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Education and Training Monitor 2020

Teaching and learning in a digital age

Directorate-General for Education, Youth, Sport and Culture

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Additional contextual data can be found at ec.europa.eu/education/monitor

Foreword

2020 has been a challenging year, for Europe and for the world. The COVID-19 pandemic has exposed more than 100 million Europeans, who are part of the education and training community, to new realities, new ways of communicating, learning and teaching. During this difficult period, education institutions and teachers demonstrated their dedication to learners' wellbeing and continued learning, as well as their enormous capacity for flexibility, creativity and innovation. At the same time, however, the crisis shone a spotlight on existing weaknesses in our education systems. Socio-economic background is still the most important determinant of educational outcomes in the EU, and the crisis is likely to have the most detrimental effect on those learners who were already in a disadvantaged position before it started.

Our task now is to prevent the crisis from becoming a long-term structural barrier for our younger generations' future. As we look back on the past decade, we see both successes and enduring challenges. On the one hand, more and more children participate in education from an earlier age and for longer. More young people than ever in Europe obtain higher education qualifications. However, basic skills have not improved in the last ten years, and we must now focus on the challenge of giving all citizens, of all ages, the chance to improve their key competences, namely reading, maths and science, and digital competence – which is more important than ever.

Indeed, the lead theme of this year's Monitor, teaching and learning in a digital age, was planned well before the pandemic struck, but it could not have been timelier. 95% of respondents to the public consultation on the Digital Education Action Plan see the crisis as a game changer for the way technology is used in education and training. Yet the Monitor shows us that, despite Member States' investments in digital infrastructure in recent years, large disparities between and within countries persist. Moreover, both learners' and teachers' digital skills need significant improvement in order to be fully fit for the digital age. It is time we abandon the common myth of the young generation of today as a generation of 'digital natives', and focus on improving basic digital skills as an essential prerequisite for education, work and life.

In order to face these challenges, the Commission recently proposed a package of initiatives that will strengthen the contribution of education and training to the EU's recovery from the coronavirus crisis, and help build a green and digital Europe. The European Education Area, the Digital Education Action Plan and the Skills Agenda will bring more investment and stronger cooperation between Member States to help all Europeans, of all ages, benefit from the EU's rich education and training offer. We will work with governments, experts and international partners to achieve our vision for the European Education Area, and in this endeavour we will continue to support policy-making at national and European level with trustworthy, comparable and insightful evidence, as presented in this year's Education and Training Monitor.

Mariya Gabriel

Commissioner for Innovation, Research, Culture, Education and Youth

European Commission

EU targets for 2020 in education

Early leavers from education and training (age 18-24)

TARGET < 10%

NOW 10.2%

11.9% Men

22.2% Foreign-born

8.4% Women

8.9% Native-born

Source: Eurostat (EU-LFS, 2019)

Early childhood education (age 4+)

Source: Eurostat (UOE, 2018)

Employment rate of recent graduates (age 20-34)

TARGET 82%

NOW 80.9%

Upper secondary vocational education 79.5%

Upper secondary general education 66.3%

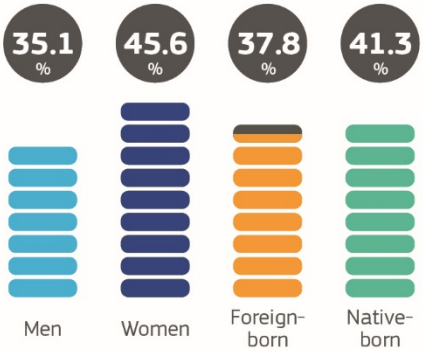
Tertiary education 85.5%

Source: Eurostat (EU-LFS, 2019)

Tertiary educational attainment (age 30-34)

TARGET 40%

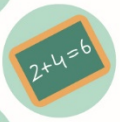
NOW 40.3%



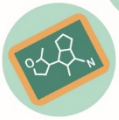
Source: Eurostat (EU-LFS, 2019)

Underachievement in

reading 22.5%



maths 22.9%



science 22.3%

TARGET below 15%

Source: OECD (PISA, 2018)

Adult participation in learning (age 25-64)

By educational attainment

TARGET 15%

NOW 10.8%

Low (ISCED 0-2)	4.3%
Medium (ISCED 3-4)	8.8%
High (ISCED 5-8)	19.0%

Source: Eurostat (EU-LFS, 2019)
Illustrations: © European Commission

Note: See front flap for sources and definitions.

