of the system. For example, at the level of students within a classroom, the relationship between student achievement and class size may be negative, if students in small classes benefit from improved interactions with teachers. At the class or school level, however, weaker or disadvantaged students are often intentionally grouped and placed in smaller classes so that they receive more individual attention. At the school level, therefore, the observed relationship between class size and student achievement is often positive, suggesting that students in larger classes perform better than students in smaller classes. At higher levels of aggregation, the relationship between student achievement and class size is further confounded, by the socio-economic intake of individual schools or by factors relating to the learning culture in different countries. Therefore, to interpret the indicators, it is important to fully understand the relationships between them.

Analysis of each element of the framework and the interplay between them contribute to understanding a variety of policy perspectives:

- quality of education outcomes and education opportunities
- equality of education outcomes and equity in education opportunities
- adequacy, effectiveness and efficiency of resources invested in education
- relevance of education policy measures to improve education outcomes.

2.3. Overview of current regular data collections and data sources

The data collections described below cover only the regular data collections conducted by the INES programme to develop the indicators presented in this handbook. The programme makes use of data available from other sources and from ad hoc surveys which are occasionally carried out by subsidiary groups and bodies but these are not listed here.

All submitted questionnaires are subject to rigorous scrutiny by statisticians in the INES team, checking year-on-year consistency of the data, cross-checking between tables and raising queries with countries as necessary. Automated verification checks in the questionnaires also facilitate the quality checking of the data and can often result in the resubmission of data. Please see Chapter 6 for more information.

2.3.1. Joint data collection by the OECD, UNESCO and Eurostat (UOE data collection)

The "UOE data collection" managed by the INES Working Party is the annual collection of data on education systems which is conducted jointly between the OECD, the UNESCO Institute for Statistics (UIS), and Eurostat and has been carried out as a joint exercise in its current form since 1993. It is a collection of aggregate national data comprising some 25 electronic questionnaires (Excel workbooks) covering student enrolments (9 questionnaires), student entrants (4), graduates (3), personnel (3), finance (3), class sizes (2) and general population (1). Countries' ISCED mappings, which map national educational programmes to the ISCED framework, form an important supplement to the UOE data collection.

The questionnaires are completed by the statistical staff in each country using the data available to them nationally.

The data requests are issued around the end of June each year. Data on students, personnel, classes, and graduates are collected for the most recently completed school year; the finance data are collected for the last but one complete financial year (to enable out-turn data to be available). Returns are due between September and November.

Advice and guidance is provided to data providers through the "UOE Manual" or *UOE Data Collection on Formal Education, Manual on Concepts, Definitions and Classifications,* (UNESCO-UIS/OECD/EUROSTAT, 2016[6]) which is revised regularly when necessary and is consistent with the concepts, definitions and classifications described in this handbook.

Countries submit their completed questionnaires jointly to the OECD, Eurostat and UNESCO (UNESCO-UIS/OECD/EUROSTAT, 2013[7]). For federal states (e.g. Belgium), the data are collected by the different communities and then jointly presented to the OECD and other partners. The three organisations co-operate over cleaning the data and reviewing new submissions following corrections, to ensure efficiency in the data collection and management process. According to European regulation, participation in data collections by European Member States is compulsory.

2.3.2. Data collections by the NESLI Network

The NESLI Network administers three annual data collections on 1) the teachers' and school heads' salaries; 2) teachers' working time; and 3) instruction time for students. NESLI has developed other non-periodical data collections which are not covered in this handbook.

From 1991 until 2013 the network collected annual data through its Teachers and the Curriculum survey. Data were collected through electronic (Excel) questionnaires and covered: compulsory and non-compulsory intended instruction time for students, teachers' working time and teaching time, and annual statutory teacher compensation. The data collected related more to the policies that applied in each country than the actual activity. Thus, for example, figures on teachers' working time reflected what was laid down in regulations rather a measure of actual working time.

In 2014 the Teachers and the Curriculum survey was split into two different data collections: instruction time, and teachers' salaries and working time. First, the Eurydice network and the OECD (NESLI Network) jointly collect data on instruction time. As both organisations were collecting data on instruction time, they developed a common tool aimed at simplifying work at national level and avoiding overlaps and inconsistencies. This joint data collection gathers information on intended instruction time in compulsory education from the first year of primary education to the end of full-time compulsory education for all students. In grades where vocational and general programmes co-exist, it only collects data for the general programmes. It does not include pre-primary education programmes, even if they are compulsory. For each grade, it gathers the number of hours of instruction as well as non-compulsory instruction time. The data requested relate to the policies that apply in each country in the year in question. The tool also collects data on actual instruction time in the different compulsory subjects, and qualitative information on the organisation of the school day.

The NESLI Network also collected information on teachers' salaries and working time through a specific NESLI data collection covering full-time classroom teachers in public institutions at pre-primary, primary, lower secondary and upper secondary levels. In 2017, this data collection was further split into two different collections, one on teachers' and school heads' salaries, and one on working time. As both Eurydice and the NESLI Network were collecting data on teachers' salaries, but the Eurydice data collection also covered the salaries of school heads, they again developed a common tool aimed at simplifying work at the national level and avoiding overlaps and inconsistencies. This survey has been designed to meet the data needs of the two organisations. As a result it differs from the data collections administered separately by Eurydice and the OECD in previous years, and the joint data collection covers the salaries of teachers and school heads for all countries. Second, the NESLI Network also collects information on teachers' working time through a specific NESLI data collection covering full-time classroom teachers in public institutions at pre-primary, primary, lower secondary and upper secondary levels.

For each level of education, the surveys collect teachers' statutory and actual teaching and working time and their statutory and actual salaries. They collect statutory salaries at four stages of teachers' careers (starting teachers, teachers with 10 and 15 years of experience, and teachers at the top of the salary scale), and for teachers with different levels of qualifications (distinguishing between minimum, most prevalent and maximum qualification levels). They also collect criteria for additional payments in public institutions, including remuneration for tasks performed by teachers.

For these three annual data collections, experts in each country fill in electronic (Excel) questionnaires, making reference to the various laws and regulations that are in place nationally. The data are issued in October each year for return by mid-December. The submitted questionnaires and related indicators are subject to rigorous scrutiny, requiring liaison with the countries involved, before the validated data are published.

2.3.3. Data collections by the LSO Network

The Annual Labour Statistics data request compiles two data collections: on the educational attainment and labour-market status of 25-64 year-olds, and on the transition from education to work for 15-29 year-olds. The data request is conducted by the OECD Secretariat in collaboration with the OECD Directorate for Employment, Labour and Social Affairs (ELS) in February/March each year.

Both data collections are derived from national labour force surveys.

For the first collection, countries' national statistical offices provide data on employment, unemployment and population by national educational attainment categories, gender and age groups. They are mapped onto ISCED 2011 levels of attainment using the agreed mapping from national categories to the ISCED 2011 standardised levels of attainment, which the LSO Network has established in consultation with country representatives. International Labour Organization (ILO) guidelines and definitions of employment and unemployment are used for reporting work status.

The second data collection covers the transition from education to work for 15-29 year-olds. The data are collected with a reference period in the early part of the calendar year, usually the first quarter. Countries report education and work status for each of three 5-year age groups by gender and educational level attained. Education refers to formal education only. The questionnaire also includes information on enrolment in work-study programmes. Some other variables are collected on a periodical basis (not every year), such as the number of hours worked, duration of unemployment or for the 18-24 age group.

Another annual data collection is the one on education and earnings. It collects data on earnings by attainment level and gender. Data are derived from national labour force surveys and other surveys, such as the European Survey on Income and Living Conditions (EU-SILC). It is conducted by the OECD Secretariat in October/November each year.

Countries submit their completed questionnaires to the OECD. In addition to these direct data submissions, the OECD also uses data from Eurostat, the ILO and UIS in order to fill gaps. Countries as well as the four international organisations, CEDEFOP, Eurostat, ILO and UIS, are contributing to the further development of the LSO data collections.

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Chapter 3. Scope and coverage of internationally comparable education statistics

This chapter sets out the coverage of the OECD's internationally comparative statistics on education. It starts by defining education and proceeds to define the coverage of the statistics which follows from that definition. It discusses various boundary issues around education, in particular in relation to the coverage of early childhood programmes, special needs education, non-regular and adult education and vocational and professional education and training.

3.1. Definition of education

The basic underlying definition of education used in the collection of OECD international education statistics is derived from the International Standard Classification of Education (ISCED 2011):[1]

> *"The basic units of classification in ISCED are the national (and subnational) education programme and the related recognized educational qualification. In ISCED, an education programme is defined as a coherent set or sequence of educational activities or communication designed and organized to achieve predetermined learning objectives or accomplish a specific set of educational tasks over a sustained period. Objectives encompass improving knowledge, skills and competencies within any personal, civic, social and/or employment-related context. Learning objectives are typically linked to the purpose of preparing for more advanced studies and/or for an occupation, trade, or class of occupations or trades but may be related to personal development or leisure. A common characteristic of an education programme is that, upon fulfilment of learning objectives or educational tasks, successful completion is certified."*

Compared to previous versions, ISCED 2011 includes improved definitions for different types of education and clarifies their application. Categories have been added to the classification of levels in recognition of the expansion of early childhood education and the restructuring of tertiary education (UNESCO-UIS, 2011[1]).

3.2. The scope of the OECD's international education statistics

Although non-formal education is a recognised part of ISCED, the OECD international data collection exercises (mappings, surveys, censuses, etc.) restrict the coverage of international educational statistics to formal programmes for the sake of international comparability and feasibility (OECD/Eurostat/UNESCO Institute for Statistics, 2015[2]).

The boundary between formal and non-formal programmes is therefore important and should be given specific attention. Countries will have a large variety of education programmes, such as initial education, regular education, second chance programmes, literacy programmes, adult education, continuing education, open and distance education, apprenticeships, technical or vocational education, training, and special needs education. Box 3.1 details the types of education which are not included.

The restriction to formal education programmes determines the reporting of statistics on education systems at different levels, such as enrolment, entrants and teachers and other human and financial resources. Statistics on formal education programmes can therefore provide information on the links between inputs (entrants into this system), the process (participation) and outputs (the qualification).

Formal education is institutionalised, intentional and planned through public and recognised private institutions. Formal education is recognised as such by the relevant national education or equivalent authorities. Institutionalised education occurs when an organisation provides structured educational arrangements, such as student-teacher

[1] See Chapter 5 for a full description of ISCED 2011, its development and the OECD's role in that development.

relationships and/or interactions, that are specially designed for education and learning. Formal education typically takes place in educational institutions that are designed to provide full-time education for students in a system designed as a continuous educational pathway up to their first entrance to the labour market, although some parts of adult education are also recognised as part of the formal education system.

Regular education has been defined within the new ISCED classification as the initial education designed for individuals without special educational needs.

Box 3.1. Other types of education outside the scope of international education statistics

Non-formal education, like formal education, is institutionalised, intentional and planned by an education provider and is complementary or alternative to formal education within the course of individuals' lifelong learning. However, non-formal education mostly leads to qualifications that are not recognised as formal or equivalent to formal qualifications by the relevant national or subnational education authorities, or to no qualifications at all.

Informal learning is defined as forms of learning that are intentional or deliberate, but are not institutionalised. Less organised and less structured than either formal or non-formal education, informal learning may include learning activities that occur in the family, workplace, local community and daily life, on a self-directed, family-directed or socially-directed basis.

Incidental or random learning covers various forms of learning that are not organised or that involve communication not designed to bring about learning. Incidental or random learning may occur as a by-product of day-to-day activities, events or communications that are not designed as deliberate educational or learning activities. Examples may include learning that takes place during the course of a meeting, or while listening to a radio programme or watching a television broadcast that is not designed as an education programme.

3.3. Coverage issues, specific inclusions and exclusions

As national education systems vary in the way they are organised and in the way they label different types of activity, it is necessary to clarify which areas of activity are included or excluded (OECD, 2017[3]).

3.3.1. Coverage of early childhood programmes

According to ISCED 2011, early childhood programmes are considered as educational when they have an intentional education component. These programmes aim to develop the cognitive, physical and socio-emotional skills needed to participate in school and society. ISCED level 0 covers early childhood education for all ages, including very young children. Programmes are sub-classified into two categories depending on age and the level of complexity of the educational content: early childhood educational development (code 010) and pre-primary education (code 020). Early childhood educational development programmes are a new class of education, not included in the ISCED-97 classification, and are generally designed for children between the ages of 0 and 2, while pre-primary education corresponds exactly to what was previously known as level 0 in ISCED-97.

Programmes classified at ISCED level 0 may be referred to in many ways, for example early childhood education and development, play school, reception, pre-primary, preschool or *educación inicial, krippen*. Programmes provided in crèches, day-care centres, nurseries or *guardería, kindergärten* must meet the ISCED level 0 classification criteria to be **included** in international education statistics. This means they must:

- have adequate intentional educational properties
- be institutionalised
- be targeted towards children from the age of 0 up to the age of entry into ISCED level 1 education
- meet minimum levels of intensity/duration (an intensity of at least 2 hours per day and duration of at least 100 days a year).

Wherever possible, programmes should also have a regulatory framework recognised by the relevant national authorities and have trained or accredited staff as set out in the appropriate regulatory framework.

The following programmes are **excluded from ISCED-2011**:

- Programmes that provide childcare only (i.e. supervision, nutrition and health). Integrated programmes in which the non-educational portion is greater than the educational portion.
- Purely family-based arrangements that may be purposeful but do not meet the UOE definition of a "programme" (e.g. informal learning by children from their parents, other relatives or friends is not included under ISCED level 0).
- Learning activities delivered in private homes or other institutionalised centres that are outside the jurisdiction of an appropriate national early childhood education authority or regulatory body, regardless of whether the activities are organised in the style of an approved early childhood education programme. An example of this would be a private citizen who, of his or her own volition, provides learning opportunities for young children that nominally meet the ISCED level criteria around intentional education, intensity/duration and staff qualification requirements, but who is not recognised by an authorising body.
- Programmes where attendance can be ad hoc or of a drop-in style where individual children will not experience a continuity of structured learning opportunities.
- Short-duration programmes, such as vacation care, which may have an educational curriculum but do not offer a sustained period of instruction or learning opportunities.
- Programmes with intentional educational properties but with no minimum level of attendance, such as when parents are free to choose an intensity and duration of their child's attendance that does not meet the ISCED level 0 criteria.
- Early childhood services that are open for extended hours and provide intentional educational activities during these hours, but do not require a minimum intensity/duration of attendance or enrolment.

Some countries may define early childhood education more broadly than others. Some countries have a so-called "integrated care and education on level ISCED 0" (where

ISCED 01 and ISCED 02 enrolments cannot be separated). This is an integrated system of care and education before entering primary education, but preschool curriculum is not directly integrated with the curriculum of primary education. Thus, comparability of international statistics on programmes at ISCED level 0 depends on each country's ability to report data for this level according to a standard international definition, even if that definition may diverge from the one it uses in compiling its own national statistics. In this regard, the data reported in *Education at a Glance* (OECD, 2018[4]) as ISCED level 0 programmes may differ from national reporting of early childhood education (see Chapter 5 for more detail on the implementation of the ISCED 2011 classification).

3.3.2. Coverage of special needs education

The ISCED 2011 manual defines special needs education as:

> *"education designed to facilitate learning by individuals who, for a wide variety of reasons, require additional support and adaptive pedagogical methods in order to participate and meet learning objectives in an education programme. Reasons may include (but are not limited to) differences in physical, behavioural, intellectual, emotional and social capacities (including disabilities, difficulties or disadvantages). Education programmes in special needs education may follow a similar curriculum as that offered in the parallel regular education system, but they take individual needs into account by providing specific resources (e.g. specially-trained personnel, equipment or space) and, if appropriate, modified educational content or learning objectives. These programmes can be offered to individual students within already-existing education programmes or as a separate class in the same or separate educational institutions."*

While there was agreement on the need to include special needs education with the overall scope of the UOE data collection (with certain specific exclusions), there remained difficulties in terms of defining special needs students as a separate reporting group in an internationally comparable manner. The ISCED 2011 classification considerably improved the definition of special needs education, although types of provision may vary across countries. Countries differ, for example, in the programmes offered, the degree to which special needs education is integrated into the regular education system, the classification of types of special needs and type of support given to these students. The UOE data collection recommends only excluding special needs programmes from data on numbers of classes and students in primary and lower secondary education by type of institutions (UNESCO-UIS / OECD / EUROSTAT, 2017[5]) (UNESCO-UIS, 2013[6]).

3.3.3. Coverage of non-regular or adult education

Regular education has been defined within the new ISCED classification as the initial education designed for individuals without special educational needs. Non-regular education covers adult education.

Adult education is education specifically targeted at individuals who are regarded as adults by their society to improve their technical or professional qualifications, further develop their abilities, enrich their knowledge with the purpose to complete a level of formal education, or to acquire, refresh or update their knowledge, skills and competencies in a particular field. This also includes what may be referred to as "continuing education", "recurrent education" or "second chance education", as opposed to initial education.

Initial education is defined as education taken by people in preparation for their initial entry into work. Initial education typically follows a continuous path or paths of progression prior to initial entry into full-time employment.

Formal adult education programmes included in data collection may be designed as second chance programmes for youth or adults and offered in the same or similar formal settings as **initial education**. They do not have the same typical entry age as equivalent programmes in initial education and may have a different, usually shorter, duration but with subject content similar to initial education, leading to similar qualifications as corresponding initial programmes. Data on these are assigned to the most appropriate ISCED levels according to the instructional content of the programmes.

In some countries, adult education is not recognised as part of the formal education system and is therefore **excluded** from data collection. Conversely, for instance, in Belgium data on adult education is included in the data collection.

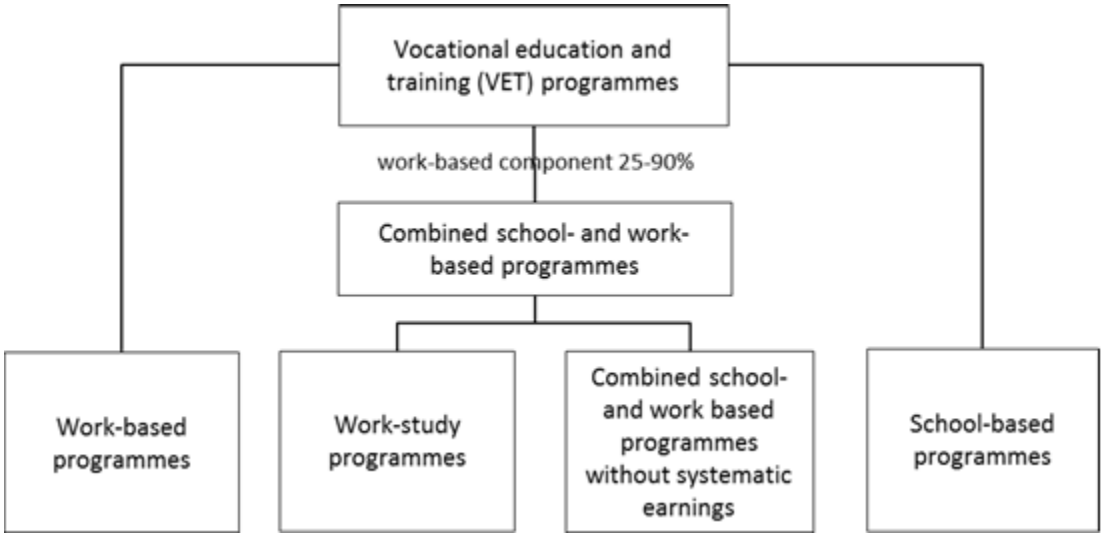
3.3.4. Coverage of vocational and professional education

For secondary, post-secondary non-tertiary and short-cycle tertiary education (ISCED levels 2 to 5), programme orientations can be general or vocational. ISCED 2011 also allows for the possibility of coding academic and professional orientation categories at the tertiary levels (ISCED levels 6 to 8). However, internationally agreed definitions on these orientation categories for tertiary education are still to be developed.

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.

Figure 3.1 summarises the different combinations of vocational and training programmes.

Figure 3.1. Taxonomy of formal vocational education and training programmes



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). Combined programmes include **work-study programmes,** which are formal education/training programmes combining interrelated study and work periods for which the student/trainee receives earnings, as well as combined school- and work-based programmes without systematic earnings. Hence, students participating in work-study programmes are considered to be both "in education" and "in employment" (OECD, 2017[7]).

Experience shows that for combined school- and work-based programmes, the coverage of work-based components in national data collections is uneven. In order to ensure comparability across countries, the reporting of student numbers fully includes participation in the work-based components, as part of combined or hybrid systems, while the teaching staff (or trainers) for this component are always **excluded**.

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. These programmes can have an on-the-job training component involving some practical experience in the workplace. Programmes are classified as school-based if at least 75% of the programme curriculum is presented in the school environment. This may include distance education.

Work-based programmes are learning that takes place through some combination of observing, undertaking and reflecting on productive work in real workplaces. The school-based component makes up less than 10% of the time. Work-based programmes are

usually non-formal education programmes or informal learning leading to a qualification that is recognised by national education authorities (or equivalent).

3.4. Challenges in measuring student mobility

It has become increasingly important to measure mobility in education in recent years. For example, European Union Council conclusions[2] on the modernisation of higher education have set a target of at least 20% of higher education graduates on average in the EU having a "period of higher education-related study or training (including work placement) abroad representing a minimum of 15 European Credit Transfer or lasting a minimum of three months" by 2020. Defining mobile students and the criteria for identifying them, types of learning mobility and proper indicators are among the challenges faced in developing international statistics on this phenomenon.

The OECD international statistics on education report on **domestic educational activity** (i.e. within a country's own territory) regardless of ownership or sponsorship of the institutions concerned and the education delivery mechanism. This has implications for some special cases:

- **Distance learning/e-learning** involving two countries: students from country A who are enrolled with institutions in country B but who continue to live in country A are reported in the statistics of country B and not in the statistics of country A.
- **Commuting students** who cross a national border daily in order to follow an education programme in another country. As with distance learning, commuting students who are enrolled with institutions in country B but reside in country A are reported in the statistics of country B.
- **Internationally mobile students in short exchange programmes** (of at least three months but less than one academic year) that remain enrolled in their home institution (country A) and where credits for successful completion of the study abroad (country B) are awarded by the home institution. Students in such exchange programmes do not obtain their qualifications from the host institution abroad but at their home institution where they originally enrolled, and are reported by the country in which they are enrolled (country A).
- **Foreign campus**: an institution in country A may have a campus or outpost in country B (i.e. a foreign campus). Country B should report the enrolments and finance for the foreign campus in the same manner as it reports activities of its domestic educational institutions. The mobile status of the students at these campuses is determined as for all other students. Foreign campuses that in practice do not accept students from the host country (for example schools provided for the children of military personnel based outside their home country) are treated in the same way as other foreign campuses. Although in practice the host country may not have access to the data to report such students, their numbers are not likely to be statistically significant. In cases where it is not possible in practice to report these students, this should be noted.

[2] http://www.consilium.europa.eu/uedocs/cms_data/docs/pressdata/en/educ/126375.pdf

- **European schools** are schools established to provide education to children of personnel of the European institutions, leading to the European Baccalaureate. Other children may be admitted subject to the availability of places and must pay fees. It is a unique system that implements a form of co-operation between the member states and between them and the European Commission. Countries in which there are European schools report the enrolments, entrants, graduates, personnel and finance data in the same manner as for foreign campuses, i.e. like activities of its domestic educational institutions. European schools are considered private institutions. Students in European schools are excluded from data collection on language learning.

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Chapter 4. Definitions and classifications of the OECD international education statistics

This chapter sets out the definitions and classifications used for the collection of OECD international education statistics, for students and graduates, educational personnel, school organisation and the curriculum, educational institutions and educational expenditure.

Chapter 5 covers the definition and classification of educational programmes alongside guidance on the implementation of the International Standard Classification of Education (ISCED 2011) (OECD/Eurostat/UNESCO Institute for Statistics, 2015[1]) ((n.a.), 2011[2]).

The key definitions in each section are highlighted to distinguish them from the rest of the text, which discusses issues of interpretation and practical implementation. While much has been done over the years to improve the clarity of these definitions, this work is not exhaustive and the text discusses any remaining areas of ambiguity.

4.1. Students and graduates

4.1.1. Students and student enrolments

In the OECD international education statistics, a **student** is defined as any individual participating in formal educational programmes (OECD, 2017[3]). The term "student" applies to pupils and students alike. Formal education is institutionalised, intentional and planned, and provided by public organisations and recognised private bodies. It consists primarily of initial education designed for children and young people before they first enter the labour market. It also includes other types of education such as vocational, special needs and adult education provided they are recognised as part of the formal education system by the relevant national education authorities.

Enrolment or **registration** is the act of officially enlisting in a programme of study. A student may enrol in more than one programme.

Two statistics measure the activity of students:

1. **Number of students enrolled** refers to the count of students studying in a given education programme during the reference period of the data collection.
2. **Number of registrations (or enrolments)** refers to the count of enrolments within the reference period.

Both measures yield the same result if every individual is enrolled in only one programme during the reference period but they differ when students are enrolled in multiple programmes. Both measures can be useful for understanding enrolments: the **number of students enrolled** is more likely to be used to calculate participation rates within the population at large and to profile the student body, while the **number of registrations** is more likely to be used to assess total educational activity, resource allocation and operational efficiency.

For cross-national comparability, where national data collection systems permit, the number of students enrolled should reflect the number of students enrolled at the beginning of the reference school or academic year. Preferably, the end (or near the end) of the first month of the reference year should be chosen. If several rounds of data collection are conducted per year, the one closest to the end of the first month of the reference academic year should be used. Exceptions may need to be made at the early childhood and tertiary levels of education. Early childhood education may have gradual inflows of children, making it preferable to take an average over several dates. At the tertiary level, student enrolment may not be stable enough at the beginning of the academic year and therefore a count at a later point may be considered. Alternatively, for these levels, counting students over a whole reference period (a year) may provide more realistic results than taking a single snapshot count.

In all cases, the recommended method for calculating enrolment rates will depend on the purpose for which the indicator is to be used. For example, when calculating expenditure per student in order to align with the financial reference year a full-year count of full-time equivalent (FTE) students will be preferred, but for comparing enrolment rates the snapshot method is recommended.

It is more and more common for students to enrol in different programmes at different levels and institutions. Consequently, care must be taken to avoid double counting. For instance, when students enrol in multiple fields of education as part of their programme of study, they should be divided proportionately between the fields of education according to the percentage of instruction devoted to each field (UNESCO-UIS, 2014[4]).

For example, if a programme consists of 70% instruction in biology and 30% in chemistry and there are 100 full-time students attending this programme, then 70 full-time students should be reported under the biology category and 30 full-time students under the chemistry category. If countries cannot divide students in this way, they should classify them according to the main emphasis of the programme. A similar approach is followed when students enrol in multiple types of programmes (e.g. programmes with different orientations, i.e. general/vocational or destinations, i.e. with direct access to the labour market or not).

Some double counting may occur when students enrol in more than one institution in the same reference period, however. Such cases are difficult to identify and eliminate. Such double counting is likely to be relatively insignificant, but it is worth mentioning.

4.1.2. New entrants

Data on new entrants are required in order to measure the intake in education levels/programmes.

Students can be considered as either **new entrants** or **re-entrants** (repeaters, see Section 4.1.3).

A new entrant is a student who is enrolled in a programme during the current reference period but who was not enrolled in that programme in the previous reference year.

A new entrant to a level of education is a student who, during the course of the reference academic year, enters any programme in a given level of education for the first time, irrespective of whether the student entered the programme at the beginning or at an advanced stage of the programme (e.g. by virtue of credits gained for relevant work experience or courses taken at another level of education). If a student enters more than one programme at the same ISCED level in the same reference year, the highest programme within the level is used.

New entrants to an ISCED level must be distinguished from new entrants to an education programme that does not represent a new level. Entrants to an education programme that is preceded by a programme at the same level are excluded. For programmes which span two ISCED levels, as participants enter the first grade of the higher ISCED level, they are reported as new entrants to that ISCED level, even though from a national point of view they are continuing their education within the same programme.

New entrants to tertiary education are new entrants at ISCED levels 5, 6 or 7 who are entering tertiary education for the first time, i.e. with no previous education at any other tertiary level. Students who enter an ISCED 5 programme and then decide to enter an ISCED 6 programme, for example, are not counted as new entrants to tertiary education.

Foreign or international students enrolling for the first time in a country are counted by default as new entrants, regardless of their previous education in other countries, if in practice countries are not able to identify their previous education.

4.1.3. Repeaters and over-age students

A **repeater** is defined as a student who enrols in the same grade or year of study of the same educational programme for a second or further time.

Repeaters must be distinguished from students who enrol in second and further educational programmes at the same level after having completed an earlier programme at that level (returnees to a second programme). A repeater is one who is predominantly repeating the same subject matter within the programme. Repeaters include re-entrants to the same programme.

Over-age students are students who are older than the official school-age range for the educational programme they are enrolled in and are defined as those at least two years older than each grade's intended age.

4.1.4. Graduates

A **graduate** is an individual who, during the reference school or academic year, has successfully completed an education programme. Each graduate is counted only once, even if they graduate from different levels or programmes within the same year. For example, if students graduate from more than one programme at the same ISCED level in the reference year for the data collection, it is the highest programme within the level that counts. This is particularly important at secondary and tertiary levels of education where a sequence of programmes may exist within a given level of education.

The requirements for successful completion of an education programme are normally stipulated in the programme specifications. These usually include attendance requirements and/or a demonstrated acquisition of expected knowledge, skills and competencies. Successful completion must be distinguished from simple completion of a programme which is achieved solely through fulfilling attendance requirements.

The acquisition of the knowledge, skills and competencies forming the learning objective of an education programme is normally validated by:

- passing (i.e. succeeding in) a final, curriculum-based examination or series of examinations
- accumulating the specified number of study credits
- a successful formal assessment of the knowledge, skills and competencies acquired.

In formal education, successful completion usually results in a qualification recognised by relevant national education authorities. However, education programmes at ISCED levels 1 and 2 (and occasionally at ISCED levels 3 or 4) do not always conclude with a qualification. In this case, other criteria can be considered to determine successful completion, such as having attended the full final year of the programme or gaining access to a higher level of education.

Some programmes at ISCED levels 2 or 3 do not give access to programmes at a higher ISCED level. Successful completion of these programmes is also considered to be completion or partial completion of the level if the programme meets the following criteria:

- it has a duration of at least two years of study at the given ISCED level
- the cumulative duration since the start of ISCED level 1 is at least 8 years for ISCED level 2 programmes and at least 11 years for ISCED level 3 programmes.

Adult education is a special case. It applies to formal education taken by adults to improve their technical or professional qualifications, further develop their abilities and enrich their knowledge by completing a level of education, to acquire, refresh or update their knowledge, skills and competencies in a particular field. This also includes what may be referred to as "continuing education", "recurrent education" or "second chance education". Many countries do not recognise adult education as part of the formal education system and therefore exclude it from data collection. Where formal adult education programmes do exist, their graduates should be assigned to the most appropriate ISCED levels rather than treated as a separate level of education, even if the typical entry age and duration differ from formal initial education programmes.

For educational attainment purposes, any recognised qualifications obtained from the successful completion of short programmes are classified at a lower ISCED level than the programme itself.

4.1.5. Number of graduates

Graduates in the reference period can be either **first-time graduates** or **repeat graduates**.

The **flow of graduates** within the reference period records the number of students who have graduated during that time. Students are counted as graduating in the year in which they complete all the requirements of the programme. For example, a student who completed the final year of an upper secondary programme prior to the reference year but passed the final examination during the reference year is counted as graduating in the reference year.

A **first-time graduate at a given level of education** is a person who, during the reference school or academic year, successfully completed an education programme at the given level for the first time. First-time graduates only include those who have never graduated from programmes at the same ISCED level before. The number of first-time graduates is in general smaller than the total of all graduates in the reference year. First-time graduates normally graduate from the first degree or qualification level in the national degree structure. In some countries, however, students may also graduate for the first time from second or further degrees.