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Executive Summary

2020 has been an unprecedented year of challenge and disruption on education and training. The almost universal school closures due to the COVID-19 outbreak, starting from mid-March and lasting at least two months, affected more than 95 million of learners and 8 million teachers across the EU at all educational levels and sectors. Nevertheless, as a result of the tremendous efforts by the education sector, EU Member States managed to ensure education continuity by shifting rapidly to distance learning, often within a few days or weeks. As of autumn 2020, the overwhelming majority of Member States have relaunched in-situ teaching, in most cases under strict safety requirements and with contingency scenarios, which made the return difficult both from a pedagogical and organisational point of view.

Uneven access to distance learning, quality and well-being have been key concerns. The first reviews point to significant variation in terms of access to distance learning across and within countries. While in some Member States, coverage was almost universal (e.g. in Slovenia fewer than 2% of pupils could not be reached), in others a significant share of pupils were left without education (e.g. 48% of pupils in Italy). Reasons for exclusion included lack of devices, inadequate internet connections and/or difficult home situations, and many Member States distributed tablets and laptops to fill these gaps. Teaching practices also varied significantly among schools even within countries, leading to uneven quality. Initial research findings and surveys estimate that the physical closure of schools may affect learning outcomes due to the loss in instruction time and reduced pedagogical content. Vocational education and training was additionally hit by the closure of companies disrupting work-based learning. Finally, the lack of social interactions of pupils with their peers and teachers, as well as stress related to distance learning, are reported to have had a major negative impact on the well-being of students.

There is a risk that the crisis may affect vulnerable learners most, including those from lower socio-economic backgrounds and those with special educational needs and in rural or remote areas. However, the crisis did not only challenge already known vulnerable groups, but also many other learners, who for various reasons, such as a less supportive home environment and motivational factors, had difficulties in coping under the new circumstances. As a response, some countries put in place special support measures, for example Ireland, Croatia and Malta set up special forms of psychological support to pupils at risk of becoming disengaged. Belgium (French Community) decided not to provide new learning content to avoid inequalities.

Education systems faced special challenges in terms of end of year exams and enrolment to universities. End of year exams and enrolment in higher education institutions have also been a major challenge and Member States approaches varied significantly from one country to another. Germany has decided that all final examinations would be conducted, whereas some other countries (e.g. Austria and Slovakia) preferred to postpone upper secondary school leaving exams, as well as the deadline of application to universities. In some Member States final exams have been cancelled (e.g. France and Sweden,) and replaced by continuous assessment.

Teaching and learning in a digital age

The COVID crisis demonstrated the importance of stepping up the readiness of digital solutions for teaching and learning in Europe and also pointed to where the weaknesses lie. Member States have invested heavily in digital education, in particular in digital infrastructure with the support of Structural Funds. As a result, the digital infrastructure of schools developed significantly in the past decade, yet large disparities persist in many countries. The share of students attending highly digitally equipped and connected schools differs widely across Europe, is highest in Nordic countries, and ranges from 35% (ISCED 1) to 52% (ISCED 2) to 72% (ISCED 3). However, only 8% of students attend schools located in a village or a small city which have access to a high-speed Internet above 100 Mbps.

However, teachers were not adequately prepared to use digital technologies in the classroom before the crisis. Investment in digital infrastructure and tools has not always been adequately accompanied by appropriate preparation of teachers. On average in the EU, fewer than

half of teachers (49.1%) report that ICT was included in their formal education or training. Moreover, while a growing number of teachers participate in continued professional development (CPD) programmes related to the use of digital technologies, this does not always translate into teaching practices.

Pupils' digital skills are improving, but they are not digitally native. Contrary to the common view of the young generation of today as a generation of 'digital natives', the ICILS results indicate that young people do not develop sophisticated digital skills just by growing up while using digital devices. Underachievement, in the sense of a failure to understand and perform even the most basic ICT operations, is widespread in the EU. In 2018, as many as 62.7% of Italian pupils[1] did not manage to pass the underachievement threshold. Neither did 50.6% of pupils in Luxembourg, 43.5% in France, 33.5% in Portugal, 33.2% in Germany, 27.3% in Finland and 16.2% in Denmark.

The adaptation to the crisis was easier for those Member States that were more advanced in digital education as a result of implementing comprehensive national strategies in recent years (e.g. Finland, Denmark and Estonia). This points to the importance of embedding investments in comprehensive digital education policies that cover a broad range of aspects, including digital equipment, skills development, pedagogical content, appropriate support mechanism etc. The effective use of EU funding has been essential in this regard. For example, Croatia was largely effective in the management of the crisis thanks to the preparation undertaken as part of the e-Schools supported by a European Social Fund (ESF) project and curricular reform project. In Estonia, between 2016–20, about 80% of teachers have attended CPD in digital skills, much of this has been funded under ESF.

The Education and Training 2020 targets

Participation in early childhood education and care is high thanks to sustained efforts by Member States, but uneven access and quality remain a challenge. On average in the EU, ECEC participation (4+) stood at 94.8% in 2018, just 0.2 percentage points (pps) below the target. However, some Member States have not made sufficient progress and stayed well below the 2020 benchmark, notably Greece (75.2%), Croatia (81.0%), Slovakia (82.2%), Bulgaria (82.4%) and Romania (86.3%). Moreover, participation tends to be lower for children from disadvantaged families including families with migrant background and vulnerable minorities such as Roma. There are also significant geographical disparities in terms of access (Spain, Portugal, Croatia and Italy) and uneven quality is an issue in several Member States (Austria, Sweden, Denmark, Malta and Romania). Member States have taken various measures to achieve progress, for instance the compulsory pre-school age is being lowered in Bulgaria (to four years), Belgium and Slovakia (to five years); and targeted financial support to families has been introduced in Germany and Italy. Moreover, an increasing policy focus is also placed on improving quality in several countries, e.g. Lithuania is developing a system of quality assessment, while Austria and Malta are reviewing qualification requirements of staff.

The target on early leavers from education and training stood at 10.2% in 2019, only 0.2 pps from the target. This represents a progress of 4 pps over the past decade. Fewer girls are early leavers (8.4%) than boys (11.9%). These figures hide sizable differences among countries varying between 3% in Croatia and 17.3% in Spain. Some countries have made considerable progress, particularly Portugal (20.3 pps), Spain (13.6 pps) and Greece (10.1).

However, basic skills have not improved during the past decade. Unfortunately, the EU has not met its target to reduce underachievement in basic skills to less than 15% and little progress has been achieved over the past decade. The underachievement rate stood at 21.7% in reading, 22.4% in mathematics, and 21.6% in science in 2018, the year of the latest PISA test. That means that Europe has to face a persisting challenge with more than one fifth of 15-year-olds

[1] Critics of the results of the ICILS survey have claimed that the Italian scores should not be directly compared with other countries because the pupils who sat the test were on average a year younger than in other countries.

demonstrating underperformance in basic skills that bodes ill for their chances in professional and private life. In reading, only four EU Member States met the 15% ET2020 benchmark: Estonia (10.2%), Denmark (14.6%), Poland (14.7%) and Finland (15.0%). On the other end, the underachievement rate exceeded 30% in Romania (46.6%), Bulgaria (44.4%), Cyprus (36.9%), Greece (35.8%) and Malta (30.2%). Several Member States have recently engaged in curricular reforms (Greece, Croatia, Lithuania, Netherlands, Latvia, Romania) to move to competence-based education, reviewed evaluation and assessment methods (Cyprus, Lithuania), and strengthened quality assurance, but the results of these reforms are yet to be seen.

Socio-economic background is still the most important determinant of educational outcomes in the EU, hindering a sizable share of young people in acquiring an adequate level of basic skills and preventing upward social mobility. Its impact is particularly strong in Hungary, Romania, Bulgaria, Luxemburg, Slovakia and France. In the same vein, pupils with a migrant background seriously underperform in comparison with their peers in reading in Germany, Denmark, France and Portugal. Inequalities are partly driven by the concentration of pupils from similar backgrounds in certain schools and disparities in the quality of teaching across schools. To address inequalities, France has increased salaries of teachers working in disadvantaged schools and halved class size in the first two grades. Italy is taking steps to reduce regional gaps and plans to identify troubled schools in five southern regions. Support for language acquisition has been increased in Malta, Slovenia, Greece and Belgium (French Community) to support the integration of newly arrived migrants. Austria is piloting targeted funding for disadvantaged schools. Reforms have been recently launched to enhance inclusive education for learners with special educational needs in Poland, Ireland, Malta, Cyprus and Greece.