A **first-time graduate at the tertiary level** is a person who, during the reference school or academic year, successfully completed an education programme at the tertiary level for the first time, i.e. at ISCED level 5, 6 or 7.

The sum of first-time graduates and repeat graduates in any year gives the total number of graduations for that year. It is permissible to double count individuals across categories over time. For example, a student obtaining a degree for the first time at ISCED level 6 in the reference year who had obtained a qualification at ISCED level 5 in an earlier year can be counted as a first-time graduate at ISCED level 6 – but not as a first-time graduate at the tertiary level.

The **stock of graduates,** in contrast to the flow of graduates in a given reference year, reports the number of graduates at any point in time and is used to analyse the educational attainment of the population. The educational attainment of the population is calculated

based on the highest level of education completed by each individual member of the population.

4.1.6. Grade of students

A grade is a specific stage of instruction in initial education, usually covered during one academic year. Students in the same grade are usually of similar age. Grades are also referred to as “classes”, “cohorts” or “years”.

Students generally remain within the same grade for the duration of the school year and, on successful completion, proceed to the next grade the following year. If they do not successfully complete a grade then they may repeat it.

Students taking subjects in more than one grade are allocated to the grade where they spend the greatest amount of their time. Students not classifiable by grade (e.g. adults in adult education) are allocated to the category “grade unknown”.

4.1.7. Age of students

Student age

According to the common reference point for age, students, graduates and new entrants are classified by their age as of the 1st of January of the year in which the school or academic year ends, e.g. 1 January 2016 for academic year 2015/16. An individual born on 31 December 2004 will thus be counted as 11 years old, whereas one born on 1 January 2004 would be counted as 12 years old.

The choice of a common reference date, such as the 1st of January, can be problematic when the school years being reported vary greatly between countries. This particularly applies in Japan, Korea and New Zealand where the school year begins early in the year and so a reference date of 1st January would record students’ ages at the end of the school year. This is in contrast to most other countries where the 1st of January falls towards the start of the school year. This difference may affect the comparability of net enrolment rates for a single year age group, particularly before and after compulsory schooling. Therefore, those countries may choose a reference date closer to the start of the school year.

Typical age

The typical age is the conventional age of graduation from or entry into an education level. The typical age of entry into an education level is defined as the age range which covers at least half of the entry (which takes into account the number of new entrants of each age but also the total number of men and women at that age). The typical age of graduation from an education level is also defined as the age range covering at least half of those graduating. The typical age is calculated taking into account the reference date for students’ ages, which is by default the 1st of January of the reference year.

4.1.8. Internationally mobile and foreign students

Students can be considered as either national students or internationally mobile students (shortened elsewhere mainly to 'international students').

Internationally mobile students are individuals who have physically crossed an international border between two countries with the objective of participating in

educational activities in the country of destination, where the country of destination is different from their country of origin. Mobile students are enrolled as regular students in any semester/term of a programme taught in the country of destination with the intention of graduating from it in the country of destination and are expected to physically attend most of the courses taught. In other words, distance learners are not considered to be internationally mobile.

The measurement of student mobility depends to a large extent on country-specific immigration legislation and constraints on data availability. Countries may define international students as students who received their previous education in another country or alternatively as those who are not residents of their country of study, depending on which operational definition is most appropriate to their national context.

Foreign students are students who are not citizens of the country in which they are pursuing education, but have not moved to the country with the sole intention of pursuing education; they may have arrived as the result of other movements, such as immigration.

The status of internationally mobile student is thus dependent on the crossing of an international border for the purpose of education and not on formal residence status in the reporting country of destination. Usual residence is not a criterion to define mobility. For example, "commuter students", who live at home and commute to their classes in another country are considered mobile if they are studying at tertiary level in a different country from the one in which they were awarded their upper secondary leaving certificate. Nor can citizenship be used as sole criterion to define mobility status. For example, students who are citizens of the destination country but received their prior certificate abroad (also known as "homecoming nationals") are classified as mobile students for the destination country.

Students in exchange programmes who undertake part of their studies at an educational institution abroad are not counted as internationally mobile students in the country to which they exchange. Exchange programmes (or short-term postings) are characterised as normally lasting between three months and less than a full academic year. The defining characteristic of such students is that they are given credits for their stay abroad by their home institution where they originally enrolled and do not obtain their qualifications from the institution to which they exchange.

The status of internationally mobile student is maintained for as long as continued education at the same level of education lasts. This may involve several consecutive education programmes with no or only minor gaps (less than a year) in between. Note that all tertiary programmes are considered as belonging to the same level. Internationally mobile students entering a programme at one level of tertiary education remain internationally mobile if upon graduation they continue in a programme at another level outside their country of origin.

Countries that do not have information on international students available may report foreign students instead. This risks overestimating international mobility. When no other suitable measure exists, country of citizenship may be used – but only as a last resort.

4.1.9. Full-time, part-time and full-time equivalents

Full-time and part-time students

Students are classified as full-time or part-time on the basis of their intended study load within the reference period. The full-time/part-time distinction is therefore an attribute of

the student's study pattern rather than an attribute of the organisation of the educational programme.

A **full-time student** is one committed within the reference period to an intended study load of at least 75% of the normal full-time annual study load, where**:**

- The intended study load is the study time or resource commitment expected of a student enrolled in the given education programme during a single school or academic year. For predominantly classroom-based study, time in the classroom would be an adequate measure of this. This is a proxy measure for the amount of instruction time that a student receives and can be counted in hours of instruction during the reference school or academic year, the number of course credits taken, or some combination of the two.
- The normal full-time annual study load is the study time or resource commitment expected of a typical student to complete a full-time full-year of a given education programme.

Conversely, a **part-time student** is one whose intended study load is less than 75% of the normal full-time annual study load.

The distinction between full-time and part-time programmes may also be based on the characteristics of the education programmes themselves. In practice, the national context tends to dictate which methods countries use to categorise students as full-time or part-time and these tend to vary by level of education. For primary and secondary education, the most frequent measure is student attendance at the institution or time in the classroom, whereas at tertiary level study load is more likely to be measured in terms of instructional hours and credit accumulation.

In the particular case of combined school- and work-based programmes, the work-based component is considered a mandatory requirement to fulfil the programme**.** Therefore, students participating in these dual system apprenticeship programmes are classified as full-time students even though the school-based component comprises only part of the programme.

Converting head-count data to full-time equivalents

The conversion of student head counts to full-time equivalents (FTEs) aims to express study loads in a single standard unit which equates to a full-time, full-year student. To determine the FTE of a given student, intended study load is divided by the corresponding normal annual study load for the reference period.

For example if the normal study load during the reference school or academic year is 30 hours per week, someone who studies 15 hours per week would have an FTE of 0.5. Given the definitions of full-time and part-time stated above it is possible for a full-time student to have an FTE of less than one. For example, a student who studies 90% of the normal annual study load is recorded as full-time but their FTE is 0.9. It is also possible for a full-time student to have an FTE of more than one if they are enrolled in more than one education programme or ISCED level during the reference academic year.

When converting student head-count data to FTEs, it is recommended:

- Where data and norms on individual participation are available:

$$\text{FTE} = \frac{Actual\ study\ load}{normal\ study\ load}\ X\ \frac{Actual\ duration\ of\ study\ during\ reference\ period}{normal\ duration\ of\ study\ during\ reference\ period}$$

So, for example if the normal study load for a full-time student during the reference period is 30 hours per week for 20 weeks, a student who studies 30 hours per week for 10 weeks would have an FTE of 0.5.

- Where data and norms on individual student study loads are not available, then a full-time student is considered equal to one FTE. Most countries will use this assumption for the primary and secondary level of education. If equivalent programmes exist separately as full-time and part-time programmes, then the ratio of the theoretical durations of these programmes can be used as a proxy for the conversion of part-time student head counts into full-time equivalents.

Early childhood education is a special case, since the concepts used to define full-time and part-time participation are not easily applicable to ISCED level 0. The daily or weekly hours that represent a typical full-time enrolment in an educational programme at ISCED level 0 vary widely between countries. Currently, no consensus has been reached on a methodology for calculating FTEs for early childhood education, but it is recommended to consider all enrolments as full-time.

4.2. Educational personnel

4.2.1. Coverage of data on personnel

The term "**education personnel"** is used for teachers and other personnel engaging in a broad number of activities including:

- student instruction
- professional support for students (whether academic or health/social support)
- management and administration of the education service (both within and outside educational institutions)
- maintenance and operations of educational institutions
- provision of services to educational institutions as a subcontractor.

These last are included if the personnel hired by the subcontractor are working exclusively or mainly (i.e. at least 90% of the time) for the school or educational institution throughout the period of the contract. For example, if the preparation of school meals is subcontracted to a catering company, but company staffs are working exclusively at the school for which they provide food, they are included as if they were employed by the educational institution.

Therefore, educational personnel refer to all those employed in educational institutions covering both instructional institutions (such as schools, colleges and universities) and non-instructional institutions. This includes staff employed by national, regional and local levels of government who administer the education system as well as staff in entities providing support or ancillary services.

There are, however, certain exclusions:

- Personnel from subcontracted services which cannot be distinguished from other non-education services provided by the subcontractor. A typical example would be that of a local transport company carrying out the school bus service as well as other activities during the day. Similar situations might be encountered for

building maintenance and school cleaning.

- Retired teachers, including those who retired early, regardless of whether their salary is still reported under expenditure on teacher salaries.
- Educational personnel in the work-based component of combined school- and work-based programmes. This approach is designed to improve comparability across countries because virtually no country is able to report personnel in the work-based component.

When determining the number of educational personnel, only individuals are counted, irrespective of their assignments to specific programmes, levels or grades. Each staff member is counted only once. If staff are assigned to more than one level or grade or have more than one contract, numbers are divided proportionately according to the percentage of contractual working hours devoted to each programme, level or grade during the reference school or academic year.

Personnel for whom the teaching function and the management function are equally important are treated as teachers and recorded as such. For example, a full-time teacher with some management responsibilities who teaches for 60% of the average teaching time of a full-time teacher will be counted as one full-time teacher and as 0.6 of a full-time equivalent.

Special case: some analyses may wish to record the teaching responsibilities of all staff whether classified as education personnel or not. For this purpose, school management personnel who spend at least 0.25 of their working time teaching to a group or class of students will be considered as having at least some teaching responsibilities.

4.2.2. Classification of educational personnel by function

The classification of educational personnel is intended to serve as a framework to classify schools and other education system personnel for all levels of education (ISCED 2011 levels from 0 to 8). The classification is based on the primary or major functions performed by staff and organises them into four main functional categories, three of which are further broken down into sub-functions with specialised types of personnel:

1. **instructional personnel**
   a. classroom teachers (ISCED 0-4); academic staff (ISCED 5-8)
   b. teachers' aides (ISCED 0-4); teaching/research assistants (ISCED 5-8)
2. **professional support for students**
   a. pedagogical support (ISCED 0-4); academic support (ISCED 5-8)
   b. health and social support (ISCED 0-8)
3. **management/quality control/administration**
   a. school or institutional-level management (ISCED 0-8)
   b. higher-level management (ISCED 0-8)
   c. school or institutional-level administrative personnel (ISCED 0-8)
   d. higher-level administrative personnel (ISCED 0-8)
4. **maintenance and operations personnel (ISCED 0-6)**

The following sections describe each of these categories in greater detail.

Instructional personnel

Classroom teachers and academic staff

A **classroom teacher (ISCED 0-4)** is defined as a person who plans, organises and conducts a group of activities with the aim of developing students' knowledge, skills and competencies as stipulated by educational programmes. Teachers are employed in a professional capacity to guide and direct the learning experiences of students, irrespective of their training, qualifications or delivery mechanism. This category includes:

- professional personnel whose primary or major activity is direct student instruction
- special education teachers in whichever setting they teach
- other teachers who work with a whole class in a classroom, in small groups in a resource room, or one-to-one inside or outside a regular classroom.

This category excludes:

- educational staff whose primary function is something other than teaching, such as managerial or administrative functions
- student teachers and teachers' aides.

Early childhood education is a special case. ISCED level 0 programmes are often delivered by staff with varying levels of qualification, depending on their role in the institution in which they are employed. For the purposes of reporting, reference should be made to the relevant regulatory framework for detail on requirements for persons providing or delivering an education programme to children in the years prior to primary school (such as pedagogical qualifications, training or accreditation at various staffing levels).

Academic staff (ISCED 5-8) includes personnel whose primary or major assignment is instruction or research. This includes personnel who hold an academic rank with such titles as professor, associate professor, assistant professor, instructor or lecturer and personnel with other titles (such as dean, director, associate dean, assistant dean, chair or head of department), if their principal activity is instruction or research.

This category excludes student teachers, teachers' aides and paraprofessionals.

Teachers' aides and teaching/research assistants

Teachers' aides (ISCED 0-4) include not professionally qualified personnel who support teachers in providing instruction to students and other paraprofessional personnel who are employed on a full-time or part-time basis by an education system.

It excludes student teachers or other personnel who do not get paid for their employment. At early childhood education level, support personnel are not regarded as teachers' aides unless they perform educational functions involving groups of pupils on a regular basis.

Teaching/research assistants (ISCED 5-8) includes all students employed on a part-time basis for the primary purpose of assisting in classroom or laboratory instruction or in the conduct of research. Personnel in these positions are typically graduate students who

hold such titles as teaching assistant, teaching associate, teaching fellow or research assistant, or equivalent personnel with other titles.

Professional support for students

Pedagogical and academic support

Pedagogical support (ISCED 0-4) includes professional staff providing services to students to support their instructional programme such as guidance counsellors, librarians, educational media specialists and attendance officers. In many cases, these personnel were originally licensed as teachers but then moved into other professional positions in education systems.

Academic support (ISCED 5-8) includes all personnel whose primary responsibility is to support students' academic programmes. It covers the same categories of staff included under pedagogical support as well as other professional support staff employed in tertiary education institutions.

Health and social support

This category includes all personnel employed in education systems who provide health and social support services to students such as:

- health professionals such as doctors, dentists, ophthalmologists, optometrists, hygienists, nurses and diagnosticians
- psychiatrists and psychologists
- speech pathologists and audiologists
- occupational therapists
- social workers.

Management, quality control and administration

School or institution-level management

- **School-level management (ISCED 0-4)** covers professional personnel whose primary or major responsibility is leadership, school management and/or administration. It includes school heads, principals, assistant principals, headmasters, assistant headmasters, head teachers, assistant head teachers and other management staff with similar responsibilities. It does not include receptionists, secretaries, clerks and other staff who support the administrative activities of the school.
- **Institution-level management (ISCED 5-8)** covers personnel whose primary or major responsibility is the management of the institution, or a recognised department or subdivision of the institution. This category includes personnel with the following titles or their equivalents, if their primary activity is administrative: president, vice president, dean, director, chancellor, associate dean, assistant dean, executive officer or department head.

Higher-level management

Higher-level management (ISCED 0-4) covers personnel whose primary or major responsibility is quality control and the management of the education system at levels above that of the school. These personnel may be employed by local boards of education, state or regional ministries or departments of education, or by national ministries or departments of education. Their work may involve direct administration or other functions that support the operation of education systems such as planning, evaluation, budgeting and accounting, and public information. This category includes the following types of personnel: superintendents of schools, associate and assistant superintendents, commissioners of education, associate and assistant commissioners, directors of instruction and curriculum, directors of planning and evaluation, and other equivalent titles. This category excludes personnel whose main activity is teaching but have some management responsibilities.

Higher-level management (ISCED 5-8) covers personnel with similar functions described above for ISCED 0-4. It also includes other administrative/management positions specific to the tertiary education sector.

School or institution-level administrative personnel

School-level administrative personnel (ISCED 0-4) covers all personnel who support the administration and management of the school. This category includes receptionists, secretaries, typists and word processors, bookkeepers and clerks, and photocopying assistants.

Institution-level administrative personnel (ISCED 5-8) covers all personnel with similar functions described above for ISCED 0-4, and other personnel who support the administrative / management functions of the institutions. These other personnel include: accountants, analysts, auditors, computer programmers, systems analysts, evaluators, financial aid officers, grant developers, lawyers, network administrators, public relations / informational services officers, registrars, and others with similar functions and responsibilities.

Higher-level administrative personnel at all ISCED levels

This category covers personnel who support the administrative or management functions of the education system at the higher level. These personnel may be employed by local boards of education, state or regional ministries or departments of education, or by national ministries or departments of education.

Maintenance and operations personnel

At all ISCED levels, maintenance and operations personnel include personnel who support the maintenance and operation of schools, school security, and ancillary services such as the transportation of students to and from school, and food services operations. It includes the following types of personnel:

- masons, carpenters, electricians, locksmiths, maintenance repairers, painters and paperhangers, plasterers, plumbers, and vehicle mechanics
- bus drivers and other vehicle operators, construction workers, gardeners and groundskeepers, bus monitors and crossing guards, cooks/food caterers, custodians, food servers, dormitory supervisors, and security guards.

4.2.3. Age of educational personnel

As when reporting the ages of students (see Section 4.1.7), educational personnel are classified by their age as of 1st January of the year in which the school or academic year ends (for example 1 January 2016 for academic year 2015/16). For example, in a country where the school year runs from September to August, a teacher born on 31 December 1985 will be reported as aged 30 for the academic year 2015/16, whereas one born on 1 January 1986 will be reported as aged 29.

Countries where the 1st of January falls at the end of the school year may choose to reference the ages of personnel at some time closer to the start of the school year and redistribute the ages on the same basis as the estimation described for student data in Section 4.1.7. The strict comparability of the reference dates for the ages of personnel is, however, likely to be less of an issue than it is for the student data where the calculation of participation rates are more sensitive to reporting differences.

Educational personnel not classifiable by age are allocated to the category "age unknown".

4.2.4. Employment status of educational personnel

Full-time and part-time educational personnel

The classification of educational personnel into full-time and part-time staff is done on the basis of contractual working time. This classification is regarded as an attribute of their individual contract of employment rather than as an attribute of the educational programmes or the provision of education in general in which they are involved.

Full-time employment in each country will be defined differently but will usually be based on the number of normal or statutory working hours which are expected of a full-time employee. The normal or statutory working hours of educational personnel are those needed to meet the requirements according to the official national policies or laws of full-time employment at a specific level of education, or in the job or role in which they are employed, over a full school or academic year.

In order to determine whether educational personnel are full-time or part-time, their contractual working hours should be compared to the normal or statutory number of hours for full-time educational personnel according to the national norms or conventions at the given level of education.

The definitions of full-time and part-time educational personnel in the OECD education statistics are stated relative to these national norms for each category of educational staff as follows:

Full-time educational personnel are defined as employees who are employed for at least 90% of the normal or statutory working hours of educational personnel in the same job or role at the given level of education over a complete school year.

Part-time educational personnel are employed for less than 90% of the normal or statutory working hours of educational personnel in the same job or role at the given level of education.

Note that the 90% cut-off point for educational personnel is different from the 75% cut-off point for students. This reflects the greater standardisation within countries on the normal

working hours of full-time educational personnel in a given job or role compared with the intended study load of full-time students.

Converting head-count data to full-time equivalents

Head counts of educational personnel are converted to FTEs in a similar way to students. The aim is to express working hours during the reference period as a single standard unit which equates to full-time, full-year educational personnel. FTEs are determined by dividing contractual working hours by the corresponding normal or statutory working hours for the reference period.

For example if the normal or statutory working hours during the reference school or academic year is 30 hours per week, someone who works 15 hours per week would have an FTE of 0.5. Given the definitions of full-time and part-time given earlier it is possible for full-time educational personnel to have an FTE of less than one. For example, a teacher who works 90% of the normal or statutory working hours of a full-time teacher should be recorded as full-time but their FTE should be 0.9. It is also possible for full-time educational personnel to represent more than 1 FTE if they have more than one employment contract during the reference school or academic year. In these cases, they should be reported as full-time educational personnel but with FTEs greater than 1.

The conversion to FTEs is often difficult for non-teaching educational personnel. Some countries collect data on the number of contracted hours worked in a typical week for certain categories of non-teaching staff, which are then converted into FTEs as above.

Classification of educational personnel involved in multiple education programmes

It can be difficult to classify educational personnel whose work is divided between different types of institutions (public/private), different levels of education, different orientations (general/vocational) or between different functions (such as teaching and administration). In this case, the calculation of head counts and FTEs will differ:

For reporting head counts: first, the total number of educational personnel is split into those who are full-time and those who are part-time by aggregating their contractual working hours over all of their activities. The full-time and part-time numbers are then pro-rated between education levels, education programmes, types of institutions and functions on the basis of the most appropriate data available relating to the split.

For example, in the absence of any better information, the numbers of educational personnel who work exclusively in public and private institutions respectively can be used to pro-rate the numbers who share their time between the two.

For reporting full-time equivalents, educational personnel are apportioned to the different levels, education programmes, types of institutions and functions in proportion to the amount of contractual working time that they spend on each function. For example, a teacher whose working time totals 0.8 of an FTE teacher, and who spends 50% of their time teaching ISCED 2 and 50% teaching ISCED 3 should be allocated as 0.4 FTE to each of ISCED 2 and ISCED 3.

4.2.5. Classification of teachers by the orientation of education programmes

Teaching staff can be involved in the instruction of students on programmes with different orientations: general, pre-vocational or vocational.

The criterion used to classify teachers is the characteristics of the education programmes followed by the students, rather than the specific subjects taught by the teachers.

In countries which do not have a reporting system which classifies teachers directly by the level and orientation of the programmes they teach, then, for the purpose of reporting head-count data, teachers are pro-rated according to the time they are assigned to the corresponding levels and type of educational programmes. Teachers in different types of programmes are divided in proportion to their contractual working hours. For the reporting of full-time equivalents, teachers are apportioned according to their contractual working time in the respective programmes.

4.2.6. Teachers' working time, teaching time and non-teaching time

Teachers' working time is defined as the number of hours per year that a full-time teacher is expected to work according to the formal policy of that country. This should exclude overtime, non-specified preparation time and days that the school is closed for public holidays, vacations, and festivities. Days or periods of self-regulated professional development which take place during school holidays should also not be reported as working time. To account for non-specified working time in countries where teachers are also subject to other labour regulations (like those that pertain to public employees), the working time of the relevant part of the labour force is also measured (i.e. the statutory working time of public employees).

Working time in school is defined as the working time teachers are supposed to be at school, including both teaching and non-teaching time.

Teachers' working time can be divided into **teaching time** and **non-teaching time:**

Teaching time is defined as the number of hours per year that a full-time teacher teaches a group or class of students according to the formal policy in that country each year. Activities such as professional development days, student examination days, attendance at conferences, and time devoted to the preparation of classes should not be counted as teaching time. Teaching time is calculated as the net contact time for instruction**,** excluding any time allocated for breaks of ten minutes or more, and days that the school is closed for holidays. To ensure measures of teaching time are comparable, teaching periods must be transformed into 60-minute periods *(*e.g. a 45-minute lesson = 0.75 hour).

The formula used to calculate hours of teaching time per year is the following product:

$$\prod(Number\ of\ teaching\ days\ per\ year, Number\ of\ teaching\ hours\ per\ day)$$

Where the number of teaching days per year = number of teaching days per week multiplied by the number of teaching weeks per year minus the number of days that the school is closed for holidays. The number of teaching hours per day is converted into 60-minute periods, excluding breaks of ten minutes or longer.

An exception to the use of this formula is the calculation of teaching time at the pre-primary and primary level, where short breaks are included if the classroom teacher is responsible for the class during these breaks. However, even at these levels, lunch breaks should not be included.

All data relating to teachers' working and teaching time should refer to the situation that applies according to the formal policy in each country. This formal policy may be framed in terms of minimum, maximum or typical requirements. Where the regulations vary within the country (e.g. by region, school type or teacher group), weighted averages of

these regulations can be used, according to the number of teachers to which the variations apply. When this is impractical, countries should consider the teaching and working requirements of the typical teacher.

Non-teaching time refers to the number of hours a full-time teacher spends per year, according to the formal policy, on:

- teaching-related tasks, such as lesson preparation, correction of assignments and tests, supervision activities, meetings about student reporting, annual exams, and meetings with parents
- general school tasks, such as providing student support, cultural activities, meetings, supervision of students during breaks and administrative tasks
- professional development activities, such as observational visits to other schools, attending internal or external conferences, workshops and training.

Some of these activities may take place inside or outside of the school, depending on the formal policy in that country.

Actual teaching time is the annual average number of hours that full-time teachers teach a group or class of students, including overtime. The data can be gathered from administrative registers, statistical databases, representative sample surveys or other representative sources.

4.2.7. Teachers' statutory and actual salaries

The **annual gross statutory salary** consists of teachers' pay according to existing salary scales including any additional benefits that all teachers receive and that constitute a regular part of the annual base salary, such as a thirteenth month or holiday bonus. These salary scales can be based on regulations or agreements between stakeholders, such as teachers' unions, local authorities or school boards.

For example in Spain, the *trienios* (a small salary supplement added to the salary of teachers after every three-year period of service) and the *sexenios* (a salary supplement added after each six-year period and related to in-service training) are included in the annual gross statutory salary figures.

This approach can be considered as the gross salary from the employee's point of view, since it includes any social security contributions and pension scheme contributions that are paid by employees, even if they are deducted automatically from the employee's gross salary by the employer. However, it excludes any employers' premiums for social security and pension contributions. For example a teacher in the United Kingdom receives a monthly gross salary from which some 6% is automatically deducted as the employee's contribution towards the national insurance scheme. Separately, the teacher's employer pays an employer's contribution towards the scheme. In this case, the gross salary reported is the salary before the deduction of the 6% but not including the employer's contribution.

Data on statutory salaries are collected at four points on the salary scale (for a specific level of qualifications of teachers, as explained in Section 4.2.8.): starting salaries, salaries after 10 years of experience, salaries after 15 years of experience and salaries at the top of the scale.

- Starting salaries refer to the average scheduled gross annual salary for a full-time teacher at the beginning of his or her teaching career.

- Salaries after 10 and 15 years' experience refer to the scheduled annual salary of a full-time classroom teacher with 10 and 15 years' experience.
- Salaries at the top of the scale refer to the maximum salaries of a full-time classroom teacher.

Progression in the salary range (from starting point to the top) only reflects pay increases resulting from the number of years in service. It excludes salary increases due to other factors, such as the completion of continuing professional development activities.

Teachers may acquire other compensation, such as bonuses and allowances on top of their statutory salaries, in addition to the amount received on the basis of educational qualification and experience. These may be awarded for teaching in remote areas, for participating in school improvement projects or special activities, for taking on management responsibilities in addition to teaching duties (such as serving as a head of department or co-ordinator of teachers in a particular class/grade), or for excellence in teaching performance.

The **actual gross salary** is the annual money earnings actually received by qualified full-time teachers as direct payment for labour services provided, before taxes. It is the gross salary from the employee's point of view, since it includes the portion of any social security and pension scheme contributions paid by employees, even if deducted automatically from the employees' gross salary by the employer. However, it excludes any employers' contributions towards social security and pension schemes. Work-related payments such as annual bonuses, result-related bonuses, extra pay for holidays and sick-leave pay from employer(s) should also be included. Income from other sources, such as government social transfers, investment income and any other income not directly related to their profession are not to be included. These data can be derived from a variety of sources, including administrative registers, statistical databases, representative sample surveys and other representative sources.

Remarks

Definitions here might be different from those in Section 4.5.5 because they refer to different data sources.

4.2.8. Teacher qualifications

A fully qualified teacher is one who has fulfilled all the training requirements for teaching (a certain subject) and meets all other administrative requirements, such as a successful probation period, according to the formal policy of a country (e.g. a bachelor's degree plus a competitive examination plus an induction programme). The qualification level refers to the entry point to the teaching profession. In a few countries, all teachers must obtain further qualifications to move up in the salary range. Professional experience or number of years in service can also be recognised as further qualifications. In this case, the qualification level will be considered to be that of the starting teachers, even though teachers with a certain number of years' service may have further qualifications. Sometimes, changes in the qualification level are compulsory for all teachers after a certain number of years in the teaching profession.

The **minimum level of qualification or training** required to teach at a given ISCED level is defined as the minimum duration and type of training required for entry into the profession in the reference year. It does not include any eventual further requirements to become a licensed teacher in the public school system, such as completing probation years. In a few countries, the minimum qualification requirements to enter the teaching

profession may have changed over time. As a result, the minimum level of qualification of teachers with 10 or 15 years of experience and at the end of their careers may be different from the stated qualification level for starting teachers.

The **higher than minimum qualification (if most prevalent) to enter the teaching profession in the reference year** is defined as the level of qualification and training higher than the minimum that is held by the largest proportion of teachers (among all teachers at a given level of education) and recognised through a specific salary range. Information on teachers with this qualification is collected to give a more representative perspective in countries where most teachers hold a qualification higher than the minimum to enter the teaching profession and which is also recognised by the compensation system. In all other countries, the most prevalent qualification is considered to be the minimum qualification. In a few countries, the most prevalent qualification for teachers with 10 or more years of experience may be different from the most prevalent qualification at entry to the profession in the reference year, especially when qualification requirements have changed over time.

The **maximum level of qualification or training** is defined as the highest level of qualification recognised from the point of view of compensation. The maximum qualification may correspond with the minimum qualification or a higher than minimum qualification to enter the teaching profession that is held by the largest proportion of teachers. In a few countries, the maximum qualification requirements for teachers with 10 or more years of experience may be different from the maximum qualification at entry to the profession in the reference year.

The **most prevalent level of attainment** refers to the ISCED 2011 level of attainment reached by the greatest proportion of teachers in the system at a given time (e.g. the reference year of the reported data).

4.3. School organisation and curriculum

4.3.1. Instruction time

Two measures of instruction time are collected: intended and actual instruction time.

Intended instruction time

Intended instruction time is defined as the amount of time a student ought to receive instruction from a classroom teacher during the year.

Intended instruction time includes**:**

- the amount of instruction time a public school is expected to provide to students on all subjects integrated into the compulsory and non-compulsory curriculum (see Section 4.3.2) on the school premises
- time spent on out-of-school activities which are a formal part of the compulsory programmes.

Intended instruction time excludes:

- breaks between classes or other types of interruptions
- non-compulsory time outside the school day
- time dedicated to homework activities

- individual tutoring or private study
- days when schools are closed for festivities, such as national holidays, and days when students are not expected to be at school because of teacher development days or examination periods.

Table 4.1. List of study areas (subjects) used in the questionnaire:

Term	Definition
Reading, writing and literature (L1)	Covers skills such as spelling, reading and writing in the language of instruction and includes subjects such as grammar, the language of instruction and literature. It can be considered as the first language taught to students. If there are two languages of instruction in almost every public school, then the hours allocated to reading, writing and literature in both languages of instruction should be reported.
Mathematics	Covers all numeracy skills and subjects such as arithmetic, algebra, geometry and statistics.
Natural sciences	Includes subjects such as science, physics, chemistry, biology, environmental sciences and ecology.
Social sciences	Includes subjects such as history, geography and all related studies. May also include community studies, social and political instruction, and philosophy or civics education.
Languages (2-5)	Includes subjects that develop students' knowledge of a language viewed in the curriculum as "foreign" (or modern) languages, other national languages and/or regional and minority languages. This definition of languages in the curriculum is educationally based and unrelated to the political status of the languages.
Physical education and health	Includes subjects such as education in sports and health-enhancing physical activities, as well as time devoted to instruction in competitive and traditional games, gymnastics, swimming, athletics, dance or other activities that develop pupils' physical and social competences (including knowledge, skills, psychomotor co-ordination, co-operation and leadership) and an active healthy lifestyle.
Arts education	Includes subjects such as arts, history of arts, music, visual arts, drama, music and dance performance, photography, and creative handicraft.
Religion/ ethics/ moral education	Includes subjects whose aim it is to teach the principles and history of one or more religions and subjects such as ethics whose aim it is to determine how to live and behave in accordance with human and social principles.
Information and communication technologies (ICT)	Includes subjects such as informatics, information and communication technologies or computer science. These subjects include a wide range of topics concerned with the new technologies used for the processing and transmission of digital information, including computers, computerised networks (including the Internet), microelectronics, multimedia, software and programming.
Technology	Includes subjects that provide knowledge on the practical use of scientific or technological discoveries that use specific instruments and processes, such as construction, electricity, electronics, graphics and design.
Practical and vocational skills	Includes vocational skills (preparation for a specific occupation), accountancy, business studies, career education, clothing and textiles, driving and road security, home economics, nursing, secretarial studies, tourism and hospitality, woodwork, metalwork, and sewing.
Other subjects	Includes different subjects that cannot be classified within the other groups or which specifically reflect national concerns. The following types of subjects could be included in this category: Latin, ancient Greek, classical studies, minority languages that have not been reported in the Languages 2-5 columns, environmental education, and personal development and well-being. The "other subjects" must be part of the compulsory curriculum to be provided by schools. Form time, assemblies and tutoring should only be included if they are compulsory, have an educational component and are aimed at all students.
Compulsory subjects with flexible timetable (total time devoted to…)	Includes the total amount of instruction time indicated by the central authorities for a given group of subjects, which regional authorities, local authorities, schools or teachers allocate to individual subjects. There is flexibility in the time spent on a subject, but not in the subjects to be taught. For example, central authorities may define the total number of hours that students should be studying reading, writing and literature; mathematics; science; and modern foreign languages per year and schools may choose how to distribute this time between these individual subjects.
Compulsory options chosen by the students	Includes the total amount of instruction time on one or more subjects that pupils have to select (from a set of subjects that it is compulsory for schools to offer) in order to cover part of their compulsory instruction time. This only applies if students have a choice between different subjects and not a choice within a subject category. For example, students may be able to choose between studying a second foreign language or computer science or economics, but it is compulsory for them to study one of these options.
Compulsory flexible subjects chosen by schools	Includes the total amount of compulsory instruction time indicated by the central authorities, which regional authorities, local authorities, schools or teachers allocate to subjects of their choice (or subjects they chose from a list defined by central education authorities). For example, schools may be able to choose between offering religious education or more science, or art but, but it is compulsory for the school to offer one of these subjects and the students must study it.
Non-compulsory curriculum	Includes the total amount of instruction time to which students are entitled beyond the compulsory hours of instruction and that almost every public school is expected to provide. Subjects can vary from school to school or from region to region and take the form of elective subjects. For example, students may have the possibility to take an enriched maths course or to study an additional foreign language, above the compulsory hours of instruction. Students are not required to choose one of these elective subjects, but all public schools are expected to offer them the possibility. Please note that additional activities before/after classes offered by the school are not per se part of non-compulsory curriculum if they can be considered as non-formal instruction. For example, non-compulsory education excludes additional activities such as morning care classes or after-school care classes, even if they are officially regulated.

Although instruction time can be recorded in different units in different countries, it is converted into hours (of 60 minutes) per grade for the purpose of comparing statistics on educational indicators.

The subject areas taught during compulsory education vary depending on the country. They have therefore been grouped into more general subject areas, in order to be able to compare the collected information. The scope, however, is not identical for each of the subject categories. Certain subject categories (e.g. natural sciences) cover several taught subjects (physics, chemistry or biology), whereas others are more specific (e.g. technology). Table 4.1 defines the subject categories that are included in the data collection on instruction time.

Actual instruction time

Actual instruction time is defined as the average instruction time, by subject, in each grade in schools. Actual instruction time refers to the instruction time actually provided in schools, taking into account the cancellation of lessons for a variety of reasons (e.g. school closures, teacher absenteeism and strikes).

Actual instruction time is especially relevant for countries without central recommendations on the intended curriculum and countries that delegate the setting of instruction time to schools or local authorities. Additionally, for countries with regulations on the distribution of intended instruction time, data on the actual instruction time will help to present the national situation in a more accurate way.

4.3.2. Curriculum

The **national curriculum** is usually set out in a document describing the common goals, objectives and quality and/or content criteria of a national school system. This document may take the form of standards (defined objectives and achievement criteria at given levels of education and in specific subjects of study areas) without allocating actual time or mentioning subjects. It may also resemble a timetable, specifying the number of periods for each subject and in each grade by programme. It may also indicate the extent to which decisions on curriculum content and final time allocation can be made at the local or school level.

The intended (or prescribed) curriculum's goals, structure, subjects and notional student workload may be based on the regulations or standards of the top-level authority responsible for education. The top-level authority is usually the state, but in some countries the competencies lie (or are shared) with sub-state entities such as regions. The regulations or standards may document the different elements of the curriculum as a whole, as well as the instruction time linked to each subject. Alternatively, they might only include information on the goals and the content of the subjects, and delegate the distribution of instruction time to other complementary documents. All of these sources of information may be used to collect data about the time allocation between subjects and educational stages.

The intended curriculum comprises both compulsory and non-compulsory parts of the curriculum.

The **compulsory curriculum** refers to the amount and allocation of instruction time that has to be provided in almost every public school and must be attended by almost all public sector students. The compulsory curriculum may be flexible in various ways, giving local authorities, schools, teachers and/or students varying degrees of freedom to

choose the subjects and/or the allocation of compulsory instruction time (see Section 4.3.1). Its goals, structure, subjects and students' notional workload may be based on regulations or standards from the central (top-level) authority responsible for education. Again, this central authority is usually the state, but in some countries the competence lies (or is shared) with sub-state entities, such as regions.

The **non-compulsory curriculum** is included when almost all public sector students are entitled to instruction time above the compulsory hours of instruction. For example, educational authorities may expect almost every public school to allocate resources to teaching elective subjects. These subjects often vary from school to school or from region to region, and may take the form of non-compulsory elective subjects.

4.3.3. Classes and class size

Data on average class sizes are collected for primary and lower secondary education.

A **class** is a group of students who receive tuition together.

Class size is simply the number of students in the group who receive tuition together. In general, the calculation of average class size is simply the total number of students divided by the total number of classes. Students attending special-needs programmes are excluded from this data collection to ensure comparability between countries.

At primary and secondary education levels, class size is computed by **division**. A **division**, often commonly referred to as a class, is made up of the students who are following a common course of study. Students may only be registered in one division, and grouped together based on the highest number of common courses, usually compulsory studies. A division is therefore the pedagogical structure in which each student is enrolled.

In some cases, divisions can be further divided into sub-groups according to the modules being taught. While the concept of average class size can be applied to either the division or the sub-group, this manual uses the average class size per division, as divisions are more commonly used than sub-groups to partition programmes across education levels.

For example, if a teacher has a division of 28 pupils during 8 hours, and this division is also divided in two sub-groups of 14 students during 1 hour for a specific module, then the average size of the class is considered to be the number of students per division = 28/1=28, without consideration for the sub-groups. For more details on class-size calculations see Chapter 7, Section 7.9.2.

4.4. Educational institutions

Although educational institutions are no longer a statistical unit for the purpose of regular international data collections (data on the number of educational institutions are no longer collected), the definition of educational institutions is crucial in defining the coverage of educational expenditure. In the context of lifelong learning, educational institutions remain important because of their role in formal education.

4.4.1. Basic definition

Educational institutions are defined as entities that provide either core or peripheral educational goods and services to individuals and other educational institutions.

This definition leaves some ambiguity surrounding the definition of institutions as separately identifiable statistical units. In particular, the issue of whether an institution with several campuses should be regarded as a single or multiple institutions still needs to be properly addressed. Further complications arise where campuses are located in another country and in the area of distance learning, where courses are Internet based. Further work is needed in this area.

For instance, an institution in country A may have a campus or outpost in country B (i.e. a foreign campus). Country B should report enrolments and finance for the foreign campus in the same manner as it reports activities of its domestic educational institutions. The mobile status of the students at these campuses should be determined as for all other students. Foreign campuses which in practice do not accept students from the host country (for example schools provided for the children of military personnel based outside their home country) should be treated in the same way as other foreign campuses.

Whether or not an entity qualifies as an educational institution is not contingent upon which public or private authority (if any) has responsibility for it. For example, tertiary institutions are classified as educational institutions regardless of which ministry or other authority may have ultimate responsibility for them. In some countries, the ministry of agriculture or defence might have responsibility for some institutions.

4.4.2. Instructional and non-instructional educational institutions

Instructional educational institutions are institutions such as schools, colleges and universities, whose main purpose is to provide educational programmes for students and which fall within the scope of education statistics. Instructional institutions are typically where students enrol in order to study educational programmes. Such institutions are normally accredited or sanctioned by the relevant national education authorities or equivalent authorities. Instructional educational institutions may also be operated by private organisations, such as religious bodies, special interest groups or private educational and training enterprises, both for profit and non-profit.

The generic term “school” is often used to refer to instructional institutions at the primary, secondary and post-secondary non-tertiary levels, and “universities” to those at the tertiary level.

Non-instructional educational institutions are educational institutions providing education-related administrative, advisory or professional services for individuals or other educational institutions. Non-instructional educational institutions include the following types of entities:

- **Entities administering educational institutions**: institutions such as national, state, and provincial ministries or departments of education; other bodies that administer education at various levels of government (e.g. the administrative offices of local education authorities and education officers of municipalities, and central agencies responsible for the remuneration of staff or pension payments); and analogous bodies in the private sector (e.g. diocesan offices administering Catholic schools and agencies administering admissions to universities).
- **Entities providing support services** to other educational institutions including institutions that provide educational support and materials as well as operation and maintenance services for buildings. These may be part of general-purpose units of public authorities. An example of an institution providing educational support in Greece is the Textbook Publishing Organisation (OEDB) whose chief

responsibility is to publish and distribute all books and printed material necessary for all levels of education. The OEDB is an agency overseen by the Ministry of Education, but not formally part of it.

- **Entities providing ancillary services**: separate organisations providing education-related services such as vocational and psychological counselling, placement, transportation of students, and student meals and housing. In many countries, general-purpose units of public authorities (states or municipalities) provide maintenance and ancillary services such as administering student transport. Although they cannot be defined as educational institutions as a whole, the expenditure and personnel committed to the education-related services they provide should be included in data collection. In that sense, general-purpose units of public authorities should be treated as educational institutions to the extent that they provide services to schools or students.

4.4.3. Classifying public and private institutions

Basic classification criteria

Educational institutions are classified as either public or private. Private institutions are further divided into government-dependent and independent private institutions.

An institution is classified as **public** or **private** depending on whether a public agency or a private entity has overall control over it. Overall control is decided with reference to who has the power to determine the general policies and activities of the institution and to appoint the officers managing it. Overall control will usually also extend to the decision to open or close the institution. As many institutions are under the operational control of a governing body, the constitution of that body will also have a bearing on the classification.

An institution is classified as **public** if it is controlled and managed:

- directly by a public education authority or agency of the country where it is located
- directly by a government agency or by a governing body (such as a council or committee), most of whose members are appointed by a public authority or elected by public franchise.

An institution is classified as **private** if:

- overall control and management rest with a non-governmental organisation (e.g. a church, trade union, business enterprise or foreign or international agency)
- the governing board consists mostly of members not selected by a public agency.

Remarks

Classification criteria: when classifying educational institutions as either public or private, only the school-based component of combined school- and work-based programmes should be considered. Similarly, the classification of students as enrolled in public or private institutions should consider only the school-based component of such programmes. For example, if a student performs the school-based component in a public school and the work-based component in a private enterprise, this student should be counted under the "public" heading.

Source of funds: the extent to which an institution receives its funding from public or private sources does not determine its classification as a public or private institution. For example, a privately managed school could obtain all of its funding from public sources and a publicly controlled institution could derive most of its funds from tuition fees paid by households.

Ownership: whether or not a public or private body owns the buildings and site of a school is not crucial to its classification status. The term "ownership" may refer to the ownership of school buildings and site, or alternatively ownership of the institution in the sense of ultimate management control. Only in the latter sense is ownership relevant for classifying institutions.

Regulation: privately managed but publicly funded schools may be subject to some regulation or control by public authorities, but these institutions should nevertheless be classified as private, provided that they are ultimately subject to private control. Public regulation may extend to areas such as the curriculum, staffing appointments and admissions policies. In practice, publicly regulated private schools may pose problems of classification where the extent of regulation is on a par with that of publicly controlled schools. This may especially be the case at tertiary level where institutions may be autonomous and self-governing but subject to considerable public control. Control over such functions as the selection and dismissal of staff, the setting of curricula, the examination and testing of students, and the admission of students may all be shared between a public authority and a governing board. It is also not uncommon for private schools in many countries to be required to teach the national curriculum and be subject to more or less the same regulations as public schools, in return for public funding of these schools.

Legal basis: in the case of some institutions, a legal basis for their foundation may exist in a public charter, deed of trust or even legislation enacted by parliament. In general, the legal instrument on which the institution is founded affects its classification status only to the extent that such a legal instrument enables a public authority to exercise ultimate authority or control over the institution. The issue of public recognition or licensing of private schools should not be confused with the issue of overall control.

Difficult cases

In many countries, the public authorities lay down minimum conditions for private schools (both government-dependent and independent) in relation to the curriculum or qualifications of staff.

Some countries have autonomous, self-governing universities, which are owned and managed by self-perpetuating governing boards made up of private members, but are publicly chartered and considered to be performing a "public" function. Nevertheless, these institutions should be classified as private.

In other cases, a public agency may have granted so much educational and fiscal autonomy to individual schools (sometimes vesting authority in school governing boards composed of private members), that few significant elements of public control or governance remain. Nevertheless, these institutions should be classified as public as it was the choice of the public agency which had overall control to grant additional freedom to the schools.

In still other cases, the degree of public regulation of nominally privately owned and managed institutions may be so great that few vestiges of private decision-making authority remain. Nevertheless, these institutions should be classified as private.

European schools, established for the children of personnel of the European institutions, should be classified as private institutions, because they are not directly controlled or managed by a public education authority or agency of the country in which they are located. In fact, they are managed by an intergovernmental institution, the Board of Governors, pursuant to a distinct international treaty. They are classified as private independent institutions, because most of their core funding comes from the European Commission's operating budget, with less than 50% coming from government agencies of the host countries.

Distinguishing between government-dependent and independent private institutions

The terms **"government-dependent"** and **"independent"** refer only to the degree to which a private institution is dependent on funding from government sources; they do not refer to the degree of government direction or regulation.

A **government-dependent private institution** is a private institution that receives 50% or more of its core funding from government agencies, or one whose teaching personnel are paid by a government agency or through government directly.

An **independent private institution** is a private institution that receives less than 50% of its core funding from government agencies and whose teaching personnel are not paid by a government agency.

Core funding refers to the funds that support the basic or core educational services of the institutions. It therefore excludes:

- funds provided specifically for research projects
- payments for services purchased or contracted by private organisations
- fees and subsidies received for ancillary services, such as lodging and meals.

Tuition fees and other fees paid to institutions by students should not be considered as government funds unless the fees are financed by government scholarships or loans to the students or households and the student has no choice but to use the fee in that class of institution.

The classification of institutions as government-dependent or independent should be made for classes of institutions rather than for individual institutions. For example, if a country has a number of church-affiliated upper secondary schools, the determination should depend on whether such schools in general receive a majority of their core funding from government sources. If the answer is yes, then all the schools in the category should be considered government-dependent, even if some individual schools in the class may happen to receive less than half of their core funds from government sources.

4.5. Educational expenditure

This section provides specific and detailed definitions and concepts used in the compilation of international statistics on educational finance and expenditure from all sources on formal education. This includes government expenditure, including expenditure from all government ministries and agencies financing or supporting education programmes; and expenditure from international and private sources.

4.5.1. The framework for educational expenditure

Data on education finance and expenditure are reported for the same programmes as for students, teaching staff and graduates. This means they cover spending on formal education programmes which are delivered within the national territory, irrespective of the citizenship of students enrolled in these programmes and irrespective of the type of institutions (instructional or non-instructional educational institutions, public or private) (UNESCO-UIS / OECD / EUROSTAT, 2017[5]).

Expenditure on education includes expenditure on core educational goods and services, such as teaching staff, school buildings, and schoolbooks and teaching materials, and

peripheral educational goods and services such as ancillary services, general administration and other activities.

Ideally, international comparisons of educational expenditure should be defined in terms of the educational goods and services which are purchased in relation to the educational programmes within the scope of each data collection. In practice, educational institutions are most commonly used as defining units rather than educational goods and services, reflecting the traditional interest in how much schools, colleges and universities cost. But while an institutional dimension is important, international comparisons may be problematic because some of the goods and services provided by educational institutions in one country may be provided outside educational institutions in another country. Differentiating the spending devoted to educational and non-educational goods and services offered by institutions also provides for an analysis of the expenditure devoted to core educational purposes. Finally, the source of funds dedicated to education spending assesses who the major contributors are and the impact this may have on the access and provision of education.

It is therefore important to consider a framework for educational finance data built around three dimensions (Figure 4.1):

- the location of service providers (within or outside of institutions)
- the goods and services provided or purchased (core and peripheral goods)
- the source of funds that finance the provision or purchase of these goods and services (from public, private and international sources).

The first dimension – represented by the horizontal axis in the diagram below – relates to the location where spending occurs. Spending on educational institutions includes spending on teaching institutions such as schools and universities, and non-teaching institutions such as education ministries and other agencies directly involved in providing and supporting education. Spending on education outside these institutions covers expenditure on educational good and services purchased outside institutions, such as books, computers and fees for private tutoring. It also deals with student living costs and costs of student transport not provided by educational institutions.

The second dimension – represented by the vertical axis in the diagram below – classifies the goods and services that are purchased. Educational core goods and services include all expenditure directly related to instruction and education. It covers all expenditure on teachers, maintenance of school buildings, teaching materials, books, tuition outside schools and administration of schools. However, not all expenditure on educational institutions can be classified as direct educational or instructional expenditure. Educational institutions in many OECD countries offer various ancillary services – such as meals, transport, housing, etc. – in addition to teaching services to support students and their families. At the tertiary level, spending on research and development can be significant. Additionally, not all spending on educational goods and services occurs within educational institutions. For example, families may purchase textbooks and materials themselves or seek private tutoring for their children. In this sense, "non-instruction" expenditure covers all expenditure broadly related to student living costs or services provided by institutions for the general public.

Table 4.2. Source of funding for educational goods and services by location of the service provider

Type of goods and services		Location of service providers: Spending on educational institutions (*e.g. schools, universities, educational administration and student welfare services*)	Location of service providers: Spending on education outside educational institutions (*e.g. private purchases of educational goods and services, including private tutoring*)
Spending on core educational goods and services		**Public and international funds** *e.g. public spending on instructional services in educational institutions*	**Publicly subsidised private funds** *e.g. subsidised private spending on books, materials or fees for private tutoring*
		Publicly subsidised private funds *e.g. subsidised private spending on instructional services in educational institutions*	**Private funds** *e.g. private spending on books and other school materials or private tutoring*
		Private funds *e.g. private spending on tuition fees*	
Educational peripheral goods and services	**Spending on research and development**	**Public and international funds** *e.g. public spending on university research*	
		Private funds *e.g. funds from private industry for research and development in educational institutions*	
	Spending on educational services other than instruction	**Public and international funds** *e.g. public spending on ancillary services such as meals, transport to schools, or housing on the campus*	**Publicly subsidised private funds** *e.g. subsidised private spending on student living costs or reduced prices for transport*
		Public subsidised private funds e.g. public subsidies for lodging, meals, health services, or other welfare services furnished to students by the educational institutions	
		Private funds *e.g. private spending on fees for ancillary services*	**Private funds** *e.g. private spending on student living costs or transport*

Public and international funds | Private funds (net of subsidies) | Public subsidies to private entities

The third dimension – represented by the colours in Table 4.2 – distinguishes among the sources from which funding originates. These include the public sector and international agencies (indicated by light blue), and households and other private entities (indicated by medium-blue). Where private expenditure on education is subsidised by public funds, this is indicated by cells in the grey colour. The uncoloured cells indicate the parts of the framework that are excluded from the coverage of the finance indicators in *Education at a Glance.*

4.5.2. Accounting principles

In keeping with the system used by many countries to record government expenditures and revenues, educational expenditure data are compiled on a cash accounting rather than an accrual accounting basis. That is to say that expenditure (both capital and current) is recorded in the year in which the payments occurred. This means in particular that:

- Capital acquisitions are counted fully in the year in which the expenditure occurs.
- Depreciation of capital assets is not recorded as expenditure, although expenditure on repairs and maintenance is recorded in the year it occurs. This can result in sharp fluctuations in expenditure from year to year owing to the onset or completion of school building projects which, by their nature, are sporadic.
- Expenditure on student loans is recorded as the gross loan outlay in the year in which the loans are made, without subtracting repayments or interest payments from existing borrowers.

A notable exception to the cash accounting rules is the treatment of the retirement costs of educational personnel in situations where there are no (or only partial) ongoing employer contributions towards the future retirement benefits of the personnel. In these cases, countries are asked to impute these expenditures in order to arrive at a more internationally comparable cost of employing the personnel.

4.5.3. What educational expenditure covers

The coverage of the finance expenditure data includes:

- goods and services of educational institutions: all direct public, private and international expenditure whether educational or non-educational (e.g. ancillary services) but with one or two exceptions (see below)
- goods and services purchased outside educational institutions: private expenditure on educational goods and services
- public subsidies to students for student living costs: regardless of where or how the student spends these subsidies.

The coverage of the finance data excludes:

- research and development (R&D) outside of educational institutions, as this is clearly outside the scope of education
- private, non-subsidised expenditure on student living costs outside of educational institutions

- expenditure on non-formal educational activities: besides their formal educational programmes, some educational institutions offer educational activities such as evening courses for adults that are classified as leisure courses.

Expenditure on goods and services within educational institutions

The following indicates what the expenditure data cover for goods and services provided by educational institutions, and presents difficult cases.

Coverage

The coverage of educational **core** goods and services includes:

- instruction costs (i.e. teaching costs), including in teaching hospitals as it relates to the teaching of medical students
- educational goods (books, materials, etc.) provided by institutions
- training of apprentices and other participants in combined school and work-based educational programmes at the workplace
- administration
- capital expenditure and rent
- special educational needs
- guidance.

The coverage of educational **peripheral** goods and services includes:

- R&D
- educational research and curriculum development (including teaching hospitals, see below)
- research and development performed at higher education institutions
- non-instructional goods and services (ancillary services)
- student transportation, school meals, student housing, boarding and student health services
- services for the general public provided by educational institutions.

The coverage of educational goods and services excludes:

- child care or day care provided by schools and other instructional institutions
- expenditure on non-formal educational programmes (such as leisure courses)
- activities of public authorities (such as ministries) that are not directly related to education (e.g. culture, sports and youth activities) unless provided as an ancillary service
- teaching hospitals' expenditure as it relates to patient care and other general expenditures not related to education
- debt servicing (i.e. payments of interest or repayments of the principal)
- depreciation of capital assets and capital charges

- goods and services taxes (GST)
- research and development outside of educational institutions.

The following sections provide special instructions concerning categories of spending on educational institutions which have posed problems for international comparability in the past.

Expenditure on research and development

Expenditure on R&D is defined according to the OECD Frascati Manual (OECD, 2002[6]). This includes all expenditure on research performed at universities and other tertiary education institutions, regardless of whether the research is financed from general institutional funds, through separate grants, or from contracts from public or private sponsors.

Expenditure on R&D excludes expenditure on independent, organisationally separate, government research institutions in cases where the connection between universities and research institutions is purely administrative.

Where R&D expenditure is embedded within general university budgets, problems can arise in separating expenditure on R&D from total expenditure. This embedded expenditure includes, for example, spending on the compensation of teaching staff who work part of their time on R&D. These elements need to be identified and staff costs need to be broken down for education and R&D activities. The OECD Frascati Manual suggests standard practices for the separation.

Teaching hospital expenditure

Expenditure by or on teaching hospitals (sometimes referred to as academic hospitals or university hospitals) is excluded from educational expenditure, particularly all costs of patient care and other general expenses of academic hospitals, even if such expenses are paid for by the education authorities.

However, teaching hospital expenditure that it is directly and specifically related to the training of medical students, and expenditure on R&D at teaching hospitals are included.

Expenditure on ancillary services

Ancillary services are defined as services provided by educational institutions that are peripheral to the main educational mission. The two main components of ancillary services are:

- Student welfare services at ISCED levels 0-3, student welfare services include such things as meals, school health services and transportation to and from school. At the tertiary level, they include halls of residence (dormitories, dining halls and health care.
- Services for the general public: these include such things as museums, radio and television broadcasting, sports, and recreational or cultural programmes.

All such ancillary services in educational institutions are included in the coverage of the expenditure data.

Expenditure on free or subsidised transportation

The classification of some public expenditure is ambiguous, since it may be classified either as ancillary services or as public subsidies to students in kind. This applies especially to free or subsidised transport of students to travel to school or for students' use more generally.

Free or subsidised transport can be provided to students in two different forms:

- Special school buses organised to bring the students to the school. Such transportation is classified as an ancillary service offered by the educational institution.
- Free or subsidised tickets for (local) transport companies.

If the main purpose of the expenditure is to fund the students' transport to school, the expenditure is classified as expenditure on an ancillary service. If the purpose of the expenditure is to fund the general use of the transport system by the student, then the expenditure is recorded as subsidies to students in kind. Note that in the latter case, the allocation of the subsidy must be contingent on the recipient being a student.

Expenditure on day and evening child care

In some countries, institutions providing pre-primary and primary education also provide extended day or evening child care. In the interest of international comparability, the cost of such services from reported expenditure statistics, especially at ISCED levels 0 and 1 are excluded.

Educational expenditure at the workplace to train participants in combined school and work-based training programmes

Expenditure by private companies on certain combined school- and work-based programmes that take place at the workplace, and public subsidies for such programmes, are regarded as expenditure by independent private educational institutions for the purposes of the indicators described in this handbook.

Expenditure on these programmes includes expenditure on the training itself (e.g. salaries and other compensation of instructors and other personnel, and costs of instructional materials and equipment). It excludes salaries or other compensation paid to students or apprentices.

For example, if the estimated total cost of a dual system apprenticeship programme to the employer is EUR 10 billion, of which EUR 6 billion is the estimated cost of training and EUR 4 billion is the cost of apprentices' salaries, social security contributions and other compensation, only the EUR 6 billion used for the cost of training would be included in educational expenditure.

Measurement of expenditure on contributions to pension schemes

The employee cost reported for educational institutions includes the cost to the employer of contributions to retirement schemes for the currently active educational employees.

Retirement expenditure is defined, in principle, as the actual or imputed expenditure by employers or third parties (e.g. social security agencies, pension agencies or finance ministries) to finance retirement benefits for current educational personnel. Pension contributions made by the employees themselves, whether deducted automatically from

their gross salaries or otherwise, are not included in retirement expenditure of educational institutions.

Depending on the types of retirement schemes in operation in a country, estimates are sometimes used according to the type of pension system available:

- In a **fully funded**, contributory pension system, employers pay contributions for each of their current employees into a fund which is sufficient to pay the required pension when the employees retire. In this case, the expenditure on retirement to be reported equates to the current employer's contribution to the pension fund.
- In a **completely unfunded** retirement system, employers make no ongoing contributions into a fund and instead the government meets the cost of retirement as it arises. This is the type of scheme (sometimes called "pay as you go") used to provide pensions for civil servants in many countries. In this case, the expenditure on retirement must be estimated or imputed.
- Likewise, in **partially funded systems** where employers contribute to a retirement system but the contributions are inadequate to cover the full costs of future pensions, it is necessary to impute the contributions which make up the short fall. Thus, retirement expenditure is the sum of actual employers' (or third party) contributions and the imputed contribution needed to cover the projected funding gap.

The System of National Accounts 2008 (SNA 2008) as well as the European System of Accounts (ESVG 2010) for European Union (EU) countries gives some guidance on the reporting of imputed social contributions such as for retirement. This enhances comparability between countries and harmonisation with National Accounts methodology.

Expenditure outside educational institutions

This covers educational goods and services purchased outside institutions and mainly student living costs.

Educational goods and services purchased outside institutions, in the free market, include:

- Expenditure on educational goods which are needed for participation in the programmes and which are therefore imposed on the student either directly or indirectly by the educational institutions. Examples include school uniforms, books requested for instruction, athletic equipment and materials for arts lessons.
- Expenditure on educational goods which are not required by institutions, but which students and households choose to buy to support their study in the programmes in scope of the data collection. Examples include additional books or computers and learning software to be used at home.
- Fees for private out-of-school tuition related to the educational programmes being pursued. This will be the main type of educational service purchased outside institutions.
- Purchases from commercial enterprises operated or sponsored by educational institutions (such as university bookstores) are regarded as expenditure outside educational institutions.

Expenditure on educational goods and services purchased outside institutions will usually be measured by household expenditure surveys, so the definition of goods and services will tend to be dictated by those used in the national survey instrument. Care therefore needs to be taken to ensure that this does not result in double counting with expenditure on educational institutions and that student living costs are not included.

For example, if private expenditure on educational institutions is reported on the basis of school accounts, and includes fees paid by households for laboratory materials and art supplies besides tuition fees, the same fees should not be counted again as payments to outside institutions on the basis of household reports in educational expenditure surveys.

- Student living costs are accounted only if they are subsidised through financial aid to students by public or private entities. The rationale for including these subsidies is that in many countries, public and private scholarships, grants or loans are provided to students not primarily or exclusively to cover the tuition fees charged by educational institutions but rather to subsidise student living expenses. It is therefore desirable to capture this expenditure in order to provide a complete picture of total investment by public and other private entities in education.

Note, however, that fees paid by private households to educational institutions for ancillary services as for student accommodation is included in private expenditure regardless of whether it is subsidised or not.

This category excludes:

- students' foregone earnings
- expenditure on student living costs outside educational institutions which are not subsidised through financial aid to students by public or private entities.

4.5.4. Sources of educational expenditure and types of transactions

Sources of funds for educational expenditure are classified as:

- governmental (central, regional or local government)
- households and other private entities (including firms and religious institutions and other non-profit organisations)
- international agencies and other foreign sources.

These sources can be either initial of final payers of funds, depending on what type of transaction is involved. The data distinguish three types of financial transactions:

- **Type 1**: direct expenditure/payments to educational institutions (disaggregated according to the type of service provider to which, or for which, the payments are made: public institutions, government-dependent private institutions, and independent private institutions)
- **Type 2**: intergovernmental transfers of funds
- **Type 3**: Public-to-private transfers of funds.

Transfer transactions can be considered to have two sources of funds, depending on the indicator being calculated. The **initial source of funds** is the original source of the funds

before transfers have taken place while the **final source of funds** is after transfers have taken place.

The following sections describe each source of funds fin more detail.

Public (government) sources of expenditure

Public expenditure refers to spending by public authorities at all levels. It excludes expenditure not directly related to education (such as culture, sports or youth activities) unless these services/activities are provided as ancillary services by educational institutions. It includes expenditure on education by other ministries or equivalent institutions, for example health and agriculture. It also includes subsidies provided to households and other private entities (often in the form of financial aid to students) which can be attributable to educational institutions (e.g. fees) or not (e.g. private living costs outside of institutions).

Public expenditure on education includes expenditure by all levels of government, both education-specific authorities and other government agencies. Thus, central government expenditure includes not only expenditure by national education ministries, but also all expenditure on education by other central government ministries and authorities. Similarly, educational expenditure by regional and local governments includes not only expenditure by the regional or local agencies with primary responsibility for operating schools (e.g. provincial ministries of education or local education authorities) but also expenditure by other regional and local bodies that contribute to the financing of education.

Classification of levels of government

Public expenditure is classified by the following three levels of government:

- central (national) government
- regional government (province, state, Land, etc.)
- local government (municipality, district, commune, etc.).

Remarks

To clarify some ambiguities in this classification:
If a country only has two levels of government, the lower level usually must be designated as local rather than regional.
If there are four or more levels, the second level usually must be designated as regional and the third (and subsequent ones) as local.
If a city (such as the national capital) has dual status as both regional and local government, its expenditure is reported as expenditure of regional level of government (e.g. the *Stadtstaaten* of Hamburg, Bremen and Berlin in Germany).
Regional and local government responsibilities:
The terms “regional” and “local” apply to governments whose responsibilities are exercised within certain geographical subdivisions of a country. They do not apply to government bodies whose roles are not geographically circumscribed but are defined in terms of responsibility for particular services, functions or categories of students.