The performance of education systems largely depends on the quality of teaching, yet the teaching profession is faced with significant challenges across the EU. The teaching workforce is ageing in most Member States. In some countries (Estonia, Lithuania, Hungary, Portugal and Italy) more than half of the teachers are above the age of 50. Shortages of qualified teachers are emerging in the majority of Member States, which is largely due to the low attractiveness of the profession. According to the TALIS survey, only 18% of teachers think that the teaching profession is valued by society. Therefore, strengthening the teaching profession has been an important priority of governments in recent years. Several countries have been raising teacher salaries (Bulgaria, Czechia, Estonia, Croatia, Hungary, Lithuania and Slovakia) and increased budgets (Finland, Denmark) to address teacher shortages. Measures have also been taken to facilitate entry into the profession, for instance by easing requirements for initial teacher education or promoting alternative pathways to the profession (Belgium, Czechia, Estonia and Latvia), in particular from STEM fields. Latvia is introducing fast-track teacher training programmes for university graduates in the STEM fields, while municipalities offer bonuses for teachers who relocate from another region. Lithuania has developed a teacher forecasting tool, which will feed into initial teacher education. There are also efforts to better adapt the continuing professional development programmes to the needs of teachers.

In the period from 2015-2018, spending at the pre-primary and primary level has increased in almost all EU countries. Countries have also seen a slight increase in spending at the secondary and post-secondary (non-tertiary) level, while at the tertiary level spending has decreased slightly. Most EU countries have seen an increase in the number of students from 2013-2018. In the context of budgetary pressure and demographic trends, it is more important than ever to ensure that educational governance provides for efficient spending, while ensuring quality outcomes. Evidence shows that higher spending per pupil does not automatically translate into better educational outcomes. In this context, some Member States (Malta and Luxembourg) are improving external evaluation of schools and gathering evidence on the performance gaps to improve quality and reduce inequalities. To address the challenges linked to the shrinking student population and the low quality of education in some small, mostly rural schools, Latvia has engaged in the consolidation of the school network including through setting minimum requirements for school and class sizes. Croatia is developing plans with the assistance of World Bank to increase instruction time, optimise the school network and introduce modern management practices. In Sweden, authorities are working on national targets and indicators for monitoring school's activities to improve equity and to better understand schools' success factors. Austria is reforming education governance to give schools more autonomy.

Tertiary educational attainment (TEA) has seen its target value of 40% reached. In 2019, the EU-27 had 40.3% people aged 30-34 with a tertiary degree (at least ISCED 5). This means the EU-27 has raised the TEA rate by 9.2 pps in the past decade. Among countries with previously low TEA, that have now reached the target, Slovakia stands out as a success story with an increase from 17.6% up to 40.1% over 10 years. The progress has also been particularly significant in Austria (from 23.4% up to 42.4% and Greece (from 26.6% up to 43.1%). The Member States with the highest tertiary attainment levels among the 30-34 year olds are Cyprus (58.8%), Lithuania (57.8%), Luxembourg (56.2%), and Ireland (55.4). Countries scoring the lowest are: Romania (25.8%), Italy (27.6%), Bulgaria (32.5%) and Hungary (33.4%). Moreover, gender differences persist across the EU. In Estonia, Lithuania, Slovenia, Latvia, Cyprus, Poland and Finland the gap is at least 18 pps. Finally, disadvantaged students' expectations to complete tertiary education are much lower (43.4%) than their advantaged peers' (82.3%).

The target for the employment rate of recent secondary and tertiary graduates was also almost reached in 2019, when the EU-27 was 1 percentage point short of the target of 82%. Even if progress in recent years has been slow, the 2019 score is the highest value since the financial crisis of 2008. There is a visible employment and wage premium for graduates, particularly tertiary graduates. However, many countries are faced with significant mismatches between labour market demand and the profile of tertiary graduates. In particular the share of STEM graduates is lowest in Cyprus, Netherlands, Belgium, Malta and Denmark, leading to labour shortages. Several Member States (Latvia, Greece and Poland) have launched or are planning major reforms of higher education. Recent measures include strengthening quality assurance mechanisms (Slovakia, Netherlands, Greece), introducing performance based funding models (Greece, Latvia), expanding student support systems (Italy and Hungary), increasing participation of students with disabilities (Luxembourg), promoting internationalisation and attracting foreign students (Greece, Slovakia, Poland and France). Countries have also been working towards increasing the quality and labour market relevance of the (vocation education and training) VET systems, e.g. by setting up a national monitoring system for VET graduates (Cyprus), launching graduate tracking (Spain), developing a labour market barometer (Czechia), updating the National classification (repertory) of professional role profiles (Italy), preparing a VET quality strategy (Finland).