Direct public expenditure on educational institutions

Direct expenditure on educational institutions by government may take two forms:

- Purchases by a government body of educational resources to be used by educational institutions. Examples include direct payments of teachers' salaries by a central or regional education ministry, direct payments by a municipality to building contractors for the construction of school buildings, and procurement of textbooks by a central or regional authority for subsequent distribution to local authorities or schools.
- Payments by a government body to educational institutions which are responsible for purchasing educational resources themselves. Examples of such payments include a government appropriation or block grant to a university, which the university then uses to pay staff salaries and to buy other resources, government allocations of funds to fiscally autonomous public schools, government subsidies to private schools, and government payments under contract to private companies conducting educational research.

The coverage of direct expenditure on educational institutions includes:

- Current expenditure on staff compensation (salaries for teaching and non-teaching staff, expenditure on retirement and other non-salary compensation).
- Expenditure designated for capital spending, ancillary services and R&D:
- Expenditure designated for capital spending: expenditure in this case must have been explicitly designated, or earmarked for capital investment. Actual capital expenditure (on buildings, equipment, etc.) may exceed the amount designated for capital if funds not specifically earmarked by governments for capital formation are used to finance capital outlays.
- Expenditure for ancillary services: the expenditure must have been explicitly designated, or earmarked for ancillary services. The amount actually spent for ancillary services may exceed the amount designated for ancillary services by public and other private sources plus fees paid by households in cases where funds not specifically earmarked by governments are used to finance ancillary services.
- Expenditure for R&D activities: although direct public expenditure for R&D activities is reported separately, it is desirable to include it in the data, broken down by public institutions, government-dependent private institutions and independent private institutions. The concept reflected in this category is the amount actually spent on R&D activities which are financed by central, regional or local levels of government.

The coverage of direct expenditure on educational institutions excludes:

- Expenditure on servicing debts (i.e. payments of interest on the amounts borrowed for educational purposes and repayments of the principal).
- Tuition payments received from students (or their families) enrolled in public schools under that body's jurisdiction, even if the tuition payments flow, in the first instance, to the government body rather than to the institution in question. Such tuition payments are reported as payments by students or households to public educational institutions.

Intergovernmental transfers of funds

Intergovernmental transfers are transfers of funds specifically designated for education from one level of government to another. They are defined as net transfers from a higher level to a lower level of government. Every transfer from one level to another level is reported as expenditure at the level of government receiving the funds.

Remarks

Sometimes, central government transfers to local governments are "passed through" regional governments: that is, the regional governments are responsible for disbursing central government funds to local authorities. In cases where this disbursement is compulsory (i.e. regional governments may not retain the funds for their own use), the payments in question are classified as central government transfers to local rather than to regional governments.

Public-to-private transfers of funds

Government transfers of funds to private entities fall into two distinct categories, public subsidies to households, and public subsidies to other private entities.

Public subsidies to households

This is financial aid to students in the form of scholarships and loans to students to cover tuition fees or living costs. There are two different forms of aid: scholarships and other grants, including child allowances and special public subsidies, and student loans.

Scholarships and other grants cover:

- **Scholarships and grants** including public scholarships and all kinds of similar public grants, such as fellowships, awards and bursaries for students. Government scholarships that are channelled through educational institutions for administrative purposes are considered government transfers to students. These scholarships and grants can be separately categorised as either those that are attributable to educational institutions (i.e. grants for payment of tuition and other fees) or those that are not. This distinction is important in determining expenditure by households on educational institutions net of subsidies.

Special public subsidies are all those transfers to households that are linked to specific spending by students and contingent upon the student status exclude all kinds of tuition costs, with the exception of tuition and other fees paid to institutions abroad. Only in exceptional cases will the payments go to educational institutions as fees for ancillary services, i.e. for lodging, meals, health services, or other welfare services furnished to students by the educational institutions. Those payments that go to institutions have to be treated with care so that subsidies attributable to institutions are separated out. The special subsidies include those for:

- transport
- medical expenses
- books and supplies
- social and recreational purposes
- study abroad
- other special subsidies.

Family or children's allowances only includes allowances contingent upon student status and excludes any allowances independent of the educational status of a child.

For example, if a country provides family allowances for all children up to age 18 regardless of educational status and provides additional allowances for young people aged 19-25 who are enrolled in an educational institution, the allowances for 19-25 year-olds are included in scholarships and other grants, but the allowances for those aged 18 and below are excluded.

Student loans, including those not attributable to household payments for educational institutions, such as subsidies for student living costs, are reported on a gross basis, that is without subtracting or netting out repayments or interest payments from the borrowers (students or households). The cost to the government of servicing these loans (i.e. interest-rate subsidies and the cost of default payments) is not included. Thus, student loan expenditure represents the total value of loans paid by government to students during the reference year.

The rationale for measuring government loans to students on a gross rather than net basis is that it provides an appropriate measure of the financial aid provided to current participants in education in the current year. A net calculation of loan expenditure would be more appropriate for other purposes (e.g. for assessing the shares of public and private expenditure on education) but further work is needed to establish an internationally agreed method for doing this.

Public subsidies to other private entities

Public subsidies to other private entities are transfers to entities specifically defined as non-educational institutions such as commercial companies or non-profit organisations. Such transactions include:

- transfers to business or labour associations providing adult education within the scope of the data collection
- subsidies to private companies (or labour organisations or associations of such entities) for the provision of training at the workplace as part of combined school and work-based programmes, including apprenticeship programmes
- the cost to government of supporting loans paid to students by private financial institutions (e.g. interest-rate subsidies, the cost of guaranteeing the loans and the cost of defaults on repayments).

Private sources

Private expenditure on education can be categorised according to sources of education funds:

- Private expenditure by households, i.e. students and their families.
- Private expenditure by other private entities, i.e. private businesses and non-profit organisations, including religious organisations, charitable organisations, and business and labour associations. It also includes expenditure by private companies on the work-based element of school and work-based training of apprentices and students.

Private expenditure by households

Household expenditure includes:

- transfers to households and students (public and private scholarships, grants or loans) and used for tuition fee payments to educational institutions
- payment for ancillary services provided by educational institutions
- costs borne by private households for the purchase of educational goods and services outside of educational institutions.

Household expenditure excludes the living expenses of students (such as costs of housing, meals, clothing and recreation).

Payments to educational institutions: in most countries, the main form of direct household expenditure on education are fees paid to educational institutions. These consist of:

- tuition fees
- other fees charged for educational services, such as registration fees, laboratory fees and charges for teaching materials plus fees paid for lodging, meals, health services
- fees paid for other welfare services furnished to students by the educational institutions.

Payments from students and households to institutions are reported as net amounts, that is, after subtracting any scholarships or other forms of financial aid (such as reductions in tuition fees or waivers of fees) provided to students by the educational institutions themselves.

For example, if the normal university tuition fee is USD 2 000 per student but some students are offered free tuition or charged only USD 1 000, the figures reflect the reduced amounts actually paid by students, not the hypothetical full tuition fees.

Payment for ancillary services: this includes household payments for lodging, meals, health services and other welfare services provided to students by the educational institutions.

Payments for educational goods and services purchased outside educational institutions:

- Educational **goods** purchased outside institutions should include books not supplied by educational institutions, school supplies, paper, school uniforms, athletic equipment, calculators and computers.
- Educational **services** purchased outside institutions will mainly consist of private expenditure on private tutoring outside school.

Private expenditure by other private entities

Private expenditure by other private entities includes direct payments to educational institutions and subsidies to students or households.

Direct payments to educational institutions: is expenditure by other private entities on educational institutions, including:

- contributions or subsidies to vocational and technical schools from business or labour organisations
- payments by private companies to universities under contract for research, training or other services
- grants to educational institutions from non-profit organisations, such as private foundations
- charitable donations to educational institutions (other than from households)
- rents paid by private organisations and earnings from private endowment funds
- expenditure by private employers on the training of apprentices and other participants in combined school and work-based educational programmes
- public subsidies to other private entities for the provision of training at the workplace included as spending by other private entities.

Subsidies to students or households: consists of financial aid to students or households provided by other private entities, including**:**

- scholarships provided by businesses and religious or other non-profit organisations
- student loans from banks and other private lenders (even if such loans are guaranteed or subsidised by government, or made through programmes of private lending organised by the government).

As with public student loans, loans are reported as gross amounts, without subtracting payments of interest or repayments of the principal by the borrowers. Thus, the student loan expenditure here should represent the total value of loans paid by banks and private lenders to students during the reference year.

Government support of these private loans (in the form of interest subsidies or payments for defaulters) is reported as public subsidies to other private entities.

Funds from international agencies and other foreign sources

International funds consist of funds from public multilateral organisations for development aid to education. These organisations include multilateral development banks (the World Bank and regional development banks), United Nations agencies and other intergovernmental organisations, bilateral development co-operation government agencies, and international non-governmental organisations (NGOs) established in the receiving country. International funds also include other foreign grants for R&D at tertiary institutions.

Educational expenditure based on loans from intergovernmental organisations, such as World Bank loans, is included as gross loans, and excludes repayments to international organisations.

International funds can be reported as:

- International payments direct to public, government-dependent private and independent private institutions. An example would be a research grant from a foreign corporation to a public university.

- International payments direct to all type of educational institutions for R&D activities.
- Transfers of funds from international sources to central, regional and local governments.

Transfers of funds from international sources to governments are not automatically included in the total of expenditure on educational institutions. These payments are reported as a transfer and expenditure at the level of the recipient of the funds.

4.5.5. Expenditure by resource category

Within educational institutions, expenditure is broadly categorised as either current or capital expenditure and these two categories are the standard ones used in national income accounting:

- **Current expenditure** is expenditure on goods and services consumed within the current year, which needs to be made recurrently to sustain the production of educational services. Minor expenditure on items of equipment, below a certain cost threshold, is also reported as current spending.
- **Capital expenditure** is expenditure on assets that last longer than one year. It includes spending on construction, renovation and major repair of buildings, and expenditure on new or replacement equipment.

Capital expenditure

Capital expenditure represents the value of educational capital assets acquired or created during the year in question regardless of whether the capital expenditure was financed from current revenues or by borrowing. The cost of the depreciation of capital assets is not included. Capital expenditure excludes expenditure on debt servicing. This means that neither interest payments nor repayments of the principal are counted as part of capital or current spending.

Current expenditure

Current expenditure is broken down into the following categories:

- Expenditure on compensation of personnel, which includes:
- Salaries, which are the gross salaries of educational personnel, before deduction of taxes, contributions for retirement or health care plans, and other contributions or premiums for social insurance or other purposes. Additional bonuses on top of basic salary (e.g. arising from the experience, age or other circumstances of the personnel) should be included.
- Expenditure for retirement (pension schemes), which covers actual or imputed expenditure by employers or third parties to finance retirement benefits for current educational personnel. This expenditure excludes pension contributions made by the employees themselves, whether deducted automatically from their gross salaries or otherwise.
- Expenditure on other non-salary compensation, which covers spending by employers or third parties on employee benefits other than pensions. These benefits may include such things as health care or health insurance, disability

insurance, unemployment compensation, maternity and childcare benefits, other forms of social insurance, non-cash supplements (such as free or subsidised housing), and free or subsidised child care.

Expenditure on compensation of personnel is also categorised by the type of personnel – distinguishing between expenditure on teaching and non-teaching staff (as defined in Section 4.2.5) including the appropriate portions of the compensation of staff who teach part-time.

Note that the breakdown of compensation of personnel into salaries and non-salary components is not requested for independent private institutions as it has not been possible to obtain these data for a significant number of countries. The underestimation of non-salary compensation, especially in countries where no reliable estimates exist for future pension liabilities of current expenditure, remains a significant potential bias in comparisons of expenditure data.

- Current expenditure other than compensation of personnel includes the following categories:
  - Expenditure on contracted and purchased services refers to expenditure on services obtained from external providers, as opposed to services produced by the education authorities or educational institutions themselves using their own personnel. The services most commonly obtained under contracts are: maintenance of school buildings and ancillary services, such as preparation of meals for students.
  - Rents paid for school buildings and other facilities. Expenditure on other resources covers the purchases of other resources used in education, such as teaching and learning materials, other materials and supplies, items of equipment not classified as capital, fuel, electricity, telecommunications, travel expenses, and insurance.
  - Required payments other than expenditure on educational resources: This can include, for example, any property taxes that educational institutions may be required to pay.
  - Financial aid to students is not included unless it is provided by the institution's own funds in the form of a reduction in tuition fees or waiver of fees and it exceeds household payments to the institution. This is because household expenditure payments to educational institutions are themselves calculated as net of institutional subsidies.

Remarks

Definitions here might differ from Section 4.2.7 because of references to different data sources.

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Chapter 5. Definition and classification of educational programmes: The practical implementation of ISCED 2011

This chapter covers the conceptual, definitional and classification issues concerning educational programmes. It starts with an overview of the latest International Standard Classification of Education (ISCED 2011) which provides the foundation for internationally comparative education statistics. It goes on to set out the definitions and classifications that apply to educational programmes within it. It then sets out the detail of how educational programmes are allocated within each ISCED level, considering the criteria that define the boundaries between educational levels.

5.1. Overview of ISCED 2011

ISCED is at the heart of international statistics on education. As the structure and curricular content of national education systems vary, it can be difficult to benchmark performance across countries over time or monitor progress towards national and international goals. In order to understand and properly interpret the inputs, processes and outcomes of education systems from a global perspective, it is vital to ensure that data are comparable. This can be done by using ISCED, the standard framework used to categorise and report cross-nationally comparable education statistics.

The ISCED classification serves as an instrument to compile and present education statistics both nationally and internationally. The framework is occasionally updated in order to better capture new developments in education systems worldwide.

Initially developed by UNESCO in the 1970s, the first ISCED (hereafter referred to as ISCED-76) became operational from 1976 and was first revised in 1997 (ISCED-97). Over the years that followed, education systems became increasingly complex, often reflecting increased choices of types of programmes and modes of attendance. This imposed new difficulties for the international comparability of education statistics and many of these changes could no longer be adequately reflected in data collected under ISCED-97. The case for a revised ISCED was clear. Following a collaborative effort involving UNESCO, the OECD and Eurostat, the UNESCO General Conference adopted ISCED 2011 as the replacement for ISCED-97 at its 36th session in November 2011. The first presentation of UNESCO ISCED 2011 was published in December 2012 (UIS, 2011[1]), followed by an operational manual (OECD/Eurostat/UNESCO Institute for Statistics, 2015[2]). ISCED 2011 was first integrated into the joint OECD, Eurostat and UNESCO UOE data collection for the school year 2013, the indicators from which were published in the 2015 edition of OECD's *Education at a Glance*.

ISCED 2011 is designed to provide an integrated and consistent statistical framework for the collection and reporting of internationally comparable education statistics. It is a programme-based taxonomy which seeks to reduce complex national educational structures into defined international categories based on certain classification criteria. It helps to transform detailed national education statistics, compiled on the basis of national concepts and definitions, into aggregate categories that are deemed to be internationally comparable. The coverage of ISCED 2011 extends to all organised and sustained learning opportunities for children, young people and adults, including those with special educational needs, irrespective of the institutions or organisations providing them or the form in which they are delivered.

The educational programme is the basic unit of classification in ISCED 2011. Each programme should be allocated to a particular level of education on the basis of its educational content, which in practice is determined by applying classification criteria such as typical starting ages, entrance qualifications and type of qualification awarded. ISCED-97 introduced these multi-dimensional criteria to capture the complexities of modern education systems and represented a major shift from the uni-dimension ladder system on which ISCED-76 was based.

The ISCED 2011 classification is an important step forward in improving the comparability of international statistics on education. The major changes between ISCED 2011 and ISCED-97 are:

The ISCED 2011 classification revises the ISCED-97 levels of education programmes (ISCED-P) and introduces for the first time a related classification of educational attainment levels (ISCED-A) based on recognised education qualifications.

The ISCED 2011 classification includes improved definitions of formal and non-formal education, educational activities and programmes.

Compared to ISCED-97, which had seven levels of education, ISCED 2011 now has nine levels to take into account changes in tertiary education, such as the Bologna structure. Programmes previously classified as level 5 in ISCED-97 will now be allocated to level 5, 6 or 7 in ISCED 2011. Moreover, while ISCED-97 mentioned the position in the national degree structure of tertiary programmes, ISCED 2011 introduces specific coding for this dimension for levels 6 and 7 (bachelor's or equivalent and master's or equivalent levels, respectively).

ISCED 2011 expands level 0 to include a new category covering early childhood educational development programmes designed for children under the age of 3.

The ISCED 2011 classification improves the use of general and vocational orientation categories within ISCED levels. Programmes not leading to labour-market relevant qualifications, classified as pre-vocational in ISCED-97, are now mainly classified as general education.

ISCED-97 distinguished two categories of access to education at higher ISCED levels, depending on the type of subsequent education, while ISCED 2011 identifies only one. The ISCED 2011 sub-category "level completion with access to higher ISCED levels" corresponds to the combined destination categories A and B in ISCED-97. ISCED 2011 further sub-classifies programmes that do not provide access to higher ISCED levels into the sub-categories "no level completion", "partial level completion" and "level completion". These three sub-categories in ISCED 2011 correspond to destination category C in ISCED-97.

5.2. Definition and classification of educational programmes

The educational programme is the basic unit of classification within ISCED 2011 and as such is the main building block for international statistical comparisons in education. This section first defines an educational programme and then describes the various ways in which such programmes can be classified: by level, outcomes and destinations, vocational/general orientation, and field of study.

5.2.1. Definition of an educational programme

The basic units of classification in ISCED are the national (and subnational) education programme and the related recognised educational qualification. An educational programme is defined as a collection of educational activities which are organised to accomplish a predetermined objective or the completion of a specified set of educational tasks.

The term "educational activities" has a broader meaning than terms such as "course" or "class". Educational activities can be courses (e.g. the study of individual subjects) organised into programmes or free-standing courses. They can also include a variety of components not normally characterised as courses, for example periods of work experience in enterprises, research projects and the preparation of dissertations. Objectives could include preparation for more advanced study, the achievement of a

qualification, preparation for an occupation or range of occupations, or simply an increase in knowledge and understanding.

An educational programme could be the study of a single subject leading to a recognised qualification or it can be the study of a collection of subjects, along with perhaps a period of work experience, all of which contribute towards the same qualification aim.

5.2.2. Classification of educational programmes by level

Table 5.1 summarises the levels to which programmes are assigned within ISCED 2011 and ISCED-97.

Table 5.1. ISCED 2011 and ISCED-97 levels compared

ISCED 2011		ISCED-97	
01	Early childhood educational development	0	Pre-primary education
02	Pre-primary education		
1	Primary education	1	Primary education or first stage of basic education
2	Lower secondary education	2	Lower secondary education or second stage of basic education
3	Upper secondary education	3	(Upper) secondary education
4	Post-secondary non-tertiary education	4	Post-secondary non-tertiary education
5	Short-cycle tertiary education	5	First stage of tertiary education not leading directly to an advanced research qualification (5A, 5B)
6	Bachelor's or equivalent level		
7	Master's or equivalent level		
8	Doctoral or equivalent level	6	Second stage of tertiary education leading to an advanced research qualification

Levels of education are an ordered set grouping education programmes together in relation to gradations of learning experiences, as well as the knowledge, skills and competencies which each programme is designed to impart. The ISCED level reflects the degree of complexity and specialisation of the content of an education programme, from foundational to complex.

From ISCED 2011, **early childhood education** (ISCED level 0) provides learning and educational activities with a holistic approach to support children's early cognitive, physical, social and emotional development and to introduce young children to organised instruction outside of the family context. It aims to develop some of the skills needed for academic readiness and to prepare them for entry into primary education.

Primary education (ISCED level 1) provides learning and educational activities typically designed to provide students with fundamental skills in reading, writing and mathematics (i.e. literacy and numeracy) and establish a solid foundation for learning and understanding core areas of knowledge and personal development, preparing for lower secondary education. It focuses on learning at a basic level of complexity with little, if any, specialisation.

Lower secondary education (ISCED level 2) is typically designed to build on the learning outcomes from ISCED level 1. Usually, the educational aim is to lay the foundation for lifelong learning and human development upon which education systems may then expand further educational opportunities. Programmes at this level are usually organised around a more subject-oriented curriculum, introducing theoretical concepts across a broad range of subjects.

Upper secondary education (ISCED level 3) is typically designed to complete secondary education in preparation for tertiary education, to provide skills relevant to employment, or both. Programmes at this level offer students more varied, specialised and in-depth instruction than in lower secondary education. They are more differentiated, with an increased range of options and streams available.

Post-secondary non-tertiary education (ISCED level 4) provides learning experiences building on secondary education, preparing for labour-market entry as well as tertiary education. It typically targets students who have completed upper secondary education (ISCED level 3), but who want to increase their opportunities to enter the labour market or progress to tertiary education. Programmes are often not significantly more advanced than those at upper secondary education as they typically serve to broaden – rather than deepen – knowledge, skills and competencies. They therefore aim at learning below the high level of complexity characteristic of tertiary education.

Tertiary education (ISCED levels 5 to 8) builds on secondary education, providing learning activities in specialised fields of education. It aims at learning at a high level of complexity and specialisation. Tertiary education includes what is commonly understood as academic education but also includes advanced vocational or professional education.

The level of an educational programme should be determined by its educational content. It is very difficult, however, to directly assess and compare the content of the educational programmes in a way that is internationally comparative. Curricula are too diverse, multi-faceted and complex to allow for clear judgements that one curriculum for students of given age or grade belongs to a higher level of education than another. Therefore, ISCED 2011 defines criteria which describe the characteristics of a programme used to allocate national programmes to ISCED levels (UIS, 2012).

Categories of education programmes and qualifications

ISCED 2011 categorises education programmes and qualifications according to the outcomes and destinations to which successful completion of the programme (or the resulting qualification) can lead. It is necessary to distinguish between the successful completion of an education programme and the completion of an ISCED level. At most ISCED levels, ISCED 2011 distinguishes between programmes which are sufficient for level completion and those which are not.

Successful completion of an education programme is the achievement of the learning objectives of the programme typically validated through the assessment of acquired knowledge, skills and competencies. Successful completion of a programme is usually documented by the award of an educational qualification.

Completion of an ISCED level is the successful completion of an education programme sufficient for level completion:

- At ISCED levels 1 and 4-8, the successful completion of a programme meeting the content and minimum duration criteria for the given level is considered as level completion.
- At ISCED levels 2 and 3 the successful completion of any programme granting access to programmes at higher ISCED levels (i.e. ISCED level 3 in the case of ISCED level 2 programmes and ISCED level 5, 6 or 7 in the case of ISCED level 3 programmes) is counted as level completion, as is the completion of any terminal programme meeting the content, minimum duration (2 years) and

cumulative duration criteria for the respective ISCED level (i.e. 8 years since the start of ISCED level 1 in the case of ISCED level 2 programmes and 11 years in the case of ISCED level 3 programmes).

Every programme can, in theory, be successfully completed even if it does not lead to any formal qualifications but not all programmes are sufficient for completion of the ISCED level. This can occur where there is a sequence of short programmes within an ISCED level or where there are programmes which are substantially shorter than the typical duration of the given level.

The duration of the programme is one of the main criteria for completion of an ISCED level: programmes representing the normal duration of the ISCED level (see Table 5.2) will usually be sufficient for completion of the ISCED level.

Table 5.2. Typical duration of ISCED 2011 levels

ISCED 2011 levels - Typical duration [most common duration]	
01 02	No duration criteria. However, a programme should account for at least the equivalent of 2 hours per day and 100 days a year of educational activities in order to be included
1	4-8 years [most common: 6 years]
2	2-6 years [most common: 3 years]
3	2-5 years [most common: 3 years]
4	6 months to 2 or 3 years
5	2-3 years
6	3-4 years when directly following ISCED level 3 1-2 years when following another ISCED level 6 programme
7	1-4 years when following ISCED level 6 5-7 years when directly following ISCED level 3
8	Minimum 3 years

At ISCED levels 2 and 3, ISCED 2011 provides for a third category of completion: programmes sufficient for partial level completion. In order to be classified as sufficient for partial level completion at ISCED levels 2 or 3, programmes need to represent:

- at least 2 years of study within the ISCED level
- at least the cumulative durations as described in Table 5.3

Table 5.3. Typical cumulative duration of primary and secondary education

ISCED 2011 levels - Typical cumulative duration in primary and secondary education	
1	4-8 years [most common: 6 years]
1+2	8-11 years [most common: 9 years]
1+2+3	11-13 years [most common: 12 years]

ISCED 2011 further categorises programmes which are sufficient for completion of ISCED levels 2-4 into those which give direct access to higher ISCED levels and those which do not. At ISCED level 3, a “higher ISCED level” means ISCED levels 5, 6 or 7. ISCED level 3 programmes which only give access to ISCED level 4 are classified as sufficient for level completion without access to higher ISCED levels.

Education programmes and corresponding qualifications can thus be classified into four categories:

- Insufficient for level completion (with no access to higher ISCED levels).
- Partial level completion (with no access to higher ISCED levels). This category applies only at ISCED levels 2 and 3.
- Level completion without access to higher ISCED levels.
- Level completion with access to higher ISCED levels (UIS, 2012[3]).

Orientation of education programmes

In ISCED 2011, the two categories of orientation of programmes at ISCED levels 2-5 are general and vocational. ISCED 2011 does not define academic and professional more precisely, but opens up the possibility of using any national definitions that exist.

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.

Vocational education programmes are designed for learners to acquire the knowledge, skills and competencies specific to a particular occupation, trade or class of occupations or trades. Such programmes may have work-based components (for example apprenticeships or dual-system education programmes). 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.

Both general and vocational programmes can contain some courses or subjects that are common to both programmes. For example, a vocational programme may contain courses on mathematics or the national language which are also taught to students in general programmes. When reporting data on certain statistical units, in particular education personnel, by programme orientation it is the classification of the programme that determines the orientation and not the subject being studied or taught (UIS, 2012[3]).

Field of education of programmes

Fields of education and training are defined as the subject matter taught in an education programme.

Programmes are classified into fields of education as defined in UNESCO's *ISCED Fields of Education and Training 2013* (UNESCO-UIS, 2014[4]).

The same classification by field of education is used for all levels of education. The fields of education are not defined within levels, but are independent of levels. It is recognised, however, that not all fields appear at all levels.

In summary, the classification distinguishes the following fields:

00 Generic programmes and qualifications

- 001 Basic programmes and qualifications
- 002 Literacy and numeracy
- 003 Personal skills and development

01 Education

- 011 Education

02 Arts and humanities

- 021 Arts
- 022 Humanities (except languages)
- 023 Languages

03 Social sciences, journalism and information

- 031 Social and behavioural sciences
- 032 Journalism and information

04 Business, administration and law

- 041 Business and administration
- 042 Law

05 Natural sciences, mathematics and statistics

- 051 Biological and related sciences
- 052 Environment
- 053 Physical sciences
- 054 Mathematics and statistics

06 Information and communication technologies

- 061 Information and communication technologies

07 Engineering, manufacturing and construction

- 071 Engineering and engineering trades
- 072 Manufacturing and processing
- 073 Architecture and construction

08 Agriculture, forestry, fisheries and veterinary

- 081 Agriculture
- 082 Forestry
- 083 Fisheries
- 084 Veterinary

09 Health and welfare

- 091 Health
- 092 Welfare

10 Services

101 Personal services

102 Hygiene and occupational health services

103 Security services

104 Transport services

5.3. Detailed description of ISCED levels and application of the classification criteria

There are several main and auxiliary criteria that act as proxy measures for educational content, which can help decide how to classify the level of any given educational programme. Table 5.4 outlines the criteria for each ISCED 2011.

Table 5.4. Criteria for classifying educational programmes

ISCED level	Main criteria	Subsidiary criteria	Complementary dimensions
Level 0 Early childhood education	• educational properties of the programme • institutional context • typical target age of children for whom the programme is designed • programme intensity or duration	• staff qualifications • existence of a regulatory framework • typically not part of compulsory education	• One dimension differentiates education programmes at ISCED level 0: target age group
Level 1 Primary education	• systematic instruction in fundamental knowledge, skills and competencies • typical entrance age and duration • instruction organised typically by one main class teacher	• part of compulsory education	None
Level 2 Lower secondary education	• transition to more subject-oriented instruction • entry requirements • cumulative duration since the beginning of ISCED level 1	• typical entry age • instruction by subject teachers and qualifications of teachers • part of compulsory education	**Two dimensions differentiate education programmes at ISCED level 2:** • Two orientation categories: general and vocational. • Four level completion and access sub-categories: 1) no completion of ISCED level 2 (and thus without direct access to ISCED 3); 2) partial completion of ISCED level 2 without direct access to ISCED 3; 3) completion of ISCED level 2 without direct access to ISCED 3; and 4) completion of ISCED level 2 with direct access to ISCED 3.
Level 3 Upper secondary education	• second/final stage of general and vocational secondary education • entry requirements • cumulative duration since the beginning of ISCED level 1	• more differentiated programmes, with an increased range of options and streams • teachers' qualifications	**Two dimensions differentiate education programmes at ISCED level 3:** • Two orientation categories: general and vocational. • Four level completion and access sub-categories: 1) no completion of ISCED level 3 (and thus without direct access to first tertiary programmes at ISCED level 5, 6 or 7); 2) partial completion of ISCED level 3 without direct access to first tertiary programmes at ISCED level 5, 6 or 7; 3) completion of ISCED level 3 without direct access to first tertiary programmes at ISCED level 5, 6 or 7; and 4) completion of ISCED level 3 with direct access to first tertiary programmes at ISCED level 5, 6 or 7.

ISCED level	Main criteria	Subsidiary criteria	Complementary dimensions
Level 4 Post-secondary non-tertiary education	• orientation • complexity of content higher than ISCED level 3 and below the level of tertiary education • entry requirements	none	**Two dimensions differentiate education programmes at ISCED level 4:** • Two orientation categories: general and vocational. • Three level completion and access sub-categories: 1) no completion of ISCED level 4; 2) completion of ISCED level 4 without direct access to first tertiary programmes at ISCED level 5, 6 or 7; and 3) completion of ISCED level 4 with direct access to first tertiary programmes at ISCED level 5, 6 or 7.
Level5 Short-cycle tertiary education	• content of short-cycle tertiary education programmes • entry requirements • minimum duration of level	• institutional transition point • typical duration of level	**Two dimensions differentiate education programmes at ISCED level 5:** • Two orientation categories: general and vocational. • Two level completion and access sub-categories: 1) no completion of ISCED level 5, if the stage (or programme) is less than two years' duration and therefore insufficient for completion of the level; and 2) completion of ISCED level 5 if the programme has a duration of two or more years and is therefore sufficient for completion of the level.
Level 6 Bachelor's or equivalent level	• theoretically and/or professionally based content • entry requirements • minimum cumulative duration of (first-degree) programme • position in the national degree and qualification structure	• staff qualifications	**Two dimensions differentiate education programmes at ISCED level 6:** • Two orientation categories: academic and professional. • Four level completion and access sub-categories: 1) stage (or programme) within a first degree at bachelor's or equivalent level with a cumulative theoretical duration (at tertiary level) of less than three years, therefore insufficient for completion of the level; 2) first-degree programme at bachelor's or equivalent level with a cumulative theoretical duration (at tertiary level) of three to four years; 3) long first-degree programme at bachelor's or equivalent level with a cumulative theoretical duration (at tertiary level) of more than four years; and 4) second or further degree programme at bachelor's or equivalent level (following successful completion of a bachelor's or equivalent programme).
Level 7 Master's or equivalent level	• theoretically and/or professionally based content • position in the national degree and qualification structure • entry requirements	• minimum cumulative duration of long first-degree programme • direct access to ISCED level 8 programmes	**Two dimensions differentiate education programmes at ISCED level 7:** • Two orientation categories: academic and professional. • Four level completion and access sub-categories: 1) stage (or programme) within a first degree at master's or equivalent level with a cumulative theoretical duration (at tertiary level) of less than five years, therefore insufficient for completion of the level; 2) long first-degree programme at a master's or equivalent level with a cumulative theoretical duration (at tertiary level) of at least five years (that does not require prior tertiary education); 3) second or further degree programme at master's or equivalent level (following successful completion of a bachelor's or equivalent programme); and 4) second or further degree programme at master's or equivalent level (following successful completion of another master's or equivalent programme).
Level 8 Doctoral or equivalent level	• written work requirements • entry requirements • minimum duration of level	• doctoral degree/ qualification required for specific occupations	**One dimension differentiate education programmes at ISCED level 8:** • Two orientation categories: academic and professional.