Progress in increasing participation in learning among adults has been slow over the past decade, and participation across Member States remains highly uneven. In 2019, the participation rate of adults in learning stood at 10.8% on average in the EU-27, a small increase from 7.8% in 2010 and still far from the 15% target, which is reached by only seven Member States. Participation rates are lowest in Romania, Bulgaria, Croatia and Slovakia, with less than 5% of adults participating in learning. This compares to participation rates above 25% in the best-performing countries Sweden, Finland and Denmark. The countries with the most remarkable improvements since 2010 in excess of 5 pps are Estonia, Finland and Sweden, two of which were already among the best performers in 2010. Some countries have taken concrete actions to support upskilling (Czechia, Denmark, Slovakia) or increase access to training, including through financial support (France, Netherlands and Germany). Several Member States focused on improving their adult learning systems (Austria, Finland and Estonia).

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Part 1

Teaching and learning in a digital age

1 Teaching and learning in a digital age

Key findings

The International Computer and Information Literacy Study (ICILS) points to competence gaps and large performance variations in computer and information literacy among pupils in the participating EU Member States.

The ICILS results dispel the myth that being born in a digital world automatically makes people digitally competent. Contrary to the common view of the young generation of today as a generation of 'digital natives', the ICILS results indicate that young people do not develop sophisticated digital skills just by growing up while using digital devices.

Teachers need to be equipped with the necessary skills to take advantage of the potential of digital technologies to improve teaching and learning and to prepare their pupils for life in a digital society. Evidence from the OECD Teaching and Learning International Survey (TALIS) 2018 indicates that the use of information and communication technology (ICT) for teaching was rarely included in the education and training of lower secondary teachers in EU countries. On average in the Member States, fewer than half of teachers (49.1%) report that ICT was included in their formal education or training.

Information technologies have been shaping the way we learn, communicate, work and organise society. In the transformation into the digital age, digital competences are becoming crucial for the ability of individuals to function in society and their inclusion in the labour market. Investing in one's digital skills throughout life is thus of utmost importance. This means that education and training systems need to introduce digital learning early on and promote it as part of lifelong, giving people the forward-looking knowledge, skills and competences they need to innovate and prosper in the world transformed by digital technology.

In 2019, 56% of individuals in the EU had at least basic digital skills, with 31% possessing above basic skills, according to the EU Digital Economy and Society Index (DESI)[2]. This continues the positive development seen since 2015, the first year with available data, when the percentages were 54% and 27%, respectively. The skills indicator varies widely across socio-demographic categories. For example, 80% of young individuals (aged 16-24) showed basic or higher digital skills against only 33% of those aged 55-74. 84% of those with high formal education showed basic or higher digital skills against 32% of individuals with no or low formal education. 66% of employed or self-employed and 87% of students had at least basic digital skills. In contrast, only 28% of the retired and other inactive categories and 44% of unemployed demonstrated such skills. The lack of basic digital skills poses serious risks of digital exclusion in a context of rapid digitisation[3].

Ensuring that the EU makes the most of the potential of the digital age is a key priority[4]. The EU has identified digital competence one of eight key competences for lifelong learning, highlighting its importance for all stages of education, both formal and informal, and across all segments of the EU population. Within this framework, digital competence is defined as 'the confident, critical and responsible use of, and engagement with, digital technologies for learning, at work, and for

2 European Commission (2020). Digital Economy and Society Index (DESI) 2020 - Human capital. Data for EU-27 extracted from Eurostat. Online data code [isoc_sk_dskl_i].

3 To better prepare young people for the labour market, the Commission's proposal for a Council Recommendation on a Bridge to Jobs – Reinforcing the Youth Guarantee recommends that, based on an assessment of gaps in digital skills, all young people who register in the Youth Guarantee are offered a dedicated preparatory training to enhance their digital skills.

4 Six Commission priorities for 2019-24.

participation in society'[5]. From an educational point of view, the challenge is twofold: developing digital competence and more extensive, effective and purposeful use of technology in teaching and learning.

The 2018 Communication from the Commission on the digital education action plan reflects this dual need of pedagogical use of technologies and development of digital competence through its two first priorities: 1) making better use of digital technology for teaching and learning and 2) developing relevant digital competence and skills for the digital transformation[6]. This chapter uses these priorities as a point of departure to provide an insight into the current state of affairs of digital education in the Member States by looking at lower secondary school pupils' digital competence and the pedagogical use of technology for teaching and learning in lower secondary school.