Source: (UIS, 2012[3]).

5.4. Country ISCED mappings

From the initial implementation of ISCED, it has been crucial to accurately document how the ISCED classification maps onto national educational programmes.

Since the public release of the new ISCED classification, OECD member countries have invested great efforts into establishing new mappings of their national educational programmes to ISCED 2011. Making the mapping of countries transparent to data providers and users of educational data is one of the most important steps in implementing ISCED 2011. As educational systems and their programmes are not static, it is crucial that ISCED remain a flexible tool for classifying programmes. It is crucial that changes in educational systems are mirrored in the ISCED mapping of countries, and, equally important, that those changes remain transparent to other countries. The ISCED mappings are therefore kept up-to-date every year via a questionnaire as part of the regular UOE data collection.

The link to the latest version of the country mappings at the time of publication is contained in Annex 2.

References

OECD/Eurostat/UNESCO Institute for Statistics (2015), *ISCED 2011 Operational Manual: Guidelines for Classifying National Education Programmes and Related Qualifications*, OECD Publishing, Paris, http://dx.doi.org/10.1787/9789264228368-en. [2]

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Chapter 6. Data quality

This chapter examines issues surrounding the quality of the OECD's international education data. It begins with a declaration on the OECD commitment to data quality and the quality framework used to collect, compile and disseminate education data. It then discusses the type of data-quality problems that arise and why, together with a description of what the OECD does to assess and address them. It then makes some suggestions about making estimates for missing data and concludes with an account of the main data-quality issues that remain to be tackled in the area of international education data.

6.1. OECD dimensions of data quality

Data quality is fundamental to the credibility of the statistics produced by the OECD in general and by the OECD Directorate of Education and Skills in particular. The OECD collection of education statistics adheres to the core values stated in the OECD's *Quality Framework and Guidelines for OECD Statistical Activities* (OECD, 2011[1]).

The OECD's education statistics are compiled and made available on an impartial basis. They are produced according to strictly professional considerations, including scientific principles and professional ethics, with regard to methods and procedures used for the collection, processing, storage and dissemination of statistical data.

Quality is defined as "fitness for use" for users' needs. This definition is broader than has been customary in the past, when quality was equated with accuracy. It is now generally recognised that there are other important dimensions. Even if data are accurate, they cannot be said to be of good quality if they are produced too late to be useful, or cannot be easily accessed, or appear to conflict with other data. Thus, quality can be seen as a multi-faceted concept. Which quality characteristics are most important depend on users' perspectives, needs and priorities, which vary across groups of users.

The OECD views quality in terms of seven dimensions: relevance, accuracy, credibility, timeliness, accessibility, interpretability and coherence. Last but not least, cost-efficiency is an important factor although not strictly speaking, a quality dimension. Cost-efficiency must be considered in the possible application of any one or more of these seven dimensions.

The OECD *Quality Framework* is therefore built around eight considerations:

- **Relevance**: measuring relevance requires the identification of user groups and their needs.
- **Accuracy** is the degree to which the data correctly estimate or describe the quantities or characteristics that they are designed to measure.
- **Credibility** is the confidence that users place in data products based simply on their image of the data producer, i.e. the brand image. Credibility is determined in part by the integrity of the production process. Principle 2 of the UN *Principles of*

Official Statistics (United Nations, 1994) states: "to retain trust in official statistics, the statistical agencies need to decide according to strictly professional considerations, including scientific principles and professional ethics, on the methods and procedures for the collection, processing, storage and presentation of statistical data".

- **Timeliness** reflects the length of time between data becoming available and the events or phenomena they describe. The notion of timeliness is assessed on the time period that permits the information to be of value and still acted upon.
- **Accessibility** reflects how readily data products can be located and accessed from within OECD data holdings.
- **Interpretability** reflects the ease with which users may understand and properly use and analyse the data. The adequacy of the definitions of concepts, target populations, variables and terminology underlying the data, and information describing the limitations of the data, if any, largely determines the degree of interpretability.
- **Coherence** reflects the degree to which the data are logically connected and mutually consistent.
  - **Coherence within a dataset** implies that the elementary data items are based on compatible concepts, definitions and classifications and can be meaningfully combined. Incoherence within a dataset occurs, for example, when two sides of an implied balancing statement, such as inflows and outflows, do not balance.
  - **Coherence across datasets** implies that the data are based on common concepts, definitions and classifications, or that any differences are explained and can be allowed for.
  - **Coherence over time** implies that the data are based on common concepts, definitions and methodology over time, or that any differences are explained and can be allowed for. Incoherence over time refers to breaks in a series resulting from changes in concepts, definitions or methodologies.
  - **Coherence across countries** implies that the data are based on common concepts, definitions, classifications and methodology, or that any differences are explained and can be allowed for.
- **Cost-efficiency** measures the costs and provider burden relative to the output. Provider burden is a cost that happens to be borne by the provider, but is a cost nevertheless. Although the OECD does not regard cost-efficiency as a dimension of quality, it is a factor that must be taken into account in any analysis of quality as it can affect quality in all dimensions.

6.2. Types (or causes) of data-quality issues

As with any data collected by the OECD, the quality of education statistics and indicators disseminated depends on two aspects: the quality of the national statistics received and the quality of the internal processes for the collection, processing, analysis and dissemination of data and metadata. While the latter is within OECD's control, the former is less so.

The quality of national statistics received will essentially be a function of:

- the adequacy of national data sources to provide the required international data
- the extent to which international data definitions and guidelines are correctly applied
- internal capacity within countries to implement OECD guidelines and develop appropriate data collection systems
- the quality and reliability of data transfer channels between national statistics offices and the OECD.

Within the field of education, a number of factors may mean national data sources are inadequate to provide the required data at the international level.

- **The coverage of national sources** – either individually or collectively – may not match the intended coverage of education as defined in Chapter 3. This can result either in gaps in the reported data or over-reporting through the inclusion of educational programmes that are not in scope of the data collection. This can also happen where there is ambiguity surrounding the validity for inclusion of some programmes, such as some continuing education programmes. As countries will typically use a number of national data sources to compile their international data returns, inconsistent coverage between them can cause problems of internal consistency and perhaps double counting of data reported by an individual country. This may occur between student data at different ISCED levels or between enrolment and finance data.
- Similarly, **the point in time when the data are collected** (the reference period) and the date on which the count of students is taken (the reference year for statistics), may differ from the international requirements. Data may simply not yet be available for the intended reference periods of the data collections, either because the national data-processing timetable does not fit well with the international data collection or perhaps because national data collections do not occur every year.
- **National data item definitions** (e.g. of teachers, graduates and programmes) and **their classifications** (e.g. programme level or type of educational personnel) may be different from international guidelines.

Difficulties adhering to international guidelines can arise when national data cannot readily be translated into the international definitions, but they can also arise from weaknesses in the guidance itself. This may be due to the lack of an internationally agreed definition for a data item or a lack of clarity in its description (United Nations, 2014[2]).

In addition to these challenges, ensuring education statistics are comparable over time is often a challenge. There are three possible reasons for significant changes in the data from one year to another:

- **Changes in the educational system**. This refers to "real" changes in the data due to changing conditions of the educational system, such as the implementation of reforms that lead to, for instance, an increase in the stock of students.
- **Changes in the coverage of the data collection**. This refers to changes introduced due to the exclusion or inclusion of programmes compared to the

previous year, for example the inclusion of adult literacy programmes or private schools.

- **Changes in the methodology used**. This refers to significant changes in the data due to new/modified methodologies in collecting or estimating data.

6.3. Tackling data-quality issues

Both the OECD and member countries have committed considerable efforts to assuring and improving the quality of education data. On the one hand this involves a rigorous data collection and verification process and on the other hand, a commitment to continuously address areas of weakness in data quality.

The OECD's main actions to improve data quality are:

- Meeting with countries to provide advice and guidance on detailed data definitions and data reporting. This guidance advises the data providers about the checks that will be carried out and the treatment of missing values.
- Using electronic data collection instruments (electronic questionnaires) which include aggregations of sub-classifications in areas where it is known to be difficult for countries to provide the required data, for example the disaggregation of some ISCED levels. Those instruments allow checks to be readily available. It also helps with coherence across the different questionnaires. For instance, student enrolment data are collected on different bases to match the coverage of the finance and the personnel data.
- Using codes in data tables to inform users of missing data or data of lower quality:
    - category not applicable (a)
    - data included in other categories (x, xr…, xc…, xa… indicating the row (r) and column (c) in which the data are included)
    - includes data from another category (d)
    - data not available (m)
    - too few observations to provide reliable estimates (c)
    - values are below a certain reliability threshold and should be interpreted with caution (r)
- Asking countries to provide metadata along with their data which outline the concepts, definitions and methods used in collection, compilation, transformation, revision practices and dissemination of statistics. For education statistics, an important element of metadata is the mapping of countries' national educational programmes to the ISCED levels and the description of these programmes. Other metadata collected include:
    - reference periods (start and end of school years) for each level of education
    - data collection periods (e.g. snapshot or whole year counts within the reference periods)
    - reference data for student ages

  - theoretical starting, ending and graduation rates
  - data sources and methods used
  - documentation on breaks in time series.

- Including automated verification in the electronic questionnaire spreadsheets sent to countries to fill in. The data providers can then run a check routine which identifies data cells with missing values and verifies the internal consistency of the data both within and between tables. Countries are asked to explain any verification errors remaining in their questionnaire submission.
- Subjecting the submitted questionnaires to rigorous scrutiny from the OECD Secretariat, particularly checking year-on-year consistency of the data, and raising queries with countries as required. These may lead to countries resubmitting data.
- Informing countries on how their data have been used in the calculation of the indicators that will subsequently appear in the publication *Education at a Glance* through preliminary tables shared with countries. Countries' knowledge of the use to which the data will be put is an important element in achieving good data quality.

Beyond the data collection process, the OECD makes a continual effort to assess and to improve the data quality, mainly conducted through the agendas of the INES Working Party and INES Network meetings. Special studies are conducted in areas where comparability problems have been identified. This specific approach allows the OECD to clarify countries' current data reporting approaches and use this to refine the data reporting guidance it provides to countries and to enrich the metadata. Such studies have been carried out in the areas of educational finance and enrolment.

In addition, the OECD runs trend data collections every year to re-collect data for past years on a consistent (similar) basis approach, in order to have comparable data over time and ensure that any adjustments to previous data have been taken into account in the most current data collection (UNESCO-UIS/OECD/EUROSTAT, 2016[3]).

6.4. Suggestions for the estimation of missing data

National data sources are rarely adequate to provide all of the data requested at the international level and missing codes frequently have to be used. This section provides some suggestions on techniques that can be used to derive estimates for some of these missing values. In each case they are, merely suggestions; the data providers are best placed to judge how reasonable the estimation techniques are in their own countries' data.

There are broadly five situations in which missing values might arise:

- **Data not collected for a variable**. In this case, it may be possible to create an estimate based on assumed relationships to other variables. For example, if students' age distribution is not available but the grade distribution is, it may be a reasonable assumption that all students in the same grade are the same age. Alternatively, there may be information about the relationship between age and grade from another source (such as a research study or ad hoc survey) which can help with estimating the missing variable.
- **Data not available for the desired level of aggregation**. A common example here would be where data only provide partial national coverage, e.g. are

available for some regions but not all. Here a feasible approach may be to scale up the subnational figures to national level using a scaling factor derived from a different, but related dataset. For example, partial student enrolment numbers could be scaled up on the basis of student data from labour force surveys or from the results of an ad hoc survey.

- **Data only available for certain sub-populations**. This case is similar to the previous situation and the same potential solution could be applied. For example, where certain data may be available for public schools and government-dependent private schools but not for independent private schools, they could be scaled up as described above.
- **Data not available for the desired level of disaggregation**. For example, expenditure data may not be available for each level of education separately but can be apportioned to the corresponding levels based on student enrolments in the respective levels. Alternatively, expenditure could be apportioned based on the relative student-teacher ratios between the levels, or staff numbers. Similarly, teacher numbers or teaching hours could be used to distribute teachers' salaries between ISCED levels. A related situation is where most national data can be allocated to the international classification but there are a number of cases that cannot and would otherwise be recorded as "not known". Here, the "not knowns" could be allocated to the target classification on a pro-rated basis.
- **Data not available for the year of the data collection**. In this case it may be possible to estimate the data on the basis of data from previous years. For some finance data, applying inflation rates to a previous year's data may be appropriate as long as that is seen as a reasonable estimate of the expenditure that will actually have occurred. Budgeted rather than actual expenditure figures may also provide a reasonable basis for estimating current year expenditure. For student enrolment data, current year estimates could be derived by applying estimates of transition rates between levels or grades, preferably based on historical trends.

In all cases, when choosing a technique to estimate missing data, thought needs to be given to the use to which the data will be put, particularly in indicator calculations. For example, using student numbers as a basis for estimating missing expenditure data would be inappropriate if the estimated expenditure data were then to be used to calculate expenditure per student.

6.5. Remaining areas for data-quality improvement

Although much progress has been made in improving the comparability of international education statistics and indicators, much has still to be done. Comparability could still be improved in the following major areas:

6.5.1. Coverage of educational programmes

Although non-formal education is a recognised part of the international classification of education, as defined in Chapter 3, international data collections are likely to restrict their coverage of educational statistics to formal programmes for the sake of international comparability and feasibility.

The heterogeneity of non-formal education programmes means that it is difficult to provide general guidelines for their application in statistical instruments, given the

purpose of international comparability. Currently, the OECD recommends using the criteria of equivalency of content for the classification of non-formal education programmes, which relate non-formal programmes to formal programmes with similar content within ISCED. However, at this stage, ISCED 2011 does not give specific advice on the development of mappings for non-formal programmes or any related non-formal educational qualifications.

6.5.2. Classification of programmes by level

According to the ISCED manual, the notion of "levels" of education is represented by an ordered set, grouping education programmes in relation to gradations of learning experiences, as well as the knowledge, skills and competencies which each programme is designed to impart. The "level" reflects the degree of complexity and specialisation of the content of an education programme, from foundational to complex. However, curricula are too diverse, multi-faceted and complex to directly assess and compare the content of programmes across education systems in a consistent way. In the absence of direct measures to classify educational content, ISCED employs proxy criteria. These proxies only provide a pragmatic answer and efforts need to continue to arrive at a more comparable allocation of programmes to levels.

6.5.3. Full-time and part-time student status and conversion to full-time equivalents

The reporting of these data to common international data definitions is one of the areas that is most constrained by what is collected nationally. As noted in Chapter 4 (Section 4.1.9), up to the end of secondary level, the method used to distinguish between full-time and part-time students is more likely to depend on student attendance or time in the classroom. At tertiary level, study load is more likely to be measured in terms of instructional hours and credit accumulation, but this may not be consistent across countries. Moreover, some countries distinguish between full- and part-time on the basis of the characteristics of the programme rather than of the time students spend studying. For instance, in the particular case of combined school and work-base programmes, students participating in these dual-system apprenticeship programmes are classified as full-time students even though the school-based component comprises only part of the programme.

In addition, the factors used for converting these student numbers to full-time equivalents will not necessarily be derived on the same basis. Some will be based on classroom attendance, some on study time commitment and some on credit accumulation, and this is likely to lead to some distortion in international comparisons. The indicators affected will be those on ratios of students to staff and expenditures per student.

6.5.4. Successful completion/graduation

The recent revision of the ISCED classification helped to clarify international definitions of graduation. When a qualification obtained does not provide direct access to a higher ISCED level, successful completion of programmes may be considered as level completion (without access) or no level completion. If such a programme meets the right criteria, completion could be partial (more details in Chapter 4, Section 4.1.4). The inherent difficulty lies in being unable to measure the quality or value of a graduation across (and within) countries. This would require an international standard or benchmark which is not available at present.

6.5.5. Ancillary services expenditure

While it is clear that expenditure on ancillary services within educational institutions should be included in the reported data (see Chapter 4, Section 4.5.3), the extent to which they are varies from country to country. Where countries do report such expenditure, it remains difficult for many of them to report it separately from expenditure on educational core services, particularly at the tertiary level. This could lead to distortions in the expenditure indicators and prevents these indicators – particularly expenditure per student – from being calculated on a more logical basis using core services expenditures only.

6.5.6. Financial aid to students

Generally, there is a need to seek fairer and more complete measures of the financial aid provided to students. Two issues in particular have not yet been adequately addressed: first, the reporting of student loans and second the tax benefits and allowances paid to students and their families which are contingent on the beneficiary being a student (see Chapter 4, Section 4.5.4). Student loans are currently measured on a gross basis, without subtracting repayments. While this is acceptable as a measure of the financing of students in the current year it does not adequately measure the generosity of the aid package available to students and nor does it fairly reflect the share of cost between the public and private sectors. Tax benefits to students and their families are excluded from the expenditures on education as there is no internationally agreed methodology for measuring and reporting them, and yet these are legitimate means of providing support to students and their families. Excluding such expenditure therefore undermines comparisons of financial aid to students and of public subsidies to households generally.

6.5.7. Student mobility

Mobility measurement in education has gained importance in the last years, which translated to an effort to better define what exactly is covered (Chapter 3, Section 3.3.5). Henceforth, efforts are needed to capture better data to improve the comparability of the foreign student data and differentiate foreign from international students.

References

OECD (2011), *Quality Framework for OECD Statistical Activities*, http://www.oecd.org/sdd/qualityframeworkforoecdstatisticalactivities.htm (accessed on 26 July 2018). [1]

UNESCO-UIS/OECD/EUROSTAT (2016), *UOE data collection on formal education Manual on concepts, definitions and classifications*, http://uis.unesco.org/sites/default/files/documents/uoe2016manual_11072016_0.pdf (accessed on 26 July 2018). [3]

United Nations (2014), *Fundamental Principles of Official Statistics*, https://unstats.un.org/unsd/dnss/gp/fundprinciples.aspx (accessed on 26 July 2018). [2]

Chapter 7. Indicator concepts and methodologies

This chapter aims to explain the concepts, methodologies and conventions used to calculate the educational statistics and indicators and the related measurement issues. The methodologies presented in this chapter are grouped according to their measurement objectives: general/international averages, graduation analysis, educational attainment analysis, labour force participation analysis, economic and social benefits of education, expenditure analysis, participation and access to education, continuing education and training analysis, learning environment and teacher working conditions analysis, education and work status of young people, equity in education.

This chapter aims to explain the concepts, methodologies and conventions used to calculate the educational statistics and indicators and the related measurement issues. It does not seek to describe in detail every indicator that appears or has appeared in *Education at a Glance* (OECD, 2018[1]). Instead it focuses on the core indicators or groups of indicators which appear regularly in EAG with conceptual or methodological aspects which are worthy of explanation. It can be considered as a catalogue of indicator methodologies rather than a catalogue of indicators.

The methodologies presented in this chapter are grouped according to their measurement objectives:

- general/international averages
- graduation analysis
- educational attainment analysis
- labour force participation analysis
- economic and social benefits of education
- expenditure analysis
- participation and access to education
- continuing education and training analysis
- learning environment and teacher working conditions analysis
- education and work status of young people
- equity in education.

Apart from Section 7.1, each section starts with discussing the policy context, explaining the relevance of each objective in the debate on education. This is followed by an explanation of the calculation methodology used. Finally, each section closes with a description of the limitations of the proposed methodology and any additional paths that could be explored to broaden the analysis.

7.1. General/international averages

To enable comparisons across countries or group of countries, the EAG often calculates averages for OECD countries, OECD partner countries and countries belonging to the European Union.

The **OECD average** is calculated as the unweighted mean of the data values of all OECD countries for which data are available or can be estimated. The OECD average refers to an average of national values and can be used to answer the question of how an indicator value for a given country compares with the value for a "typical" or average country. The OECD average therefore does not take into account the size of the population in each country, with each country contributing equally from Luxembourg to the United States.

The **OECD total** is calculated as if it is a weighted mean of the data values of all OECD countries for which data are available or can be estimated. It reflects the value for a given indicator when considering the OECD area as a whole. This approach is taken for the purpose of comparing, for example, expenditure charts for individual countries with those

of the entire OECD area for which valid data are available, with this area considered as a single entity.

The OECD average includes current OECD members (a list of which can be found at www.oecd.org/about/membersandpartners/). The coverage of the OECD average will thus vary as OECD membership changes.

For instance, *Education at a Glance* 2018 covers 36 OECD members: Australia, Austria, Belgium, Canada, Chile, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Israel, Italy, Japan, Korea, Latvia, Lithuania, Luxembourg, Mexico, the Netherlands, New Zealand, Norway, Poland, Portugal, the Slovak Republic, Slovenia, Spain, Sweden, Switzerland, Turkey, the United Kingdom and the United States.

Beyond the OECD average and total, most indicators provide averages and totals for the European Union (EU), partner countries and/or the G20. The countries covered by these will also vary also from one edition to another. The members of the EU or G20 should correspond to the membership as it was in the year to which the data relate and not the membership at the time of reporting the data. If the membership changed during the reference period, the data collection should stipulate whether the membership used was that at the start or the end of the reference period. For more information on the countries included, please refer to the Reader's Guide at the beginning of the EAG publication.

Note that both the average and the total can be significantly affected by missing data. No statistical methods are used to compensate for this.

7.2. Graduation analysis

Two measures are commonly used to analyse graduation: graduation rates and successful completion rates. These two terms are commonly confused. Concretely put:

graduation rate ≠ successful completion rate

$$\sum \frac{Graduates}{Population} \neq \sum \frac{Graduates}{NewEntrants}$$

The **graduation rate** measures the production of graduates from a certain level of education, relative to the country's population. The **successful completion rate** measures the ratio of graduates to new entrants into the same level of education. The following sections describe how to calculate each indicator in greater detail.

7.2.1. Graduation rate

Policy context

Graduation rates are a measure of the production of educational institutions and of the system in general. They record the flow of graduates who can potentially enter the labour market or further study. *Education at a Glance* typically provides graduation rates for upper secondary, post-secondary non-tertiary and tertiary levels of education.

Graduation rates represent the estimated percentage of an age cohort who are expected to graduate over their lifetime, and therefore indicate the extent to which education systems are succeeding in preparing students to meet the labour-market's minimum requirements or to access tertiary education. Not all graduates will pursue a tertiary degree or enter the

labour force immediately, however – see Section 7.10 on young people neither in employment, nor in education and training (NEETS).

Graduation rates do not capture the quality of education outcomes but may provide a picture of students' disengagement leading to them dropping out of the education system, meaning that they leave school without a qualification.

Calculation

The calculation of graduation rates is based on the age-specific distribution of graduates (see Chapter 4, Section 4.1.5) in a specific year. Graduation rates can be net or gross.

Net graduation rates represent the expected probability of individuals graduating from upper secondary or tertiary education over their lifetime if current patterns are maintained. The calculation uses the sum of the age-specific graduation rates and cross-section data of the current cohort of graduates by ages.

Net graduation rates:

$$\sum_{Age} \frac{Graduates_{EducLevel,Age}}{Population_{Age}} \text{ x } 100$$

Where $Graduates_{EducLevel,Age}$ is the number of graduates at a specific International Standard Classification of Education (ISCED 2011) level at a specific age and $Population_{Age}$ is the size of the population of that specific age.

As an example, for a given country and year, the number of graduates from an education level is broken down into age groups. The number of 15-year-old graduates is divided by the total number of 15-year-olds in the country; the number of 16-year-old graduates is divided by the total number of 16-year-olds in the country, etc. The total graduation rate is then calculated as the sum of the age-specific graduation rates.

Note that graduate data are only available broken down into single years between the ages of 11 to 49 years. For adults aged 50 to 64, graduation rates are estimated on the basis of 5-year age bands, and for those aged 65 and over, graduation rates are based on the cohort size for 65 year-olds and over (UNESCO-UIS / OECD / EUROSTAT, 2017[2]).

Gross graduation rates measure the total number of graduates from the specified level of education regardless of their age, divided by the population at the typical age of graduation for that level. The typical age of graduation is the age that covers more than 50% of those graduating at each level of education.

Gross graduation rates:

$$\sum \frac{Graduates_{EducLevel}}{Population_{TypicalAge}} \text{ x } 100$$

Where $Graduates_{EducLevel}$ is the total number of graduates in the reference year at a specific ISCED level and $Population_{TypicalAge}$ is the number of people at the typical age of graduation.

In Education at a Glance, net graduation rates are always preferred to gross graduation rates where data are available. They are calculated for upper secondary, post-secondary non-tertiary, short-cycle tertiary, bachelor's or equivalent, master's or equivalent and doctoral level education.

First-time graduation rates may also be used in addition to graduation rates. This calculation is based on the number of first-time graduates (defined in Chapter 4, Section 4.1.5) in a given year. It has the advantage of eliminating double counting of graduates over time within the same level, which can otherwise lead to overestimating graduation rates.

Limitations and further considerations

- The interpretation of the graduation rate indicator is complex. It is not a measure of the proportion of graduates in a country at a specific time but a measure of the probability of someone in the country graduating in the long term, based on current graduation patterns. Therefore, graduation rates are sensitive to any changes in education systems, such as the introduction of new programmes or variations in a programme's duration, like those seen in many EU countries as a result of the implementation of the Bologna Process. If the pattern of graduation is seen to be changing due to temporary education system changes, the interpretation of the results can be difficult.
- Upper secondary graduation rates can be very high – even over 100% – during a period. This could be due to a large number of people graduating outside the typical ages (e.g. through second chance programmes), a change in the education system, such as changes in the duration of some programmes (which strongly affect graduation rates) or other reasons such as double counting of students (it is complex to identify first-time graduates without detailed registers). To resolve this issue, data report first-time graduation rates to general and vocational programmes as of *Education at a Glance* 2018.
- The analysis of graduation rates can be expanded by determining the profiles of first-time graduates. Such profiles look at the distribution of graduates by gender, age group, international status and ISCED level, or by fields of education at upper secondary and tertiary level.

7.2.2. Completion rates

Policy context

The **completion rate** describes the percentage of students who graduate from a certain educational programme a given number of years after they entered, as a share of those who entered. It is a measure of how efficiently students flow through a level of education (upper secondary or tertiary).

Calculation

Completion rate:

$$\sum \frac{Graduates_{EducLevel,Year}}{NewEntrant_{Year-n}} \text{x}100$$

Where $Graduates_{EducLevel,Year}$ is the number of graduates from a specific level of education in a specific year and $NewEntrant_{Year-n}$ is the number of new entrants (see the definition in Chapter 4, Section 4.1.2) at that level of education "n" years previously where "n" is the number of years of full-time study required to complete the qualification. It can also be calculated for a longer timeframe of n+2 or n+3 to account for students who had to repeat a grade or individual courses, or who studied part time and so on.

Limitations and further considerations

- Depending on data availability for the level of education of interest, the completion rate can be calculated using two different methods. The first method, true cohort, follows individual students from entry into a programme until a specified number of years later. Completion is then calculated as the share of entrants who have graduated in that timeframe. The second method, cross cohort, is used when individual data are not available. It calculates completion by dividing the number of graduates in a year by the number of new entrants to that programme a certain number of years before, when the number of years corresponds to the theoretical duration of the programme.
- Due to the difference in methodologies, caution must be used when comparing results. For example, consider a programme with a theoretical duration of two years. Completion rates could be calculated using the graduation cohort in 2014 and an entry cohort two academic years earlier, in 2012/13. For countries using cross-cohort data, the graduation cohort in 2014 will include the students who entered in 2012/13 and graduated on time (within two years) but also any others who entered before 2012/13 and graduated in 2014. As a result, in countries where a significant share of students takes longer to graduate, cross-cohort calculations will overestimate completion rates when compared to true-cohort ones, which have a more limited time frame.

7.3. Educational attainment of the population

7.3.1. Educational attainment of the population

Policy context

Educational attainment is a commonly used proxy for the stock of human capital – that is, the skills/knowledge available in the population. Qualifications certify and offer information about the type of knowledge and skills that graduates have acquired in formal education. Educational attainment provides a profile of the level of educational attainment of the population as a whole or subsets of it such as the labour force or specific age groups.

Calculation

Educational attainment rate is determined by the distribution of the population or subsets by the highest level of education attained.

Educational attainment rate:

$$\frac{Population_{Age,Gender,EducLevelAttained}}{Population_{Age,Gender,Total}} \text{x}100$$

Where $Population_{Age,gender,EducLevel}$ is the number of people in a particular age and gender group broken down by highest educational attainment level and $Population_{Age,Gender,Total}$ is the total population of the same group. *Education at a Glance* typically shows data for all educational levels as described by ISCED 2011.

Similar to graduation rates, attainment rates require the successful completion of a programme, rather than simply attending that programme. However, educational attainment differs from graduation in referring only to the highest degree of education an

individual has successfully completed. For educational attainment, only the recognised successful completion of the highest programme attended is counted.

The source for the data for most countries is that country's national labour force survey (LFS).

Limitations and further considerations

- People with unknown level of educational attainment are excluded from the calculation of the indicator.
- Trends in educational attainment of the population are important for assessing expansion of the education system, but are difficult to measure. Changes in the ISCED classification in 1997 and 2011 have created breaks in the series. Another way to measure trends in educational attainment is by looking at the educational attainment across age groups. The difference in the attainment of younger and older cohorts gives a good estimation of the expansion of the education system across generations. Example: "A comparison of educational attainment rate among younger (25-34 year-olds) and older (55-64 year-olds) age groups indicates marked progress in attaining tertiary education in most countries." (OECD, 2017[3]). However, any results from countries reporting high participation in adult learning should be treated with caution.

7.4. Labour force participation

7.4.1. Labour force participation

Policy context

In recent decades, economies and labour markets have in many countries become increasingly dependent on a stable supply of well-educated workers to further their economic development and to maintain their competitiveness. This indicator provides a perspective on this effect by examining the labour force participation rates of groups with different levels of education. People with higher-level qualifications are more likely to be employed, as they are considered better equipped with the skills required in the labour market. On the other hand, while there is still work for those with lower levels of education, people with the lowest educational qualifications are at greater risk of being unemployed.

Calculation

The employment rate for a particular age group, gender and level of educational attainment is equal to the percentage of people of that same age group, gender and level of educational attainment who are employed.

The employment rate by level of education:

$$\frac{Employed_{Age,Gender,EducLevel}}{Population_{Age,Gender,EducLevel}} \text{x}100$$

Where $Employed_{Age,Gender,EducLevel}$ is the number of people employed within a specified age group and gender who have attained a certain education/ISCED level. Employed individuals are those who, during the survey reference week: 1) have worked for pay (employees) or profit (self-employed and unpaid family workers) for at least one hour; or

2) have a job but are temporarily not at work (through injury, illness, holiday, strike or lock-out, educational or training leave, maternity or parental leave, etc.).

Where $Population_{Age,Gender,EducLevel}$ is the total number of people in the population of the same age group, gender and educational attainment level.

The unemployment rate for a particular age group, gender and level of educational attainment, is equal to the percentage of the labour force of the same age group, gender and level of educational attainment who are unemployed.

The unemployment rate by level of education:

$$\frac{Unemployed_{Age,Gender,EducLevel}}{Labourforce_{Age,Gender,EducLevel}} \text{x}100$$

Where $Unemployed_{Age,Gender,EducLevel}$ is the number of unemployed people of a certain age group, gender and level of education. Unemployed individuals are those who are, during the survey reference week, without work (i.e. neither had a job nor were at work for one hour or more in paid employment or self-employment) and who were actively seeking employment (i.e. had taken specific steps during the four weeks prior to the reference week to seek paid employment or self-employment), and currently available to start work (i.e. were available for paid employment or self-employment before the end of the two weeks following the reference week).

Where $Labourforce_{Age,Gender,EducLevel}$ is the total number of employed and unemployed people within the same age group, gender and educational attainment level.

The inactivity rate for a particular age group, gender and level of educational attainment is equal to the percentage of the population of the same age group, gender and level of educational attainment who are inactive.

The inactivity rate by level of education:

$$\frac{Inactive_{Age,Gender,EducLevel}}{Population_{Age,Gender,EducLevel}} \text{x}100$$

Where $Inactive_{Age,Gender,EducLevel}$ is the number of inactive people within a certain age group, gender and level of education. Inactive individuals are those who are neither employed nor unemployed during the reference week, i.e. individuals who are not looking for a job. The number of inactive individuals is calculated by subtracting the number of active people (labour force) from the total population.

Labour force participation rate: The labour force participation rate is computed as labour force participation rate=100 – inactivity rate

The source of the data for most countries is the national LFS.

Limitations and further considerations

- Employment and unemployment rates by level of education do not show a causal relationship between education and employment/unemployment outcomes but do help to estimate the likelihood of being employed or unemployed. Employment and unemployment rates vary a lot from one country to another as labour-market conditions and overall economic situation vary.

- The work status refers to the International Labour Organisation definitions of employment, unemployment and not in the labour force. The type of employment refers to full-time or part-time employment based on a threshold definition of 30-usual-hours on the worker's main job. Full-time workers are those who usually work 30 hours or more on their main job. Some countries may refer to all jobs instead of a worker's main job, or part time may refer to less than 35 hours per week instead of 30 hours.
- As vocational education and training (VET) programmes may contain work-based components (such as apprenticeships or dual-system education programmes), special attention should be paid to the labour-market outcomes of individuals who graduated from such programmes to assess how relevant they are to the labour market.

7.5. Economic and social benefits of education

7.5.1. Relative earnings advantage from education and percentage of people with earnings

Policy context

One of the ways in which the market provides incentives for individuals to develop and maintain appropriate levels of skills is through wage differentials, in particular through the enhanced earnings accorded to people who complete additional education. Variations in relative earnings across countries reflect a number of factors, including the demand for skills in the labour market, the supply of workers at various levels of educational attainment, minimum wage laws, the strength of labour unions, coverage of collective-bargaining agreements, relative incidence of part-time and seasonal work and/or the age composition of the labour force.

Calculation

Relative earnings from employment are equal to the percentage of the mean annual earnings of an individual within a certain age group, gender and educational attainment relative to a baseline. Different relative earnings may be calculated for different analysis.

When analysing relative earnings from employment by educational attainment, the baseline usually considered is the mean earnings of individuals of the same age group and gender whose highest level of attainment is upper secondary education. Upper secondary attainment is an appropriate baseline as this is considered as a pivotal point in students' decisions to pursue higher education.

Average earnings can be calculated for people working full-time, full-year, or for all earners (i.e. including full-time, full-year earners and part-time earners) or for the entire population (i.e. including all earners and people with no earnings).

Relative earnings of employed compared to employed with upper secondary education:

$$\frac{Earnings_{Age,Gender,EducLevel}}{Earnings_{Age,Gender,UpperSec}} \, x \, 100$$

Where $Earnings_{Age,Gender,EducLevel}$ is the mean earnings of individuals within an age group and gender whose highest level of educational attainment is *EducLevel* and

$Earnings_{Age,Gender,UpperSec}$ is the mean earnings of individuals of the same age group and gender whose highest level of attainment is upper secondary.

It is also appropriate to analyse the relative earnings by gender for a given age group and educational attainment. In this case, the baseline considered is the mean annual earnings of men with the same age group and level of educational attainment.

Women's earnings relative to men:

$$\frac{Earnings_{Age,EducLevel,Women}}{Earnings_{Age,Educlevel,Men}} x\ 100$$

Where $Earnings_{Age,EducLevel,Women}$ is the annual mean earnings of women of a particular age group and highest educational attainment level and $Earnings_{Age,Educlevel,Men}$ is the annual mean earnings of men of the same age group and level of educational attainment.

Level of earnings relative to median earnings:

The level of earnings relative to median earnings is defined as the ratio of the number of people with earnings within an earnings level relative to the median, and all people who have earnings from employment.

The distribution is calculated for all earners (i.e. including full-time, full-year earners and part-time earners).

Percentage of people with earnings:

$$\frac{Population_{EarningLevel}}{Population_{Earnings}} \text{x } 100$$

Where $Population_{EarningLevel}$ is the number of individuals broken down into the following earning levels: 1) less than or half of the median; 2) more than half the median and less than or equal to the median; 3) more than the median and less than or equal to 1.5 times the median; 4) more than 1.5 times the median and less than or equal to twice the median; and 5) more than twice the median.

Where $Population_{Earnings}$ is the number of individuals with earnings.

In some cases, the relative earnings of students and non-students are computed. This is defined as the mean annual earnings of students divided by the mean earnings of non-students.

Relative earnings of students compared to non-students:

$$\frac{Earnings_{Students}}{Earnings_{Non-students}} \text{x } 100$$

Where $Earnings_{students}$ is the annual mean earnings of students and $Earnings_{Non-students}$ is the annual mean earnings of non-students.

Limitations and further considerations

- The presentation of relative earnings improves the comparability of data across countries, by avoiding the need to convert earnings into a single monetary unit. While earnings data should be based on annual, full-year earnings, before tax and excluding earnings from self-employment, this is not the case for all countries and therefore results should be interpreted with caution. For example, in countries

reporting annual earnings, differences in the incidence of seasonal work among individuals with different levels of educational attainment will have a different effect on relative earnings than in countries reporting weekly or monthly earnings. More details on specific country data on earnings can be found in Annex 3 of *Education at a Glance*.

- The earnings average for men plus women is based on earnings of the total population, i.e. it is not the simple average of the earnings figures for men and women. The earnings average for men plus women weights the average earnings figures separately for men and women by the share of men and women at different levels of attainment.
- The definition of full-time earnings is either based on a self-designated full-time status or a threshold value of typical number of hours worked per week.
- The distribution of earners can also be considered to understand relative earnings better. The share of students and non-students (individuals no longer in education) among all earners, or the share of full-time full-year earners, part-time earners and people with no earnings in the total population can all be considered.

7.5.2. Financial incentive to invest in education

Policy context

Putting time and money into education is an investment in human capital. Better chances of employment and higher earnings are strong incentives for adults to invest in education and postpone labour-market activities. Countries, in turn, benefit from having better-educated individuals, through reduced public expenditure on social welfare programmes and higher revenues earned through taxes (income tax and value-added taxes) paid once individuals enter the labour market (receive earnings and then buy consumption goods).

Rates of return can be measured from the private individual's point of view or from society's point of view. Private rates of return measure the future net economic payoff to an individual of increasing the amount of education undertaken, while public rates of return measure the benefits to society of additional education. The calculation formulae for both types of returns are the same; only the costs and benefits included differ between the two.

Calculation

In calculating the financial returns to education, two indicators can be used: net present value and internal rate of return.

Net present value (NPV)**:**

$$\sum_{t=0}^{d-1} \frac{C_t}{(1+i)^t} + \sum_{t-d}^{64-a-d} \frac{B_t}{(1+i)^t}$$

Where C_t $refers\ to$ costs at period t (t ∈ 0, d-1), B_t refers to benefits at period t (t ∈ 0, d-1), *i* refers to the discount rate, *d* refers to duration of studies (in years), *a* refers to age at beginning of education/training and 64 is assumed to be the age of the last year of activity in the labour market.

The net present value (NPV) expresses in present value terms cash transfers happening at different times, to allow direct comparisons of costs and benefits. In this framework, costs and benefits during a working-age life are transferred back to the start of the investment. This is done by discounting all cash flows back to the beginning of the investment using a fixed interest rate known as the discount rate that makes possible to compare costs or benefits (cash flows) over time. All the values presented in the tables in this indicator are in net present value equivalent, converted to USD using purchasing power parities (PPP). The PPP controls for different costs of living and price levels between countries, by equalising the purchasing power of different countries' currencies for a market "basket of goods".

The **internal rate of return** (IRR) is the discount rate *i* at which NPV=0.

The IRR looks at the issue of the financial returns to education from a different angle. The IRR is the discount rate at which the net present values of all cash flows is equal to the initial investment, or in other words, the rate at which the investment breaks even. Translated to education, the IRR can be interpreted as the interest rate an individual can expect to receive every year during their working life on the investment made on higher education. In project evaluation, a project is approved if the IRR is greater than the prevailing interest rate or the return from an alternative investment. The higher the IRR, the more attractive it is to pursue higher education.

The financial returns on investment in education are calculated from the age of entry into further education to a theoretical age of retirement, assumed to be 64. It considers two periods: 1) time spent in education during which the private individual and the government are paying the cost of education; and 2) time spent in the labour market during which the individual and the government are receiving the additional payments associated with further education.

These two indicators incorporate costs and benefits which need to be carefully determined.

The costs

Investing in a higher level of education has both direct and indirect costs. Direct costs are the upfront expenditure paid during the years of additional studies. Indirect costs for private individuals are the foregone earnings that they would have received if they had decided to work instead of pursuing an additional degree of education. Similarly, indirect costs for the public sector are the foregone tax revenues not received because individuals chose to pursue further education instead of entering the labour market:

private costs = direct costs + foregone earnings

public costs = direct costs + foregone tax revenues

The direct costs of education include all expenditures on education for all levels of government combined (public direct costs) and all education-related household expenditure (private direct costs).

Private direct costs are net of loans and grants, and public loans are not included in public direct costs. Excluding loans from public costs may lead to public costs being underestimated for some countries, particularly at the tertiary level. In cases where loans and grants cover more than the private direct costs, the private direct costs are set to zero.

Foregone earnings (FE) and foregone tax receipts (FT) are both indirect costs. Foregone earnings or taxes are the earnings/tax receipts lost during the years spent in education

weighted by the probability of being employed. For individuals, FEs are the additional earnings they would have had if they entered the labour force instead of pursuing a higher degree of education. From the government perspective, FTs are the additional foregone taxes the government is not collecting while the individual is studying instead of working.

Foregone earnings:

$$FE_{z,j,s} = \left(ES_{\text{non-student, z-1}} * \text{E}_{\text{non-student, z-1}} + UB_{\text{non-student, z-1}} * US_{\text{non-student, z-1}}\right) - \left(ES_{\text{student, z-1}} * \text{E}_{\text{student, z-1}}\right)$$

Foregone tax receipts:

$$FT_{z,j,s} = \left(ES_{\text{non-student, z-1}} * \text{T}_{\text{non-student, z-1}} - UB_{\text{non-student, z-1}} * US_{\text{non-student, z-1}}\right) - \left(ES_{\text{student, z-1}} * \text{T}_{\text{student, z-1}}\right)$$

Where ES stands for the employment rate, US for the share of the population who are unemployed and UB for unemployment benefits. $\text{T}_{\text{non-student/student, z-1}}$ is defined as the level of taxes required from an individual earning $\text{E}_{\text{non-student/student z-1}}$.

The indicator assumes that the foregone earnings are equal to the difference between what individuals could expect to earn in the labour market and what they could get while studying. That is, the foregone earnings equal the average earnings of 15-24 year-old non-students ($\text{E}_{\text{non-student, z-1}}$) minus the average earnings of 15-24 year-old students ($\text{E}_{\text{student, z-1}}$). Where these data are not available, estimations are based on the total earnings of 15-24 year-olds. Given the specificities of the "student" status in many countries, in order to simplify calculations and ensure comparability across countries, the indicator assumes that students do not receive transfers or unemployment benefits from governments.

The benefits

The benefit of investing in education is the additional income associated with a higher level of education, given the probability of successfully finding a job. For private individuals, this additional income is the additional net earnings expected from an additional level of education, given that they successfully enter the labour market, and receive earnings until their retirement age, estimated as 64 years old for all countries. Public benefits are constructed to mirror private benefits. Public benefits are the sum of added tax revenues that accrue to the government from an individual with a higher level of education, provided that the individual successfully enters the labour market. Inactive individuals are assumed to receive zero earnings.

For j, the highest level of educational attainment, and j-1, a lower level of attainment, total public and private benefits can be written as:

$$\begin{aligned} Total\ private\ benefits_j &= \{Expected\ net\ earnings\ at\ level_j\} \\ &- \{Expected\ net\ earnings\ at\ level_{j\text{-}1}\} \\ &= \{(1 - Unemployment\ rate)_j * (Net\ earnings)_j \\ &+ (Unemployment\ rate)_j * (Net\ unemployment\ benefits)_j\} \\ &- \{(1 - Unemployment\ rate)_{j-1} * (Net\ earnings)_{j-1} \\ &+ (Unemployment\ rate)_{j-1} * (Net\ unemployment\ benefits)_{j-1}\} \end{aligned}$$

$$
\begin{aligned}
&Total\ public\ benefits_j \\
&\quad = \{Expected\ tax\ receipts\ at\ level_j\} \\
&\quad - \{Expected\ tax\ receipts\ at\ level_{j-1}\} \\
&\quad = \{(1 - Unemployment\ rate)_j * (tax\ receipt)_j \\
&\quad - (Unemployment\ rate)_j * (Net\ unemployment\ benefits)_j\} \\
&\quad - \{(1 - unemployment\ rate)_{j-1} * (tax\ receipt)_{j-1} \\
&\quad - (Unemployment\ rate)_{j-1} * (Net\ unemployment\ benefits)_{j-1}\}
\end{aligned}
$$

Decomposition of earnings and tax receipt effects: this indicator presents the decomposition of earnings and tax revenue effects, based on additional income associated with a higher level of attainment.

- Gross earnings benefits are the discounted sum of earnings premiums over the course of a working-age life associated with a higher level of education, provided that the individual successfully enters the labour market. In order to increase the stability of the indicator, data on earnings use a moving average combining three years of earnings.
- The income tax effect is the discounted sum of the additional amount of income tax paid by the individual and received by the government for a higher level of education. Income tax data are computed using the OECD Taxing Wages model ((OECD, 2015[4])), which determines the level of taxes based on a given level of income. This model computes the level of the tax wedge on income for several household composition scenarios. This indicator uses a single worker with no children.
- The social contribution effect is the discounted sum of the additional amount of employee social contributions paid by the individual and received by the government for a higher level of attainment. Employee social contributions are computed using the OECD Taxing Wages model's scenario of a single worker with no children, aged 40.
- The social transfers effect is the discounted sum of the additional amount of social transfers paid to individuals by the government for a higher level of attainment. Social transfers correspond to the sum of social assistance and housing benefits paid by the government to individuals. Social transfers are computed using the OECD Tax-Benefit model ((OECD, 2015[4])), under the assumption of a single worker with no children, aged 40.
- The unemployment benefit effect is the discounted sum of additional unemployment benefits associated with a higher education level over the course of a working-age life and received during periods of unemployment, taking into account the probability of being unemployed for the different levels of educational attainment.. Unemployment benefits are computed using the OECD Tax-Benefit model, under the assumption of a single worker with no children, aged 40. Individuals are considered to be eligible for full unemployment benefits during unemployment.

Limitations and further considerations

- Data reported are accounting-based values only. The results will probably differ from econometric estimates using the same data at the micro level (i.e. data from

household or individual surveys) rather than a stream of earnings derived from average earnings during a working-age life.

- The approach used estimates future earnings for adults with different levels of education, based on knowledge of how average present gross earnings vary by level of attainment and age. However, the relationship between different levels of educational attainment and earnings may change in the future, as technological, economic and social changes may all alter how wage levels relate to education levels.
- The approach takes into account the effect of education on the likelihood of finding employment. However, this also makes the estimate sensitive to the stage in the economic cycle at which the data are collected. Given that more highly educated adults typically have better labour-market outcomes, the value of education generally increases in times of slow economic growth.
- The theoretical retirement age of 64 has been used to calculate returns over the lifetime. However, the age of eligibility for pensions varies widely between countries. A few years more or less in the labour market can make a substantial difference in the returns to education for an individual and the public.
- The model only considers the taxes and benefits directly linked to the earnings level of an individual, disregarding other taxes that may indirectly be incurred from activities individuals may engage in as a result of their higher income. For instance, as earnings generally increase with educational attainment, individuals with higher levels of education typically consume more goods and services, and thus pay additional value-added tax (VAT) on their consumption. This indicator thus underestimates the public returns.
- Individuals with higher earnings also tend to pay more into their pensions and so, after leaving the labour force, will have a further income advantage that the indicator does not take into account. In addition, in countries where a substantial part of the pension system is financed by employers through employer contributions added to salaries, the returns to higher education are typically underestimated compared to countries where pensions are paid for by the individual.
- Many governments have programmes that provide loans to students at low interest rates which provide a strong incentive for individuals to pursue their studies and reduce the costs of attaining higher education. Yet, as loans have to be repaid later, they also reduce the financial benefits of education. While currently not included in the calculation, these subsidies can often make a substantial difference to the public and private returns to education.
- Other factors not reflected in this indicator affect the returns to education. For instance, the financial returns may be affected by the field of study and by country-specific economic situations, labour-market contexts and institutional settings, as well as by social and cultural factors. Furthermore, returns to education are not limited to financial returns but also include other economic outcomes, such as increased productivity that boosts economic growth, and social outcomes, such as better health and well-being and higher social participation.
- The discount rate reflects the time-value of money and makes it possible to compare costs or payments (cash flows) over time. The discount rate can be

estimated either by raising it to the level at which financial benefits equal costs, which is then the internal rate of return (IRR), or by setting the discount rate at a required rate, which is then a net present value calculation (NPV) with the gains expressed in monetary units. Choosing an adequate interest rate for the net present value calculations is a difficult and critical issue as it should reflect the overall time horizon of the investment project and the cost of borrowing or the perceived risk of the investment. To keep things simple, and to make the interpretation of results easier, the same discount rate is applied across all countries.

7.5.3. Education and social outcomes

Policy context

Several social outcomes can be related to education through lifestyle choices by individuals which may be improved by the cognitive and socio-emotional skills developed through education. The social outcomes which are commonly analysed include health, work-life balance, social connections, civic engagement and governance, environment, personal safety, and subjective well-being.

Calculation

The relationship between education and social outcomes is measured in a similar way for different variables. Taking the example of education and health, the indicator calculates the percentage of adults reporting that they are in good health for a particular educational attainment level and/or numeracy or literacy proficiency level out of the total number of 25-64 year-olds with the same educational attainment and/or proficiency level.

Percentage of adults reporting that they are in good health:

$$\frac{GOOD\ HEALTH_{i,j}}{Population_{i,j}} \text{ x } 100$$

Where $GOOD\ HEALTH_{i,j}$ = the number of people who answered that they are in good or very good health who have attained i educational attainment level and/or who have j literacy or numeracy proficiency level and $Population_{i,j}$ = the total number of people in the population who have i educational attainment level and/or who have j literacy or numeracy proficiency.

Limitations and further considerations

- Cross-country variations in self-reported social outcomes and their associations with educational attainment need to be interpreted with care. This is because subjective measures may be affected by social and cultural factors which can vary both within and across countries.
- When interpreting the results and the differences between groups, special attention should be paid to the standard errors and the confidence interval. The statistical estimates are based on samples of adults, rather than the whole target population.

7.6. Expenditure analysis

Expenditure is commonly analysed through a framework built around three dimensions (see Chapter 4, Section 4.5.1):

- the type of goods and services provided or purchased (core and peripheral)
- the service provider (educational or other organisations, such as bus companies)
- the source of funds financing the provision or purchase of these goods and services (public or private sources).

In addition, there are four different types of expenditure:

- direct public, private and international expenditure on educational institutions
- private expenditure on educational goods and services purchased outside educational institutions
- subsidies to students from government and other private entities
- transfers and payments to other private entities.

Depending on the indicator being calculated, the type of expenditure, the nature of the goods and services purchased, the type of service provider and the source of funds considered may vary, as the following sections lay out in more detail.

7.6.1. Expenditure on educational institutions per student

Policy context

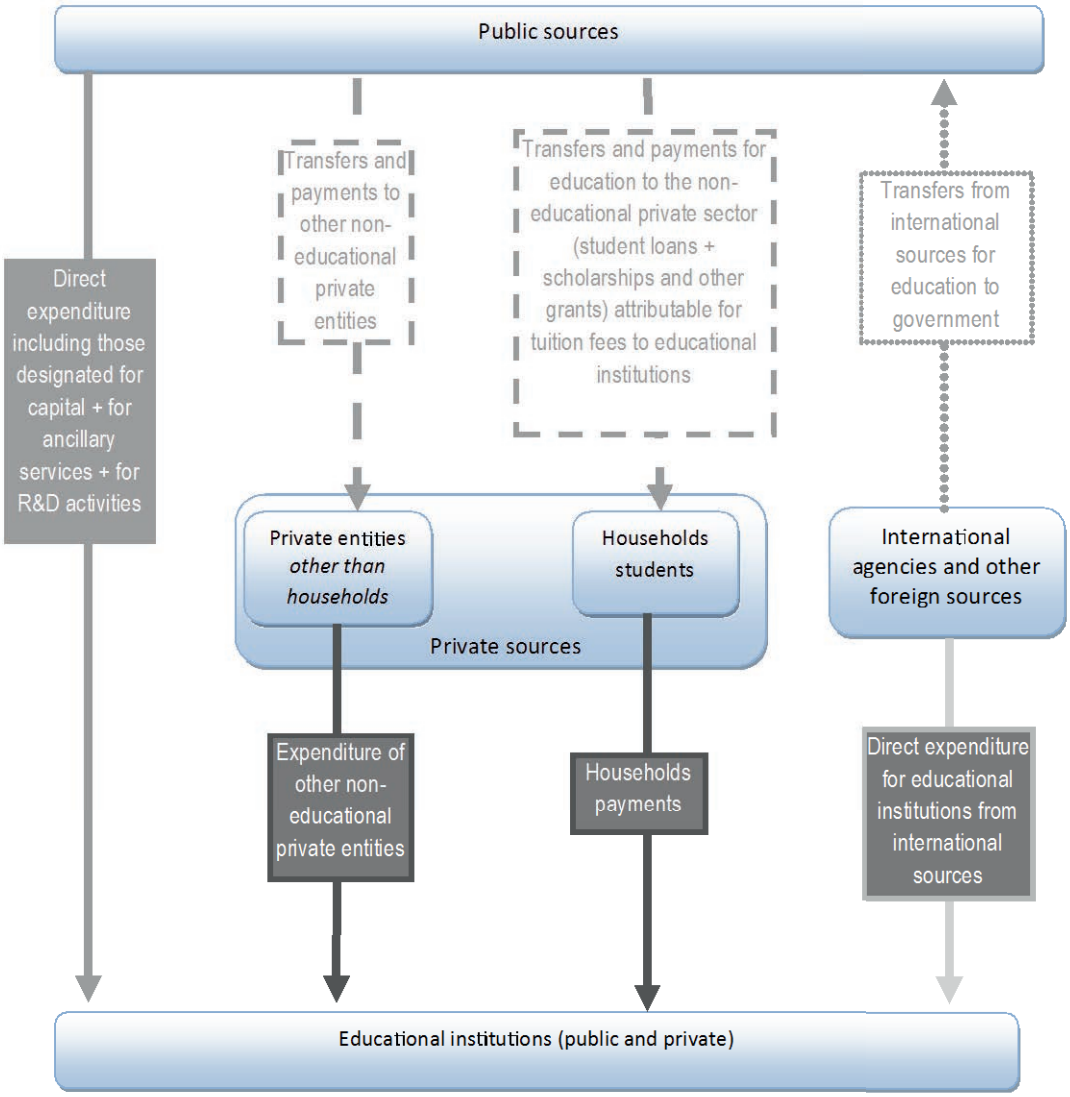
Effective learning requires the right combination of trained and talented personnel, adequate facilities, state-of-the-art equipment and motivated students ready to learn. Policy makers must balance the importance of improving the quality of education services with the desirability of expanding access to education opportunities.

It is difficult to assess the optimal resources needed to ensure optimal returns for either the individual or society as a whole. However, international comparisons of expenditure on educational institutions per student can provide a starting point for discussion on the extent of countries' investment in education in order to assess the effectiveness of different models of educational provision. It indicates the adequacy or efficiency of education funding relative to the system key unit: the student.

Calculation

This indicator calculates the total expenditure on educational institutions in relation to the number of full-time equivalent students enrolled in these institutions. It includes expenditure on staff compensation, and expenditure designated for capital investment, ancillary services and research and development (R&D), from public, private, and international sources (Figure 7.1). It excludes expenditure on servicing debts (i.e. payments of interests on the amounts borrowed for educational purposes and repayments of the principal) and tuition fees paid by households to regional or local government rather than directly to educational institutions (UNESCO-UIS / OECD / EUROSTAT, 2017[2]).

Figure 7.1. Sources of funds considered in the calculation of public, private and international expenditure on educational institutions



Public to private transfers are considered public spending from the initial source of funds and private spending from the final source of funds

Initial public spending on educational institutions includes → direct public expenditure on educational institutions
plus → transfers paid to the private sector (households, students and other non-educational private entities)
less → transfers received by the international sources

Initial private spending on educational institutions includes → Total household payments and expenditure from other non-educational private entities on educational institutions, less → the portion of such payments offset by public subsidies (transfers and payments....)

Final international spending on educational institutions includes → direct expenditure for educational institutions from international sources, less → the portion of such payments offset by transfers to government

Expenditure on educational institutions per student at a particular level of education for all education levels except for early childhood education and care (ISCED 0):

$$\frac{EDU_EXPENDITURE_{year_x} \ / \ PPP_{\ year_x}}{AdjustedFTE_ENRL_{year_x}}$$

This indicator can be disaggregated by the source of funds: public, private or international. The disaggregation of the indicator across public, private and international funds is presented both from the perspective of the *initial source* of funds before government transfers to the private sector, and from the *final source* of funds, after public transfers have been made to private entities.

Public expenditure on educational institutions per student:

$$\frac{EDU_EXPENDITURE_{public,year_x}/PPP_{year_x}}{AdjustedFTE_ENRL_{\ year_x}}$$

Private expenditure on educational institutions per student:

$$\frac{EDU_EXPENDITURE_{private,year_x}/PPP_{year_x}}{AdjustedFTE_ENRL_{\ year_x}}$$

International expenditure on educational institutions per student:

$$\frac{EDU_EXPENDITURE_{international,year_x}/PPP_{year_x}}{AdjustedFTE_ENRL_{\ year_x}}$$

$EDU_EXPENDITURE_{year_x}$ is the total expenditure (public, private and international) on educational institutions (Figure 7.1). It includes expenditure on core educational goods and services such as teaching staff, school buildings, and school books and teaching materials, and peripheral educational goods and services such as research and development services (R&D), ancillary services, general administration and other activities (see Chapter 4, Section 4.5 for definitions of educational expenditure).

$EDU_EXPENDITURE_{public,year_x}$ refers to total direct government expenditures on educational institutions for a specific year. When this is calculated from the *initial source* of funds, it includes public subsidies to households and other private entities for educational institutions. International expenditure on educational institutions may be included in public sources as this often represents a very small share of total funding on education.

$EDU_EXPENDITURE_{private,year_x}$ refers to total household payments to educational institutions, and total payments of other private institutions to educational institutions. When this is calculated from the *final source* of funds, it includes public subsidies to household and other private entities for educational institutions.

$EDU_EXPENDITURE_{international,year_x}$ refers to total expenditure for educational institutions from international sources. When this is calculated from the *final source* of funds, it includes transfers from international sources for education to government.

$EDU_EXPENDITURE_{year_x} \ / \ PPP_{\ year_x}$ is expenditure on educational institutions (in national currency) converted into equivalent USD by dividing the national currency figure by the purchasing power parity (PPP) index for gross domestic product (GDP). The PPP exchange rate is used because the market exchange rate is affected by many factors (interest rates, trade policies, expectations of economic growth, etc.) that have little to do

with current relative domestic purchasing power in different OECD countries. The PPP controls for the different costs of living and price levels by equalising the purchasing power of different currencies for a market "basket of goods".

$AdjustedFTE_ENRL_{year_x}$ is the number of full-time students enrolled in educational institutions adjusted to the financial year. Using different reference periods for the expenditure and enrolment data would bias the expenditure on educational institutions per student. Therefore, it is necessary to estimate student numbers for the reference period that coincides with the financial year. This involves taking a weighted average of the full-time equivalent number of students in the two adjacent academic years that overlap with the financial year.

$$AdjustedFTE_ENRL_{year_x} =$$

$$W_{year_x-1/x} * FTE_ENRL_{year_x-1/x} + W_{year_x/x+1} * FTE_ENRL_{year_x/x+1}$$

Where $W_{year_x-1/x}$ is the weight representing the portion of the academic year (x-1) that overlaps with the financial year x; $W_{year_x/x+1}$ is the weight representing the portion of the academic year (x+1) that overlaps with the financial year x; and $FTE_{year_x-1/x}$ is the number of full-time equivalent students enrolled in educational institutions in the academic year x-1 /x; and $FTE_{year_x/x+1}$ is the number of full-time equivalent students enrolled in educational institutions in the academic year x/x+1.

For example, in Austria, aligning school enrolment data with the 2001 financial year involves adding 8/12ths of the 2000/01 school year full-time equivalent (FTE) enrolment data and 4/12ths of the 2001/02 school year FTE enrolment data.

Expenditure on educational institutions per student can also be expressed relative to GDP per capita to measure the relative proportion of a nation's wealth per capita that is invested in educational institutions.

Expenditure on educational institutions per student as a percentage of GDP per capita:

$$\frac{EDU_EXPENDITURE_{year_x}}{AdjustedFTE_ENRL_{year_x}} / \frac{GDP_{year_x}}{Population_{year_x}}$$

Expenditure on educational institutions in the national currency is divided by GDP per capita in the national currency. See more details in next section.

Limitations and further considerations

- All expenditure data as well as the GDP are adjusted to latest year available prices using the GDP price deflator.
- In the cases where the financial year data do not align to the reference year (calendar year), the financial year data are updated to the intended reference period using the appropriate GDP deflators. As a result, adjusted FTE figures might differ from FTE figures in other indicators.
- Not all spending on instructional goods and services occurs within educational institutions. For example, families may purchase commercial textbooks and materials or seek private tutoring for their children outside educational institutions. At the tertiary level, students' living expenses and foregone earnings can also account for a significant proportion of the costs of education. This

indicator excludes all expenditure outside educational institutions, even if publicly subsidised.

- At higher levels of education, this measure is more difficult to interpret because student enrolment rates vary widely among countries. At tertiary level, for example, OECD countries may rank relatively high on this measure if a large proportion of their wealth is spent on educating a relatively small number of students.
- Expenditure on programmes not distributed by ISCED level were excluded from the calculation of total education expenditure.
- When spending per student is calculated at the level of early childhood education and care programmes (ISCED 0) per child, headcounts are used instead of FTE.

7.6.2. Expenditure on educational institutions as a percentage of GDP

Policy context

Expenditure on educational institutions is an investment that can help to foster economic growth, enhance productivity, contribute to personal and social development, and reduce social inequality. The proportion of total financial resources each country devotes to education is one of the key choices governments make. This indicator provides a measure of the proportion of their wealth (GDP) that nations invest in educational institutions and therefore allows countries' investment to be valued as a function of their relative ability to pay. The "domestic" approach (relative to GDP) is preferred to the "national" approach (relative to gross national product, GNP) because it is consistent with other concepts used in education statistics and in the UOE data collection.

Calculation

This indicator represents expenditures on educational institutions in relation to the wealth of nations as measured by GDP. It includes expenditure on staff compensation, and expenditure designated for capital investment, ancillary services and R&D, from public, private and international sources (detailed in Figures 7.1, 7.2 and 7.3). It excludes expenditure on servicing debts (i.e. payments of interests on the amounts borrowed for educational purposes and repayments of the principal) and tuition fees paid by households to regional or local government rather than directly to educational institutions.

Expenditure on educational institutions **as a percentage of GDP:**

$$\frac{EDU_EXPENDITURE_{year_x}}{GDP_{year_x}}$$

This indicator can be disaggregated by sources of funds – public, private or international. The disaggregation of the indicator across public, private and international funds is presented both from the perspective of the **initial source** of funds before government transfers to the private sector, and from the **final source** of funds, after public transfers have been made to private entities (Figure 7.1).