Box 1 – The COVID-19 crisis: school and campus closures, emergency measures, distance learning, loss of learning

The closure of schools and campus buildings lasting for 2-6 months as part of the international effort to contain the spread of COVID-19 has been unprecedented, and is estimated to have affected 74% of all enrolled learners in 186 countries. All EU Member States have put in place remote learning schemes as a temporary measure to replace physical presence at school. The full cost of school and campus closures and their long-term consequences are hard to predict and measure, and will perhaps only become visible in the next waves of international school performance surveys such as the OECD Programme for International Student Assessment (PISA), ICILS and the Progress in International Reading Literary Study (PIRLS). A set of risks and negative impacts of the closures is already emerging from various case studies, however. Physical school and campus closure and the adoption of distance and online education may negatively affect students' learning in four main ways: less time spent in learning, stress symptoms, a change in the way learners interact, and lack of learning motivation. Nonetheless, distance and online education is fundamental to ensure the continuity of learning in situations where in-person classes are suspended.

A 'School Barometer' survey conducted in late March and early April 2020 among Austrian and German pupils, parents and school staff, later extended to a few other EU countries indicates that a substantial proportion of students reported a worryingly low level of learning at home during the school lockdown (2 h or less per day). In contrast, just under a third of students reported a relatively high level of learning commitment (5 h or more per day). An analysis conducted to characterise these two student groups indicates that conscientious students – who self-regulate their planning for the day, get up early, have a regular schedule, do not feel like they are on holiday and do sports regularly – are more likely to be hard-working (in terms of the weekly hours spent on academic matters). Also, it seems that, when teachers regularly control students' work, students are more engaged in learning at home.[7]

Being confined at home may trigger unique psychosomatic stress reactions in pupils. Being constrained to social contacts only with members of the household and deprived of face-to-face contacts with their schoolmates and peers may lead to

5 Council Recommendation of 22 May 2018 on key competence for lifelong learning, OJ C 189, 4.6.2018, p. 1–13. For more info on DigComp, see here.

6 European Commission (2018). Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions. On the Digital Education Action Plan. Brussels, 17.1.2018, COM(2018) 22 Final.

7 Huber G.H. , Helm, C (2020). COVID-19 and schooling: evaluation, assessment and accountability in times of crises – reacting quickly to explore key issues for policy, practice and research with the school barometer.

feelings of loneliness, grief, depression, lack of concentration or insomnia, all of which may be detrimental to learning outcomes.

Sharing the classroom with other pupils is known for its positive indirect effects: mutual learning, healthy rivalry, social influence etc. Moreover, classroom interactions are vital for developing non-cognitive social skills, sense of identity, positive self-esteem, empathy, the calibration of social reactions and teamwork and the sense of belonging to a group.

Home confinement may also be detrimental to learning motivation. Taking this into account, several countries (e.g. Spain, Italy) have announced that pupils would not have to repeat the school year regardless of their performance while studying remotely, as a general rule. France has forbidden the use of student assessment results during the COVID-19 period in the formal evaluation of the *brevet* (lower secondary school exam) and of the *baccalaureat* (upper secondary school exam). Although this could be a fair decision, studies suggest that students may be more externally motivated to learn if they know their learning will be assessed.

Furthermore, distance learning may pose unprecedented challenges to parents who have to juggle their own remote work while helping their children studying at home.

The inequality dimension and the social gradient in both distance and online learning and in coping with lockdown is an important policy challenge. For children to successfully take part in distance and online learning, certain minimum technical requirements have to be satisfied, requirements that poorer households often cannot afford. Successful online learning presupposes that each child has a computer or a tablet at their disposal, combined with a fast internet connection. Moreover, each child needs a private and quiet room during the online sessions, but also for successful self-study and homework. Poorer families typically live in more crowded spaces and are able to offer their children much less comfortable conditions for distance and online learning and self-study.

The social gradient extends to children's wellbeing. Poorer families typically have less space for children to play (no gardens for example, or no access to playgrounds). Food security might be yet another issue as poorer children may rely more on school meals. Children from poorer families are more likely to suffer isolation and boredom with less space available at home and fewer things to keep them creatively occupied at home, such as musical instruments or books[8].