Public expenditure as a percentage of GDP:

$$\frac{EDU_EXPENDITURE_{public,year_x}}{GDP_{year_x}}$$

Private expenditure as a percentage of GDP:

$$\frac{EDU_EXPENDITURE_{private,year_x}}{GDP_{year_x}}$$

International expenditure as a percentage of GDP:

$$\frac{EDU_EXPENDITURE_{international,year_x}}{GDP_{year_x}}$$

Where $EDU_EXPENDITURE_{public,year_x}$ refers to total direct government expenditure on educational institutions for a specific year. When this is calculated from the **initial source** of funds, it includes public subsidies to households and other private entities for educational institutions. International expenditure on educational institutions may be included in public sources as this often represents a very small share of total funding on education.

$EDU_EXPENDITURE_{private,year_x}$ refers to total household payments to educational institutions, and total payments of other private institutions to educational institutions. When this is calculated from the **final source** of funds, it includes public subsidies to household and other private entities for educational institutions.

$EDU_EXPENDITURE_{international,year_x}$ refers to total expenditure for educational institutions from international sources. When this is calculated from the **final source** of funds, it includes transfers from international sources for education to government.

GDP_{year_x} refers the gross domestic product for a specific year, or the producers' value of the gross outputs of resident producers, including distributive trades and transport, minus the value of purchasers' intermediate consumption plus import duties. GDP is expressed in local currency (in millions).

Limitations and further considerations

- For countries which provide this information for a reference year that is different from the calendar year (such as Australia and New Zealand), adjustments are made by linearly weighting their GDP between two adjacent national reference years to match the calendar year. The data are derived from the National Accounts Database.
- The student enrolment data are aligned to the financial year reference period. It may not be necessary to use an inflation adjustment to bring the financial year in line with the reference year if the GDP per capita figures refer to the same reference year as the finance data.
- As in the previous indicator, not all spending on instructional goods and services – such as on textbooks and private tutoring – occurs within educational institutions. This indicator excludes all expenditure outside educational institutions, even if publicly subsidised.
- Expenditure on programmes not distributed by ISCED level are excluded from the calculation of total education expenditure.
- The theoretical framework underpinning the calculation of GDP has been provided for many years by the United Nations' publication, *A System of National Accounts*, which was released in 1968. Updated versions were released in 1993 and 2008 (commonly referred to as SNA93 and SNA2008).

7.6.3. Relative proportions of public, private and international expenditure on educational institutions

Policy context

How costs are shared between participants in the education system and society as a whole is an issue under discussion in many countries. This question is especially relevant at the beginning and end of a student's education – early childhood and tertiary education – where full or nearly full public funding is less common in some countries. This indicator illustrates how the cost of education is shared between the public and private sectors, including the amounts invested by one sector relative to the other and the extent of transfers of educational funds between them.

Calculation

This indicator represents the relative proportions of disaggregated public, private and international expenditure on educational institutions. It includes expenditure on staff compensation, and expenditure designated for capital investment, ancillary services and R&D, from public, private, and international sources (detailed in Figure 7.1). It excludes expenditure on servicing debts (i.e. payments of interests on the amounts borrowed for educational purposes and repayments of the principal) and tuition fees paid by households to regional or local government rather than directly to educational institutions.

The attribution of spending to public, private and international funds is presented both from the perspective of the **initial source** of funds before government transfers to the private sector, and from the **final source** of funds, after public transfers have been made to private entities.

Relative proportion of public sources:

$$\frac{EDU_EXPENDITURE_{public}}{EDU_EXPENDITURE} \text{x}100$$

Relative proportion of private sources:

$$\frac{EDU_EXPENDITURE_{private}}{EDU_EXPENDITURE} \text{x}100$$

Relative proportion of international sources:

$$\frac{EDU_EXPENDITURE_{international}}{EDU_EXPENDITURE} \text{x}100$$

Where $EDU_EXPENDITURE_{public}$ refers to public expenditure on institutions including expenditure on ancillary services and R&D. It excludes expenditure not directly related to education (such as on culture, sports and youth activities) unless provided as ancillary services. When this is calculated from the **initial source** of funds, it includes public subsidies to households and other private entities for educational institutions.

$EDU_EXPENDITURE_{private}$ refers to expenditure by the private sector (students, households and other private entities as defined in Chapter 4, Section 4.5.4) on educational institutions. When this is calculated from the **final source** of funds, it includes public subsidies to households and other private entities for educational institutions.

- $EDU_EXPENDITURE_{internatioanal}$ refers to funds from public multilateral organisations for development aid to education. These organisations include multilateral development banks (the World Bank and regional development

banks), United Nations agencies and other intergovernmental organisations, bilateral development co-operation government agencies, and international non-governmental organisations (NGOs) established in the receiving country. International expenditure on educational institutions may be included in public expenditure as this often represents a very small share of total funding on education.

- $EDU_EXPENDITURE$ refers to total public, private and international spending on educational institutions as defined above.

Limitations and further considerations

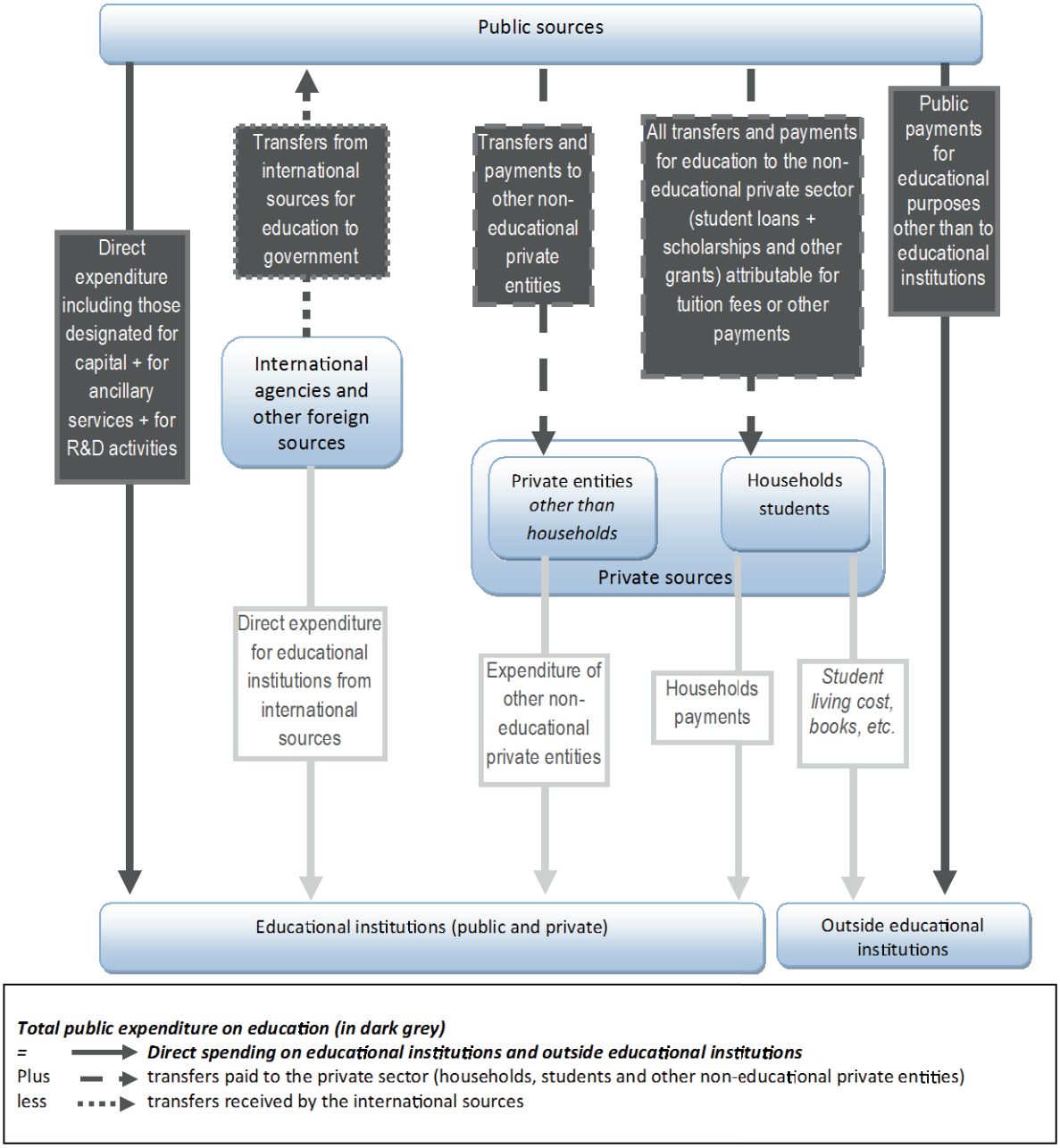
- As with the previous two indicators, not all spending on instructional goods and services occurs within educational institutions. This indicator excludes all expenditure outside educational institutions, even if publicly subsidised.
- Expenditure on servicing debts (i.e. payments of interests on the amounts borrowed for educational purposes and repayments of the principal) is excluded from the calculation.
- Tuition fees that the families of students enrolled in public educational institutions are paying to regional or local government rather than directly to educational institutions are excluded to avoid double counting as they are included under household payments to institutions.
- Expenditure on programmes not distributed by ISCED level were excluded from the calculation of total education expenditure.

7.6.4. Total public expenditure on education

Policy context

Public expenditure on education as a percentage of total public expenditure indicates the value of education spending relative to that of other public investments such as health care, social security, and defence and security. To some extent, it can be interpreted in terms of relative priorities between different functions of the public sector and the abilities of the private sector to deliver on them. However, the role and mandate of the public sector varies greatly from country to country, according to their specific circumstances. For instance, nationwide health or security crises may result in comparatively lower spending on education relative to health or defence, even though education may remain a high priority for the public agenda.

Figure 7.2. Sources of funds considered in the calculation of total public expenditure on educational as a share of total government expenditure



Calculation

Contrary to previous indicators, which focused solely on expenditure on educational institutions, this indicator looks at total public educational expenditure (see Figure 7.2). This includes subsidies for expenditure outside institutions (such as for students' living costs) and by all public entities, not just ministries of education.

Total public expenditure in education:

$$\frac{EDU_EXPENDITURE_{public}}{ALL_EXPENDITURE_{public}}$$

Where $EDU_EXPENDITURE_{public}$ is total public spending on educational institutions and outside educational institutions. It includes all public-to-private transfers including loans for tuition, loans and subsidies for students' living costs and for other private expenditure outside institutions (subsidies for education to private entities). It includes expenditure by all public entities at central (national) government level including ministries other than ministries of education, local and regional governments, and other public agencies.

$ALL_EXPENDITURE_{public}$ is general government spending and corresponds to the non-repayable current and capital expenditure of all levels of government: central, regional and local.

Limitations and further considerations

- The data can also be presented broken down by government sources of expenditure on education, apart from international sources, classified into three levels: central (national) government, regional government (province, state, Land etc.) and local government (municipality, district, commune etc.). The terms "regional" and "local" apply to governments whose responsibilities are exercised within certain geographical subdivisions of a country. They do not apply to government bodies whose roles are not geographically circumscribed but are defined in terms of responsibility for particular services, functions or categories of students (see Chapter 4, Section 4.5.4 for more detail on the levels of government).
- Although expenditure on debt servicing (e.g. interest payments) is included in total public expenditure, it is excluded from public expenditure on education. The reason is that some countries cannot separate interest payments for education from those for other services. This means that public expenditure on education as a percentage of general government expenditure may be underestimated in countries where interest payments represent a large proportion of total public expenditure on all services.
- This indicator is usually calculated for public expenditure on primary to tertiary education.
- Expenditure on programmes not distributed by ISCED level were excluded from the calculation of total education expenditure.

7.6.5. Financial support to students and tuition fees charged by educational institutions

Policy context

Policy decisions related to tuition fees affect both the cost of tertiary education to students and the resources available to tertiary institutions. Policies aimed at supporting students and their families enables governments to encourage participation in education – particularly among low-income students – by covering part of the cost of education and

related expenses. In this way, governments can address issues of access and equality of opportunity.

Calculation

Two indicators can be calculated: average tuition fees and the share of students benefitting from financial aid.

The estimated annual average tuition fees charged by educational institutions:

$$\frac{\text{Annual average tuition fees}_{EducationLevel,fields\ of\ education,institution\ type,student\ nationality}}{PPP}$$

Where the annual average tuition fees for full-time students (broken down by levels of education, fields of education or the international/national status of students) in national currency are converted into equivalent USD by dividing by the PPP index for GDP. The PPP controls for the different costs of living and price levels by equalising the purchasing power of different currencies for a market "basket of goods".

The percentage of students benefitting from financial aid:

$$\frac{\text{Students benefitting from public loans AND/OR scholarships/grants}_{EducationLevel}}{\text{Full} - \text{time students enrolled in education}_{EducationLevel}}$$

Limitations and further considerations

- Amounts of tuition fees and associated proportions of students should be interpreted with caution as they represent the weighted average of the main tertiary programmes and do not cover all educational institutions. Nonetheless, the figures reported can be considered as good proxies of the differences across countries in tuition fees charged by the main educational institutions and for the majority of students. Data in national currencies have been converted to USD using purchasing power parities.
- While data are available on the amounts of average loans and the proportion of students who have a loan, interest rates, repayment details, average debt at graduation, and remission/forgiveness possibilities, no data are published on average amounts for scholarships or grants.
- Public subsidies and support can be mostly directed towards national students, with countries setting different tuition fees for national and international students – or students coming from a specific group of countries may pay the same tuition fees as national students. To identify countries aiming to encourage international students, data can also be broken down by country of origin.

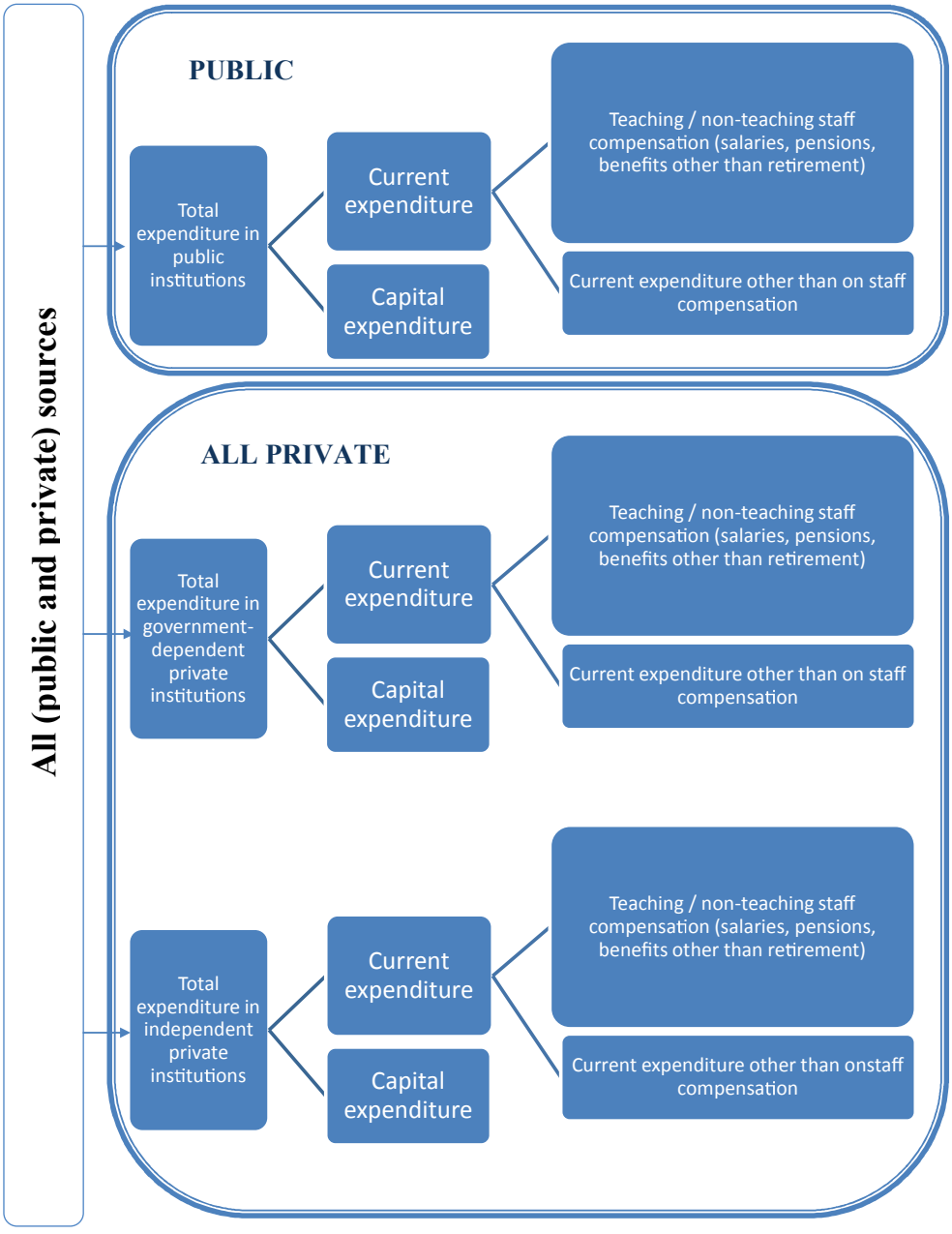
7.6.6. Share of current and capital expenditure on education

Policy context

Decisions about how resources are allocated affect the material conditions in which students are taught and can also influence the nature of instruction. This indicator shows how funding for educational institutions is spent on resources and services by breaking it down into capital and current expenditure (see definitions in Chapter 4, Section 4.5.5). Capital expenditure refers to spending on assets that last more than one year. It includes spending on construction, renovation and major repairs of buildings. Current expenditure

covers spending on resources used each year to operate the educational institution. It includes such spending as the pay of teachers and institution staff, maintenance of buildings, school meals, and the rental of buildings and other facilities.

Figure 7.3. What current and capital expenditure on education covers



Calculation

Relative proportion of current expenditure:

$$\frac{EDU_EXPENDITURE_{current,EducLevel}}{EDU_EXPENDITURE} \text{x}100$$

Relative proportion of capital expenditure:

$$\frac{EDU_EXPENDITURE_{capital,EducLevel}}{EDU_EXPENDITURE} \text{x}100$$

$EDU_EXPENDITURE_{current,EducLevel}$ refers to spending on goods and services consumed at a certain level of education within the current year and requiring recurrent production in order to sustain educational services. Other than salaries, current expenditure by educational institutions includes expenditure on subcontracted services such as support services (e.g. maintenance of buildings), ancillary services (e.g. preparation of meals for students) and rental of buildings and other facilities. It also includes expenditure on other resources and covers the purchases of other resources used in education, such as teaching and learning materials, other materials and supplies, items of equipment not classified as capital, fuel, electricity, telecommunications, travel expenses, and insurance, and required payments other than expenditure on educational resources and services. For example, this indicator includes the property taxes that educational institutions are required to pay in some countries. These services are obtained from outside providers, unlike the services provided by the education authorities or by the educational institutions using their own personnel. All sources of funding are considered in this definition, public and private.

$EDU_EXPENDITURE_{capital,EducLevel}$ refers to spending on assets at a specific level of education that last longer than one year. It includes construction, renovation or major repair of buildings and new or replacement equipment. It represents the value of educational capital acquired or created during the year in question – that is, the amount of capital formation – regardless of whether the capital expenditure was financed from current revenue or through borrowing. For example, if a school building costing EUR 10 millions is constructed in 2010, the full amount should be reported as capital expenditure for 2010, even if the building is financed by a loan with repayments spread over 20 years. If the building was constructed over two years, 2009-10, with EUR 7 million paid towards the cost of construction in the first year and EUR 3 million in the second year, capital outlays of EUR 7 million should be included in the 2009 data and EUR 3 million in the 2010 data. All sources of funding are considered in this definition, public and private.

$EDU_EXPENDITURE$ refers to total educational expenditure at all levels of education, including public and private sources.

Limitations and further considerations

- Neither current nor capital expenditure includes debt servicing (e.g. interest payments or repayments of the principal). This means that neither interest payments nor repayments of the principal should be counted as part of capital or current spending.

7.6.7. Factors influencing the level of expenditure on education

Policy context

Governments have become increasingly interested in the relationship between the amount of resources devoted to education and student learning outcomes. Governments seek to provide more and better education for their populations while also ensuring that public funding is used efficiently, particularly when public budgets are being tightened. Teachers' pay usually makes up the largest share of expenditure on education and thus of expenditure per student. Teachers' salary costs are a function of students' instruction time, teachers' teaching time, teachers' salaries and the number of teachers needed to teach students, which depends on estimated class size. This indicator seeks to explain the contribution of each of the four factors mentioned to the salary cost of teachers per student in primary and secondary education.

Calculation

Salary cost of teachers per student:

$$SAL \text{ x } instT \text{ x } \frac{1}{teachT} \text{ x } \frac{1}{ClassSize} = \frac{SAL}{Ratiostud\ /\ teacher}$$

Where *SAL* refers to teachers' salaries, estimated as the statutory salary after 15 years of experience. Teachers' salaries in national currencies are converted into equivalent USD by dividing the national currency figure by the purchasing power parity (PPP) index for private consumption.

instT refers to instruction time of students, estimated as the annual intended instruction time, in hours, for students.

teachT refers to teaching time of teachers estimated as the annual number of teaching hours for teachers.

ClassSize is computed based on the ratio of students to teaching staff and the number of teaching hours and instruction hours.

Ratiostud/teacher refers to the ratio of students to teaching staff.

Contribution of various factors to explain the difference between two variables

The analysis of the contribution of various factors to a difference between two variables is assessed, based on an assumption relating to the mathematical relationship between these variables and the explanatory:

$$X_1 = Q_1 \times R_1 \times S_1 \times T_1$$

$$X_2 = Q_2 \times R_2 \times S_2 \times T_2$$

then:

$$\frac{X_2}{X_1} = \frac{Q_2 \times R_2 \times S_2 \times T_2}{Q_1 \times R_1 \times S_1 \times T_1}$$

and,

$$1 + \frac{X_2 - X_1}{X_1} = \left(1 + \frac{Q_2 - Q_1}{Q_1}\right) \times \left(1 + \frac{R_2 - R_1}{R_1}\right) \times \left(1 + \frac{S_2 - S_1}{S_1}\right) \times \left(1 + \frac{T_2 - T_1}{T_1}\right)$$

Which can also be written as:

$$1 + V = (1 + U) \times (1 + W) \times (1 + Y) \times (1 + Z)$$

Where

$$V = \frac{X_2 - X_1}{X_1}, U = \frac{Q_2 - Q_1}{Q_1}, W = \frac{R_2 - R_1}{R_1}, Y = \frac{S_2 - S_1}{S_1}, Z = \frac{T_2 - T_1}{T_1}$$

The right hand side of the equation can also be written as:

$$V = U + W + Y + Z + UW + UY + UZ + WY + WZ + YZ + UWY + UYZ + WYZ + UWYZ$$

where V is the relative variation between X_2 and X_1 ($V = (X_2 - X_1)/X_1$).

The contribution of the different explanatory factors to the relative variation between X_2 and X_1 is therefore:

i) for factor Q:

$$U + \frac{UW}{2} + \frac{UY}{2} + \frac{UZ}{2} + \frac{UWY}{2} + \frac{UWZ}{2} + \frac{UYZ}{2} + \frac{UWYZ}{2} = A$$

ii) for factor R:

$$W + \frac{UW}{2} + \frac{UY}{2} + \frac{UZ}{2} + \frac{UWY}{3} + \frac{UWZ}{3} + \frac{UYZ}{3} + \frac{UWYZ}{4} = B$$

iii) for factor S:

$$Y + \frac{WY}{2} + \frac{UY}{2} + \frac{YZ}{2} + \frac{UWY}{3} + \frac{UYZ}{3} + \frac{WYZ}{3} + \frac{UWYZ}{4} = C$$

iv) for factor T:

$$Z + \frac{UZ}{2} + \frac{WZ}{2} + \frac{YZ}{2} + \frac{UWZ}{3} + \frac{UYZ}{3} + \frac{WYZ}{3} + \frac{UWYZ}{4} = D$$

where $A + B + C + D = V$

With this method, we can measure the direct and indirect contribution of each factor to the variation of the variable between the two countries. For example, if a worker receives a 10% increase of the hourly wage and increases the number of hours of work by 20%, his earnings will increase by 32%, resulting from the direct contribution of each of these variations (0.1 + 0.2) and the indirect contribution of these variations due to the combination for these two factors (0.1*0.2).

The contribution of explanatory factors to the absolute difference between the two variables (X_2 - X_1) is:

i) for factor U:

$$\frac{A}{V} \times (X_2 - X_1) = AX_1 = a$$

ii) for factor R:

$$\frac{B}{V} \times (X_2 - X_1) = BX_1 = b$$

iii) for factor S:

$$\frac{C}{V} \times (X_2 - X_1) = CX_1 = c$$

iv) for factor T:

$$\frac{D}{V} \times (X_2 - X_1) = DX_1 = d$$

With

$$a + b + c + d = X_2 - X_1$$

Limitations and further considerations

- Class size is an estimated proxy for the average number of students that are grouped together in classrooms. It is estimated on the basis of the ratio of students to teaching staff and the number of teaching hours and instruction hours. As a proxy, this estimate should be interpreted with caution.
- The salary cost of teachers per student is estimated based on theoretical values: statutory salaries at a specific point in the salary scale, theoretical students' instruction times and statutory teachers' teaching times, and estimated class sizes. As a consequence, this measure may differ from the actual teachers' salary costs resulting from the combination of actual average values for these four factors.

7.7. Participation and access to education

A well-educated population has become a defining feature of a modern society. Education is seen as a mechanism for instilling civic values, and as a means for developing individuals' productive and social capacity. Early childhood programmes prepare young children socially and academically for primary education. Primary and secondary education provides basic skills that serve as a foundation for young people to become productive members of society. Tertiary education provides opportunities to acquire

advanced knowledge and skills, either immediately after initial schooling or later. This section outlines the main methodologies used to report access and participation in education using enrolment rates, expected number of years in education and first-time entry rates. It also covers the international dimension of higher education.

7.7.1. Enrolment rates – from early childhood to tertiary education

Policy context

Information on enrolment rates at various levels of education provides a picture of the structure of different education systems, as well as access to educational opportunities in those systems.

In addition to analysing the paths of individuals through the educational system, enrolment rates provide additional information such as the prevalence of part-time study, vocational education and training, and formal education of adults beyond the typical enrolment age group.

Calculation

The enrolment rates in *Education at a Glance* are net enrolment rates and are calculated by dividing the number of students of a particular age or age group enrolled in all levels of education by the number of people in the population in that age or age group (UNESCO-UIS / OECD / EUROSTAT, 2017[2]).

Enrolment rate:

$$\frac{ENRL_{Age,Gender,EducLevel,general/vocational,part-time/full-time}}{Population_{\boldsymbol{Age}}} \text{x}100$$

Where $ENRL_{Age,Gender,EducLevel,general/vocational,part-time/full-time}$ is the number of people of a specific age or age group who are enrolled in a particular level of education. This figure can further be broken down by gender, programme orientation (general/vocational) and intensity (part-time/full-time).

$Population_{Age}$ is the corresponding population of the same age or age group.

This indicator is typically calculated for single ages (15, 16, 17, 18, 19, etc.) or age groups (5-14 year-olds, 15-19 year-olds, 20-29 year-olds, 25-64 year-olds).

Limitations and further considerations

- Enrolment data and population data must refer to the same time period, as differences in the reference dates between those data can lead to errors in calculation and rates exceeding 100%. Students' ages used in the enrolment data usually refer to their age on the 1st of January of the reference year (see Chapter 4, Section 4.1.7 for more details).

7.7.2. Expected years in education

Policy context

Expected years in education is an estimate of the number of years an individual may expect to be in education. This comprises enrolment in all forms of formal education, including non-continuous and incomplete participation.

Calculation

Expected years in education is measured as the sum of the age-specific probabilities of enrolment of the total population of a given country. It provides a realistic approximation of the number of years spent in school for levels of education in which the majority of the population at the typical age is enrolled.

Option 1: Expected years in education

$$\sum_{Age=5,\ldots,39} \frac{ENRL_{Age,Gender}}{Population_{Age,Gender}} \text{x}100$$

Where $ENRL_{Age,Gender}$ is the number of students aged 5 to 39 enrolled in education in the reference year.

$Population_{Age,Gender}$ is the population at age 5 to 39.

Expected years in education can be calculated separately by gender.

Option 2: Expected years in education and at work between the ages of 15 and 29

$$\frac{STUDENT_{15-29Yrs,Gender}}{Population_{15-29Yrs,Gender}} \text{x}15$$

Where $STUDENT_{15-29Yrs,Gender}$ is the number of 15-29 year-olds in education and $Population_{15-29Yrs,Gender}$ is the 15-29 year-old population

This calculation is not based on the sum of the age-specific probabilities of enrolment, but rather on the share of 15-29 year-olds in each category multiplied by 15 (the number of years between 15 and 29). For example, if 50% of 15-29 year-olds are in education, the expected number of years in education is 7.5 years (0.50*15).

Expected years in education can be calculated separately by gender.

For this option, the data sources are the national labour force surveys.

Limitations and further considerations

- In *Education at a Glance*, the expected years in education is calculated for the population aged 5 to 39 and estimates the number of years in which an individual is expected to be enrolled in an educational programme (either part-time or full-time) during those ages. This interpretation assumes that that the current patterns of enrolment will remain unchanged over time.
- The expected years in education cannot be interpreted as a measure of educational attainment.
- When comparing data on expected years of education across countries, it must be borne in mind that neither the length of the school year nor the quality of education is necessarily the same in each country. In addition, unless specified, this indicator makes no distinction between full and part-time study and these are given equal weight in the calculation.

7.7.3. Share of repeaters and share of over-age students

Policy context

The way educational systems cope with students who repeat grades may differ greatly between countries and within the same countries across ISCED levels, programmes, rural or urban areas, socio-economic conditions or other factors. The existence of repeaters and their distribution across different grades varies greatly from country to country.

The number of repeaters is closely linked to the number of over-age students (i.e., students at least two years older than the intended age for a grade), as in most countries the main reason for having a large share of over-age students is the accumulation of students who have repeated at least one year in one grade or another. The share of over-age students is thus a complementary metric to the share of repeaters. Over-age students in the final grade of any level are likely to enter the labour market with a disadvantage.

Calculation

The share of repeaters is the number of repeaters in a grade and year compared to the total number of students enrolled in the same grade and year.

The share of over-age students is the number of students at least two years older than the intended age for a grade compared to the number of students enrolled in the same grade. The intended ages of enrolment for each grade are available in each country's ISCED mapping.

Share of repeaters:

$$\frac{\sum_{grade} RPTR}{\sum_{grade} ENRL} \times 100$$

Share of over-age students:

$$\frac{\sum_{grade} OVERAGE}{\sum_{grade} ENRL} \times 100$$

Where RPTR is the number of repeaters enrolled in a given grade and ISCED level and OVERAGE is the number of over-age students in a given grade and ISCED level, i.e. at least two years older than that grade's intended age of enrolment. ENRL is the number of students enrolled in initial education, i.e. before their entry into work.

The calculation is limited to the last grade of each ISCED level.

Limitations and further considerations

- The share of repeaters differs from the repetition rate as it is calculated by comparing repeaters to the total number of students enrolled in the grade and year in which they are re-enrolled rather than to their original grade and year. This indicator thus measures the relative presence of repeaters in an educational system, but not the rate of failure of a given grade or ISCED level.
- The calculation of the share of over-age students is based on data on enrolment by age and is indicative of the share of students who are likely to enter the next grade or ISCED level after a delay. However, for some countries, any misalignment between the reference ages of the data on enrolment by age and the intended ages

recorded in the ISCED mappings may result in an under- or over-estimation of the share of over-age students. For example, if students are allowed to enrol in a grade if they are 12 years old on 30 June 2015, but their enrolment is measured on 1 January 2016, it is likely that half of the students will have turned 13 by then and the share of over-age students is likely to be over-estimated.

7.7.4. Entry rates to tertiary education

Policy context

Entry rates to tertiary education estimate the proportion of people from a specified age cohort who enter a certain level of tertiary education. Entry rates are currently only calculated at the tertiary level, where the policy relevance is greatest. It provides information on the accessibility of tertiary education, the perceived value of attending tertiary programmes, and the degree to which a population is acquiring the high-level skills and knowledge that can create and fuel knowledge-based economies.

Calculation

Entry rates are calculated for each ISCED level of tertiary education. The first-time entry rate into tertiary education as a whole is also estimated.

Entry rates are calculated as net entry rates unless lack of data prevents this in which case they are calculated as gross entry rates.

The net entry rate for a specific age group is obtained by dividing the number of new or first-time entrants in that age group for each type of tertiary education by the total population in the corresponding age group. The overall net entry rate is calculated by adding the rates for each age group. The result represents an estimate of the probability that a young person will enter tertiary education in his or her lifetime if current age-specific entry rates continue.

Net entry rate:

$$\sum \frac{NewEntrants_{\,EducLevel,Age}}{Population_{Age}} \text{ x } 100$$

Where $NewEntrants_{\,EducLevel,Age}$ is the number of new entrants at a specific age to tertiary education for each of the following education levels: short-cycle tertiary programmes, bachelor's level or equivalent, master's level or equivalent and doctoral programmes.

$Population_{Age}$ is the number of people in the population of the same age.

Since data by single years are only available for ages 11 to 49, the net entry rate for older students is estimated from data for 5-year age bands until the age of 64, and the whole cohort for 65 year-olds and over.

When data on new entrants are not available by age, the **gross entry rate** is calculated. This is the ratio of all new entrants, regardless of their age, to the size of the population at the typical age of entry.

Gross entry rate:

$$\sum \frac{NewEntrants_{\,EducLevel,All\ Ages}}{Population_{Typical\ Age}} \text{ x } 100$$

Where $NewEntrants_{EducLevel,All\ Ages}$ is the total number of new entrants to tertiary education for each of the following education levels: short-cycle tertiary programmes, bachelor's level or equivalent, master's level or equivalent and doctoral programmes, irrespective of their age.

$Population_{Typical\ Age}$ is the number of people in the population that are at the typical age of entry to that level (see Chapter 4, Section 4.1.7 for more details).

Not all countries can distinguish between students entering a tertiary programme for the first time and those transferring between different levels of tertiary education or repeating or re-entering a level after an absence.

First-time entry rate at tertiary level:

$$\sum \frac{NewEntrants_{TertiaryLevel,AgeGroup}}{Population_{AgeGroup}} x\ 100$$

Where $NewEntrants_{TertiaryLevel,AgeGroup}$ is the number of new entrants to any level of tertiary education at a specific age group and $Population_{Age}$ is the number of people in the population of the same age group.

Rates for each level of tertiary education cannot simply be added together to form a total tertiary-level new entrants rate because it would result in counting entrants twice.

Entry rates can be disaggregated by gender and national origin. The profile of new entrants can also be disaggregated by fields of education.

Limitations and further considerations

- Entry rates represent the percentage of an age cohort that is expected to enter a tertiary programme over a lifetime. This estimate is based on the number of new entrants in a reference year and the age distribution of this group. Therefore, the entry rates are based on a "synthetic cohort" assumption, according to which the current pattern of entry constitutes the best estimate of the behaviour of today's young adults over their lifetime. Entry rates are sensitive to changes in the education system, such as the introduction of new programmes. For example, during the implementation of the Bologna Process, some students in European countries stayed longer than expected in tertiary education, while others postponed their entrance in order to earn a degree under the new classification. Entry rates can be very high, and even greater than 100% (thus clearly indicating that the synthetic cohort assumption is implausible), during a period when there are an unexpectedly high number of entrants.
- In interpreting these indicators, it must be remembered that student numbers are reported on a domestic basis. In countries with limited tertiary study opportunities, entry/participation rates will appear low.
- The entry rate adjusted for international students calculates the entry rate while excluding international students in the numerator of each age-specific entry rate. In several countries, all international students enrolling for the first time in that country are counted as new entrants, regardless of their previous education in other countries. To highlight the impact of international students on entry rates, both unadjusted and adjusted entry rates (i.e. the entry rate when international students are excluded from consideration) should be considered.

7.7.5. International students in tertiary education

Policy context

The term "international students" refers to students who have crossed borders specifically for the purpose of study. Tertiary education is becoming more international, not just through student mobility, but also through a number of other factors such as distance education, international education-related internships and training experiences, cross-border delivery of academic programmes and offshore satellite campuses.

Student mobility is of great interest to both governments and university leaders. From the government's perspective, higher student mobility provides increased access to an international talent pool during the course of study and after graduation. From the university's perspective, higher student mobility provides increased funding in terms of tuition fees, and international diversity contributes to the dynamism of an educational programme which in turn fosters an attractive environment for talented students and academic staff.

Student mobility has increased dramatically over the past years which raises some policy questions and has increased the need for monitoring.

Calculation

Student mobility can be calculated from the perspective of the country of origin or of the country of destination. International students are those who received their prior education in another country and are not residents of their current country of study (see definitions in Chapter 4, Section 4.1.8). When information on international students is not available, foreign students – students who are not citizens of the country in which they study – can be used as a proxy.

Foreign and international student enrolment provides evidence of the extent of student mobility in tertiary education. This indicator shows international enrolment as a proportion of the total enrolment in the destination (host) country at tertiary level.

International or foreign enrolment:

$$\frac{ENRL_Foreign/International_{EducLevel,EducField,Gender,DestA}}{ENRL_{EducLevel,EducField,DestA}} \text{x}100$$

Where $ENRL_Foreign/International_{EducLevel,EducField,Gender,DestA}$ refers to the number of international and foreign students of a particular education/ISCED level, field of education, and gender, enrolled in a given destination country.

$ENRL_{EducLevel,EducField,DestA}$ refers to the total enrolment at the same education/ISCED level, field of education, and destination country, including local, international, and foreign students.

The data can be broken down by gender, by different tertiary levels of education (short-cycle tertiary, bachelor's or equivalent, master's or equivalent, doctoral or equivalent) or by fields of education, indicating the relative attractiveness of tertiary programmes for international students in each country.

The distribution of international or foreign students in OECD countries at tertiary level by country of destination identifies the major destinations of international students by

estimating the proportion of international students enrolled in each OECD country as a proportion of all international students enrolled in OECD countries.

Distribution of foreign and international students by country of destination:

$$\frac{ENRL_Foreign/International_{DestA,OriginALL}}{ENRL_Foreign/International_{OECDTotal}} \text{x}100$$

Where $ENRL_Foreign/International_{DestA,OriginALL}$ refers to the total number of international or foreign students enrolled in a given country of destination.

$ENRL_Foreign/International_{OECDTotal}$ refers to the total number of international or foreign students enrolled in OECD countries.

The distribution of destinations of international or foreign students at tertiary level by country of origin identifies the major destinations of international or foreign students.

Distribution of destinations of international or foreign students by country of origin:

$$\frac{ENRL_Foreign/International_{DestA,OriginB}}{ENRL_Foreign/International_{DestALL,OriginB}} \text{x } 100$$

Where $ENRL_Foreign/International_{DestA,OriginB}$ refers to the number of international or foreign students enrolled in destination country A from country of origin B.

$ENRL_Foreign/International_{DestALL,OriginB}$ refers to the number of all international or foreign students from country of origin B who are enrolled abroad.

The distribution of the origins of international or foreign students at tertiary level by country of destination indicator identifies the main regions of origin of international or foreign students for a given country as a percentage of all international or foreign students enrolled in that country. This analysis can be used to assess the extent of cross-border mobility (the percentage of international or foreign students coming from neighbouring countries).

Distribution of the origins of international or foreign students by country of destination:

$$\frac{ENRL_Foreign/International_{DestA,OriginB}}{ENRL_Foreign/International_{DestA,OriginALL}} \text{x } 100$$

Where $ENRL_Foreign/International_{DestA,OriginB}$ refers to the number of international or foreign students enrolled in destination country A from country of origin B.

$ENRL_Foreign/International_{DestA,OriginALL}$ refers to the total of all international or foreign students enrolled in destination country A.

The percentage of national tertiary students enrolled abroad indicator identifies the share of national students enrolled abroad as a share of all tertiary students.

Percentage of national tertiary students enrolled abroad:

$$\frac{ENRL_Foreign/International_{DestAll,OriginB}}{ENRL_{\ OriginB}} \text{x}100$$

Where $ENRL_Foreign/International_{DestAll,OriginB}$ refers to number of international or foreign students from country B who are enrolled abroad.

$ENRL_{OriginB}$ refers to total tertiary enrolment of students from country B.

The global balance of student mobility indicator identifies in relative terms the number of international students in country A, compared to the number of students from country A studying abroad. In other words, this indicator measures the balance for a given country between incoming international or foreign students and outgoing national students studying abroad.

Global balance of student mobility:

$$\frac{ENRL_Foreign/International_{DestA,OriginALL}}{ENRL_Foreign/International_{DestALL,OriginA}} \text{x}100$$

Where $ENRL_Foreign/International_{DestA,OriginALL}$ refers to the number of international or foreign students enrolled in country A.

$ENRL_Foreign/International_{DestALL,OriginA}$ refers to the number of international or foreign students from country A who are enrolled abroad.

Change in the inflow of international or foreign enrolment (since 2013):

$$\frac{ENRL_Foreign/International_{DestA,OriginALL,2016}}{ENRL_Foreign/International_{DestA,OriginALL,2013}} \text{x}100$$

Where $ENRL_Foreign/International_{DestA,OriginALL,2016}$ refers to the number of international or foreign students enrolled in country A in 2016.

$ENRL_Foreign/International_{DestA,OriginALL,2013}$ refers to the number of international or foreign students enrolled in country A in 2013.

Change in the outflow of international or foreign enrolment towards OECD countries (since 2013):

$$\frac{ENRL_Foreign/International_{DestALL,OriginA,2016}}{ENRL_Foreign/International_{DestALL,OriginA,2013}} \text{x}100$$

Where $ENRL_Foreign/International_{DestALL,OriginA,2016}$ refers to the number of international or foreign students from country A enrolled in OECD countries in 2016.

$ENRL_Foreign/International_{DestALL,OriginA,2013}$ refers to the number of international or foreign students from country A enrolled in OECD countries in 2013.

Limitations and further considerations

- The data on students studying abroad are provided by the countries of destination. As a result, the data by country of origin are normally comprehensive and cover most of the countries in the world where students originate from. Data by country of destination are not as complete, as the destinations include only the OECD countries.
- There is a distinction between “international students” and “foreign students”. The measurement of student mobility depends to a large extent on country-specific immigration legislation and constraints on data availability. Countries are free to define “international students” as those who are not residents of their country of study or as students who received their prior education in another country. Some countries, which do not have information on international students,

submit data on foreign students or students who are not citizens of the country in which the data are collected. Using data on foreign students can overestimate the number of tertiary students who go to a particular country for the purpose of study.

- Indicators are often presented with details by country of origin and by country of destination. To identify results "by destination", the total for all destinations should reach 100%, and "by origin", the total for all countries of origin should reach 100%.
- The distribution of international students among destination countries identifies the top receiving countries in absolute terms but does not reflect the percentage of international/foreign students in relative to tertiary enrolment in the host country. For example, the United States is an attractive region for international students, as the United States accounts for 18.6% of the total OECD destinations ((OECD, 2016[5])) but international students make up only 4% of students in the United States.

7.8. Participation of adults in education

7.8.1. Participation of adults in education

Policy context

As a result of globalisation and the development of new technologies, competition for skills is fierce, particularly in high-growth, high-technology markets. In order to function effectively in this context, an ever-larger segment of the population must be able to adapt to changing technologies, and to learn and apply a new set of skills tailored to meet the needs of the changing labour market.

As part of lifelong learning, adult learning is essential for upgrading the skills of the labour force and considered crucial for meeting the challenges of economic competitiveness and demographic change, and for combating unemployment, poverty and social exclusion.

Calculation

This indicator measures the percentage of adults aged 25-64 participating in learning activities to improve their technical or professional qualifications; further develop their abilities; enrich their knowledge to complete a level of formal education; or to acquire, refresh or update their knowledge, skills and competencies in a particular field. This also includes what may be referred to as "continuing education", "recurrent education" or "second chance education".

Distribution of the population participating in adult education:

$$\frac{Population_{25-64\ who\ participated\ in\ learning\ activities}}{Population_{25-64}}$$

This indicator can be calculated for different age groups, or by gender, educational attainment level, literacy or numeracy proficiency level and employment status.

All data are based on the Survey of Adult Skills (PIAAC). PIAAC is the OECD Programme for the International Assessment of Adult Competencies. For more information on PIAAC please consult (OECD, 2016[6]).

Limitations and further considerations

- The large variation in adult learning activities and participation among OECD countries at similar levels of economic development suggests that there are significant differences in learning cultures, learning opportunities at work and adult education structures.

7.9. Learning environment and teacher working conditions analysis

Five main indicators have been developed to describe the learning environment and teachers' working conditions: instruction time in compulsory education, average class size and student-teacher ratio, teachers' salaries, teaching time, and the age and gender profiles of teachers.

7.9.1. Instruction time

Policy context

Providing instruction in formal classroom settings accounts for a large portion of public investment in education. Countries make various choices about the duration of compulsory education, the overall amount of time devoted to instruction and which subjects are compulsory. These choices reflect national and/or regional priorities and preferences concerning what material students should be taught and at what age. Countries usually have statutory or regulatory requirements regarding hours of instruction. These are most often stipulated as the minimum number of hours of instruction a school must offer, and are based on the understanding that sufficient instruction time is required for good learning outcomes. Matching resources with students' needs and making optimal use of time are central to education policy. Teachers' salaries, institutional maintenance and provision of other educational resources constitute the main costs of education. The length of time during which these resources are made available to students (as partly shown in this indicator) is an important factor in determining how funds for education are allocated.

Calculation

Instruction time refers to the number of hours per year of the compulsory and non-compulsory part of the curriculum that students are entitled to receive in public schools.

Instruction time at primary and/or lower secondary education:

$$\sum \text{Instruction time at a given level of education}$$

The intended curriculum can be based on regulations or standards of the central (or top-level) education authorities or may be established as a set of recommendations at the regional level (see definition of instruction time in Chapter 4, Section 4.3.1).

Limitations and further considerations

- Data only cover compulsory education from the first year of primary education until the end of full-time compulsory education for all students. In grades where vocational and general programmes co-exist, it only refers to the general programmes. Pre-primary education programmes, even if compulsory, are not within the scope of the present data collection.

- The compulsory curriculum refers to the amount and allocation of instruction that has to be provided in almost every public school and must be attended by almost all public sector students. The compulsory curriculum may be flexible, with local authorities, schools, teachers and/or pupils having varying degrees of freedom to choose the subjects and/or the allocation of compulsory instruction time. It does not show the actual number of hours of instruction that students receive and does not cover learning outside of the formal classroom setting. The regulatory minimum hours of instruction and the actual hours of instruction received by students may differ from country to country.
- Non-compulsory instruction time (within compulsory education) could also be measured but is rare across OECD countries. The non-compulsory part of the curriculum refers to the total amount of instruction time to which students are entitled beyond the compulsory hours of instruction and which almost every public school is expected to provide. Subjects can vary from school to school or from region to region and take the form of elective subjects. Students are not required to choose one of the elective subjects, but all public schools are expected to offer the option.

7.9.2. Average class size and student-teacher ratio

Policy context

Student learning and academic achievement could be improved when fewer students are participating together in learning activities. The basic rationale is that teachers who have fewer students can devote more time and attention to each student, including identifying their specific learning needs, and that the burden of managing large numbers of students (such as classroom disruptions) is lower. But the predominance of teachers' salary costs in educational expenditure means reducing class sizes leads to increases in the costs of education. Two indicators provide empirical evidence to this debate: student-teacher ratio and class size.

Calculation

The concept of student-teacher ratio is different from that of class size. Student-teacher ratio provides information on the level of teaching resources available in a country, whereas class size measures the average number of students are grouped together in classrooms.

Average class size:

$$\frac{Students_{\ EducLevel}}{Classes_{\ EducLevel}}$$

Where $Students_{EducLevel}$ is the total number of students enrolled at a specific level of education and $Classes_{EducLevel}$ is the total number of classes at the same level of education, excluding those taught in subdivisions and excluding special needs classes.

Ratio of students to teaching staff:

$$\frac{FTE\ Students_{\ EducLevel}}{FTE\ Teachers_{\ EducLevel}}$$

Where $FTE\ Students_{EducLevel}$ is the total number of full-time equivalent students enrolled at a specific level of education and $FTE\ Teachers_{EducLevel}$ is the total number of full-time equivalent teachers enrolled at the same level (see the definition of FTE in Chapter 4, Section 4.1.9). Teachers refer to professional personnel directly involved in teaching students: classroom teachers, special education teachers and other teachers who work with students as a whole class in a classroom, in small groups in a resource room, or in one-to-one teaching inside or outside a regular classroom. This does not include teachers' aides and other paraprofessional personnel.

Limitations and further considerations

- Although one country may have a lower ratio of students to teaching staff than another, this does not necessarily mean that classes are smaller in the first country or that students in the first country receive more teaching. The relationship between the ratio of students to teaching staff and average class size is complicated by many factors, including differences between countries in the length of the school year, the annual number of hours for which a student attends class, the annual time teachers are expected to spend teaching, the grouping of students within classes and the practice of team teaching.
- Calculating the number of classes over the course of a school year can be complicated if classes subdivide into groups for certain parts of the curriculum. For example, if a class of 20 students receive tuition together for all but 1 lesson when the class splits into 2 groups of 10, it would be misleading to give the 2 classes of 10 students equal weight to the single class with 20 students. For simplicity, when calculating class size at primary and lower secondary, where such splitting of classes is less prevalent, the advice given is to exclude the subdivisions from the calculation. On the other hand, at upper secondary level it would be advisable to weight the subdivisions according to the proportion of the school week they account for, though a methodology has not yet been established for this.
- For the ratio of students to teachers to be meaningful, consistent coverage of personnel and enrolment data are needed. For instance, if teachers in religious schools are not reported in the personnel data, then students in those schools must also be excluded.
- Because of the difficulty of constructing direct measures of educational quality, this indicator is also often used as a proxy for quality, on the assumption that a smaller ratio of students to teaching staff means better access by students to teaching resources. However, a low ratio of students to teaching staff does not necessarily mean better access to teaching and to educational support and may simply be a symptom of ineffective use of human resources. On the other hand, a very high ratio of students to teaching staff certainly suggests insufficient professional support for learning, particularly for students from disadvantaged home backgrounds. Such inferences need to be made with great care since many other factors influence learning outcomes. A reduction in the ratio of students to teaching staff may have to be weighed against higher salaries for teachers, greater investment in teaching technology, or more widespread use of assistant teachers and other paraprofessionals, whose salaries are often considerably lower than those of qualified teachers.

7.9.3. School heads' and teachers' salaries

Policy context

The recruitment and retention of an educated and skilled teaching workforce is of major concern to most OECD countries. Salaries and working conditions are key determinants of the supply of qualified school heads and teachers, including starting salaries and the structures of pay scales, and the costs incurred by individuals in becoming school heads or teachers, compared with the salaries and costs involved in other occupations. Both factors affect the career decisions of potential school heads and teachers and the type of people attracted to the teaching profession.

Teachers' salaries represent the largest single cost in formal education and have a direct impact on the attractiveness of the teaching profession. The compensation of teachers is thus a critical consideration for policy makers seeking to maintain the quality of teaching and a balanced education budget. School heads' salaries also have an impact on the attractiveness of the profession. The compensation of school heads is thus also a critical consideration for policy makers seeking to maintain the good management of schools within a balanced budget.

Calculation

Statutory salaries as reported by most of the countries must be distinguished from actual expenditures on wages by governments and from **actual average salaries,** which are influenced by factors such as the level of experience of the workforce and the prevalence of bonuses and allowances in the compensation system (see the definition of teachers' salaries in Chapter 4, Section 4.2.7 which also applies to school heads' salaries).

To allow for comparison, salaries are presented in equivalent US dollars adjusted for cross-national differences using purchasing power parities (PPPs) for private consumption from the OECD National Accounts Database. The PPP exchange rate compares different countries' currencies through a market "basket of goods". PPP controls for the different costs of living and price levels across countries.

Salaries in equivalent US dollars:

$$\frac{SALARY}{PPP}$$

Where *SALARY* is the annual gross statutory or actual salaries of school heads and teachers. The data can be presented by the level of education taught/managed, years of experience and level of qualification, gender, and age groups.

Salaries relative to similarly educated workers:

$$\frac{Salary}{Average\ tertiary\ earnings}$$

Relative salaries refer to the ratios of teachers' or school heads' salaries relative to the earnings of similarly qualified workers. In most OECD countries, a tertiary degree is required to become a teacher or a school head at all levels of education, so the likely alternative to teacher education is a similar tertiary education programme. Thus, to interpret salary levels in different countries and reflect comparative labour-market conditions, salaries are compared to earnings of tertiary-educated professionals: 25-64

year-old full-time, full-year workers with a similar tertiary education. Two methodologies are available when considering the average tertiary earnings to be used in the computation of relative salaries:

- **The ratios based on weighted averages**. This methodology is used to ensure that the comparison between teachers' salaries and earnings of tertiary-educated workers is not distorted by differences between the distribution of teachers by tertiary attainment and the distribution of tertiary-educated workers by attainment level. According to this method, the salaries of teachers are compared to a weighted average of earnings of similarly educated workers. The weighted average is calculated based on the distribution of teachers with each level of attainment. This weighted average is then used as the denominator when data are available on the wages (i.e. the earnings of full-time full-year workers) broken down by ISCED level of tertiary attainment.
- **The ratios based on average earnings of all tertiary-educated workers**. This method is used when the distribution of teachers by attainment level is not available and/or the earnings of tertiary-educated workers by tertiary attainment are not available.
- These methods are used to calculate relative salary of teachers or school heads for both statutory and actual salaries.

When data on earnings of workers refer to a different reference year than the year used for teachers' salaries, a deflator is used to adjust the earnings data to the same reference year as that of teachers.

Limitations and further considerations

- School heads' and teachers' salaries refer to salaries in public pre-primary, primary, lower and upper secondary institutions.
- School heads' and teachers' salaries can also be presented relative to earnings for similarly educated workers (based on the two different methods noted above). Data on workers' earnings take account of earnings from work of all individuals during the reference period, including those of teachers. In most countries, the population of teachers is large and may impact the average earnings of workers.
- Teachers' statutory salaries are given at four different points in their careers to provide a relative range of earnings: starting salaries, salaries after 10 years of experience, salaries after 15 years of experience and salaries at the top of the scale. Statutory salaries are also presented for three qualification levels of teachers. In addition to salary ranges, most countries use a complex system of bonuses to increase basic salaries and reward qualifications and performance in teaching. These additional payments, which are currently not reflected in this indicator, may explain certain differences between statutory scheduled salaries and actual average salaries. As a result, the international comparison of basic salaries will be a biased approximation of actual teachers' monetary incentives depending on countries' relative emphasis on bonuses or base salaries.
- Teachers' salaries per hour of net contact (teaching) time after 15 years of experience are also given. This provides a measure of statutory salary relative to the number of hours per year that a full-time teacher teaches a group or class of students according to the formal policy in that country. However, this does not

adjust for the amount of time that teachers spend in various non-teaching activities. As the breakdown of teaching and non-teaching time varies considerable across OECD countries, statutory salaries per hour of net teaching time must be interpreted with caution.

7.9.4. Teaching time

Policy context

Statutory working hours and teaching hours offer valuable insight into teachers' actual workload. Where a large proportion of statutory working time is spent teaching, teachers may have less time to devote to tasks such as assessing students and preparing lessons. It also could indicate that teachers have to perform these tasks on their own time and to work more hours than required by statutory working time. The amount of time teachers spend teaching also affects the financial resources countries need to allocate to education.

Calculation

Teaching time per year measures the time spent teaching students in a classroom. It is equal to the number of school weeks per year (net of holidays, days off, festivities etc.) converted into days, multiplied by the number of hours a teacher teaches per day (converted into 60-minute periods and excluding lunch breaks and short morning or afternoon breaks of ten minutes or longer). See Chapter 4, Section 4.2.6 for more details.

Limitations and further considerations

- Teaching time is given for teachers in public pre-primary, primary, lower and upper secondary institutions.
- Reported teaching time refers to net contact time, excluding periods of time formally allowed for breaks between lessons or groups of lesson and preparation time. Some countries include breaks for pre-primary and primary classroom teachers if they are responsible for the class during these breaks, which may explain some differences across countries. The number of teaching hours per day can be given in various ways – as an average, minimum, typical or maximum figure – which may further explain discrepancies across countries.
- It is worth distinguishing between teachers' statutory teaching and working time and their actual teaching time. Actual teaching time is the annual average number of hours that full-time teachers teach a group or a class of students, including overtime, and thus provides a picture of teachers' actual teaching load.

7.9.5. Teachers' age and gender distribution

Policy context

Understanding who a country's teachers are is important when setting policies to encourage effective teachers to continue teaching. Several OECD countries have a large proportions of their teachers set to reach retirement age in the next decade, while others face a projected increase in the size of the school-age population. Governments are thus under pressure to recruit and train new teachers. The gender profile of the teaching workforce also provides information about its diversity which can then contribute towards the design of effective teacher-retention or teacher-hiring policies.

Calculation

The same methodology is used to estimate age and gender distributions.

The age distribution indicator measures the share of teachers of a given age out of the total teaching workforce at a given ISCED level (UNESCO-UIS / OECD / EUROSTAT, 2017[2]).

Age distribution of teachers:

$$\frac{Teachers_{Age,EducLevel}}{Teachers_{Total,EducLevel}}$$

Where $Teachers_{Age,EducLevel}$ is the number of teachers in public and private institutions based on head counts, by age group and by level of education.

$Teachers_{Total,EducLevel}$ is the total number of teachers at that level of education minus the number of teachers reported as "age unknown".

This gender distribution indicator measures the share of teachers by gender out of the total teaching workforce at a given ISCED level.

Gender distribution of teachers:

$$\frac{Teachers_{Gender,EducLevel}}{Teachers_{Total,EducLevel}}$$

Where $Teachers_{Gender,EducLevel}$ is the number of teachers in public and private institutions based on head counts, by gender and by level of education.

$Teachers_{Total,EducLevel}$ is the total number of teachers at that level of education.

Limitations and further considerations

- If the number of teachers reported as "age unknown" is 30% or more of the total number of teachers then the age distribution is not calculated.
- It would be worth studying the potential impact of gender imbalances in the teaching profession on student achievement, student motivation and teacher retention, especially in countries where few men are attracted to the profession, but there is little evidence that a teacher's gender has an impact on student performance.

7.10. Education and work status of young people: The NEET rate

7.10.1. Education and work status of young people: The NEET rate

Policy context

The transition of younger individuals from education to working life varies with education opportunities and social and economic contexts. The percentage of people neither employed, nor in education or training (NEET) provides a clear picture of the labour-market situation of young people across different education pathways.

Calculation

This indicator analyses the situation of young people in transition: whether they are in education, employed or are neither employed nor in education or training during the reference period. This includes not only those who have not managed to find a job (unemployed NEETs), but also those who are not actively seeking employment (inactive NEETs).

$$\frac{NotInEducation_{Age,Gender} \cap \left[Unemployed_{Age,Gender} + Inactive_{Age,Gender}\right]}{Population_{Age,Gender}}$$

Where $NotInEducation_{Age,Gender} \cap [Unemployed_{Age,Gender} + Inactive_{Age,Gender}$ is the number of young people of a given age (between 15 and 29 years old) and gender not in education and unemployed or inactive, and $Population_{Age,Gender}$ is the total population of younger adults of that age and gender.

The sources for these data for most countries are the national labour force surveys (LFSs).

Limitations and further considerations

- Data disaggregated by educational attainment may underestimate or overestimate certain educational levels as a significant share of 15-29 year-olds are still in education and gaining a higher educational attainment level.
- Education status is understood in terms of education and/or training currently being received in the regular educational system, which could be during the previous four weeks (including the survey reference week) or over a shorter period. Some countries may include some people who are not classified as being in formal education, but who are in training (or education) for employment or for tertiary entrance examinations.

7.11. Equity in education: Intergenerational mobility indicators

7.11.1. Equity in education: Intergenerational mobility indicators

Policy context

Education opportunities can promote inclusive growth and reduce inequality in societies through improved employment opportunities, higher earnings and overall wealth. However, inequalities in educational attainment sometimes persist over generations, leading to widening inequality. To facilitate social inclusion, mobility and improve socio-economic outcomes now and for future generations, countries need to assure students have access to quality education. One way to measure this is through the progress in educational attainment across different generations, also known as intergenerational educational mobility.

Calculation

Intergenerational mobility in educational attainment refers to the proportion of individuals whose highest level of qualification is different (whether higher or lower) from their parents.

Downward mobility is when individuals in a specific age group have a lower educational attainment than that reached by both parents:

$$\frac{Population_{Age\ group, With\ educational\ attainment < parents' educational\ attainment}}{Population_{Age\ group}} \quad (1)$$

Upward mobility is when individuals in a specific age group achieve a higher educational attainment level than that reached by either of their parents:

$$\frac{Population_{Age\ group, With\ educational\ attainment > parents' educational\ attainment}}{Population_{Age\ group}} \quad (2)$$

Status quo is when individuals in a specific age group achieve the same level of educational attainment as their parent with the highest level of educational attainment:

$$\frac{Population_{Age\ group, With\ educational\ attainment = parents' educational\ attainment}}{Population_{Age\ group}} \quad (3)$$

Where (1) + (2) + (3) = 100%.

These indicators can help to estimate the number of **first generation tertiary-educated adults**. This refers to the share of adults in a given age group and gender who attained tertiary education when neither parent achieved this level:

$$\frac{Population_{Age,Gender,TertiaryEducLevel\ whose\ parents\ have\ no\ tertiary\ education}}{Population_{Age,Gender,TertiaryEducLevel}}$$

Where $Population_{Age,Gender,TertiaryEducLevel\ whose\ parents\ have\ no\ tertiary\ education}$ is the number of tertiary-educated individuals of a given age group and gender who have no parent with a tertiary education.

$Population_{Age,Gender,TertiaryEducLevel}$ is the total number of individuals of the same age group and gender with a tertiary education.

These indicators can be calculated for different age groups, gender and parents' immigration status (native-born parents versus foreign-born parents). Data are based on the Survey of Adult Skills (Programme for the International Assessment of Adult Competencies, PIAAC).

Limitations and further considerations

- As the share of adults with a high level of education increases, fewer young adults will show upward educational mobility.
- In some countries, limited upward mobility can be explained by the fact that upper secondary or post-secondary non-tertiary education plays a relatively important role in providing well-recognised labour-market qualifications.
- The analysis aggregates the levels of educational attainment considered (below upper secondary education, upper secondary or post-secondary non-tertiary education and tertiary education) so it does not reflect mobility within these levels, which does occur to a large extent in some countries.
- For some of these data, the resulting sample can be small resulting in larger-than-usual standard errors. Caution should be used when interpreting the results.

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OECD Handbook for Internationally Comparative Education Statistics 2018

CONCEPTS, STANDARDS, DEFINITIONS AND CLASSIFICATIONS

For well over two decades, the OECD has developed and published a broad range of comparative indicators published yearly in the flagship publication *Education at a Glance*. These provide insights into the functioning of education systems, such as the participation and progress through education, the human and financial resources invested, and the economic and social outcomes associated with educational attainment. Through the set of harmonised indicators and definitions, they enable countries to view their education system in the light of other countries' performance, practices and resources.

Fundamental to the credibility and understanding of these comparisons are the concepts, definitions, classifications and methodologies that have been developed over the years to underpin the statistics and indicators. This Handbook draws these methodologies together in a single reference volume, complementing and providing an invaluable aid to users of *Education at a Glance*. In doing so, the Handbook aims to facilitate a greater understanding of the education statistics and indicators produced and so allow for their more effective use in policy analysis. Equally, it provides a ready reference of international standards and conventions for others to follow in the collection and assimilation of educational data.

This edition updates the *OECD Handbook for Internationally Comparative Education Statistics*, last published in 2017.

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