On the other hand, this crisis has been an opportunity and a stress test for educational systems that might have a positive effect on accelerated digitalisation and modernisation of teaching. The educational systems could test which solutions have worked and which have not during the distance learning under lockdown.

8 See also Di Pietro, G., Biagi, F., Dinis Mota Da Costa, P., Karpinski, Z. and Mazza, J. (2020). The likely impact of COVID-19 on education: Reflections based on the existing literature and recent international datasets. JRC Technical Report. JRC121071.

1.1 Pupils' digital competence

The concept of digital competence as defined in the lifelong learning framework is elaborated in the European Digital Competence Framework for Citizens[9], also known as DigComp, to explain what it means to be digitally competent. Here digital competence is described in detail by dividing the knowledge, skills and attitudes that all citizens need in a digital society into five competence areas: information and data literacy; communication and collaboration; digital content creation; safety; and problem solving. This has become a common reference tool both at European and at national level[10].

In the following, we draw on ICILS to enquire about lower secondary school pupils' level of digital competence[11]. ICILS assesses the capacities of young people to use ICT by measuring the performance of grade eight pupils (13-14 years of age) performance in two domains of digital competence: computer and information literacy and computational thinking[12].

Box 2 – Croatian response to the COVID-19 crisis

Croatia began digital development of its schools only a few years ago, acquiring equipment and materials and training teachers. Preparations for the crisis started early (2 weeks before moving schools online): producing additional education content, adapting online platforms used for teacher training, and issuing clear instructions and guidelines for the organisation of distance learning. The existing school equipment was distributed to enable access for all pupils aged 11-18 when school moved online, and additional equipment was bought for students from low socio-economic backgrounds. Pupils aged 7-10 had lessons organised through public television and teachers communicated with their parents. A special web-site was set up by Agency for VET and Adult Education and dedicated for VET schools, where materials prepared by VET teachers, e-learning courses and other digital contents were shared. In cooperation with Chamber of Commerce companies have also sent their materials that are used for in-companies trainings of their staff.

Online classes for older pupils were complemented with shorter video lessons on public television. Experienced teachers helped less experienced ones. A website provided information on distance learning for teachers and pupils and various materials, and had a FAQs section where answers were posted weekly. The Minister communicated with pupils directly via her Facebook account.

The key for success was timely planning, clear guidance, good distribution of existing resources and huge commitment from teachers and government.

Source: European Commission (2020) Education and Training monitor, Volume II - Croatia

9 Carretero, S., Vuorikari, R., Punie, Y. (2017). DigComp 2.1: The Digital Competence Framework for Citizens with eight proficiency levels and examples of use. JRC Science for Policy Report.

10 European Commission/EACEA/Eurydice (2019). Digital Education at School in Europe. An Eurydice Report.

11 ICILS results are presented in Fraillon, J. Ainley, J., Schulz, W., Friedman, T., Duckworth, D. (2019). Preparing for Life in a Digital World: IEA International Computer and Information Literacy Study 2018 International Report. Amsterdam: International Association for the Evaluation of Educational Achievement (IEA). and Fraillon, J. Ainley, J., Schulz, W., Friedman, T., Gebhardt, E. (2014). Preparing for Life in a Digital Age: the IEA International Computer and Information Literacy Study International Report. Cham: Springer.

12 The ICILS assessment framework is further described in Fraillon, J., Ainley, J., Schulz, W., Duckwoth, D., Friedman, T. (2018). IEA International Computer and Information Literacy Study 2018 Assessment Framework. Amsterdam: International Association for the Evaluation of Educational Achievement (IEA).

Computer and information literacy, defined as 'an individual's ability to use computers to investigate, create and communicate in order to participate effectively at home, at school, in the work places and in society'[13], is the core focus of ICILS. This concept largely covers the first four competence areas identified in DigComp, but also includes aspects related to the fifth competence area, which is problem solving[14]. Starting in 2018, participating countries also had the option for their pupils to complete an assessment of computational thinking: the ability to use the concepts of computer science to formulate and solve problems. Computational thinking incorporates aspects of the third and fifth competence areas identified in DigComp, digital content creation and problem solving.

In contrast to other international studies covering digital competence, where digital skills are approximated using less reliable instruments such as self-assessment questionnaires, ICILS directly measures pupils' achievement through computer-based assessments. Two cycles have been completed, the first in 2013 and the second in 2018, and a third cycle is scheduled for 2023. Nine EU Member States participated in the first cycle, and seven in the second cycle[15]. Denmark and Germany were the only Member States participating in both cycles, bringing total EU Member State participation to 14[16].

1.1.1 Comparing computer and information literacy between and within countries

Evidence from the two ICILS cycles shows substantial variation in the average pupil scores in computer and information literacy across the participating Member States (Figure 1 and Figure 2). In the 2018 cycle, the difference between the average scores of the top scoring Member State (Denmark), and the lowest scoring Member State with comparable results (Luxembourg), was 71 score points (Figure 2)[17]. The corresponding difference in the 2013 cycle between the top scoring Member State (Czechia), and the lowest scoring Member State (Lithuania), was 59 score points (Figure 1). The difference in the variation between the highest and lowest average achievement scores between the two cycles – 12 score points – is small. In Germany, the only Member State with comparable results across cycles[18], the difference in average achievement score was not statistically significant, however.

13 Fraillon, J., Schulz, W., Ainley, J. (2013). International Computer and Information Literacy Study assessment framework. Amsterdam: International Association for the Evaluation of Educational Achievement (IEA). Page 15.

14 Carretero, S., Vuorikari, R., Punie, Y. (2017). DigComp 2.1: The Digital Competence Framework for Citizens with eight proficiency levels and examples of use. JRC Science for Policy Report.

15 ICILS 2013: Czechia, Denmark, Germany, Croatia, Lithuania, the Netherlands, Poland, Slovenia and Slovakia.
ICILS 2018: Denmark, Germany, France, Italy, Luxembourg, Portugal and Finland.

16 Denmark did not meet the sample participation rate in 2013, and the 2013 results are thus not comparable to the 2018 results.

17 Pupils in Italy were tested at the beginning of the school year, with an average age of 13.3, lower than the minimum requested of 13.5 and against the average age of the students tested of 14.4, and the results are consequently not comparable to those of the other Member States.

18 See note 16.

Box 3 – Computer and information literacy proficiency levels in ICILS

Digital competence, as measured by the computer and information literacy instrument in ICILS, is described across four levels of increased sophistication[19]. The proficiency levels describe the nature and the complexity of the tasks pupils are able to solve. Pupils' computer and information literacy proficiency becomes more sophisticated as they progress up the scale; a pupil located at a particular place on the scale will be able to undertake and successfully accomplish tasks up to that level of achievement.

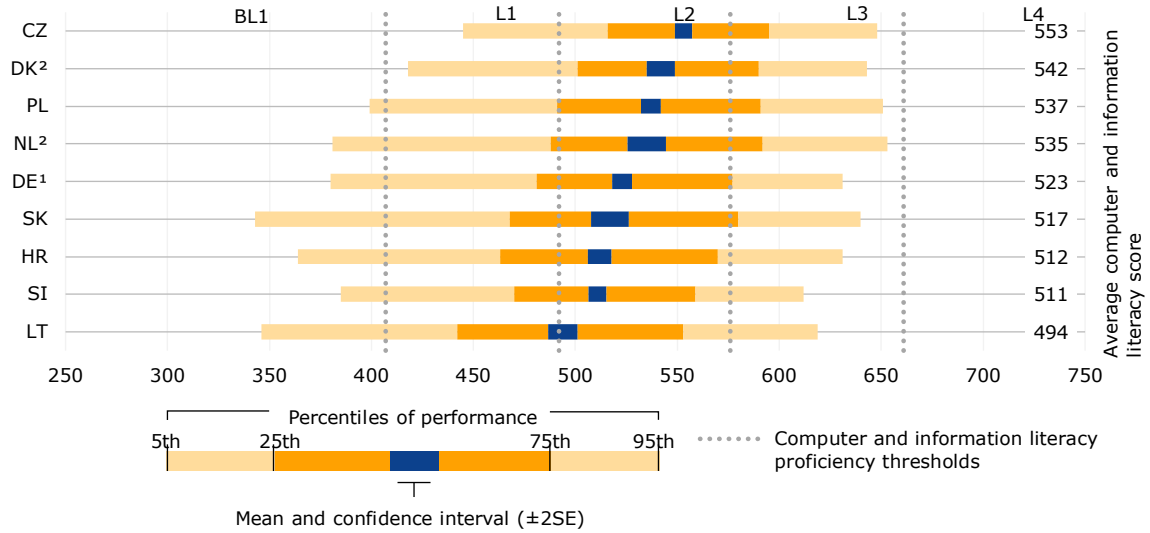
Level 1: Pupils demonstrate a functional working knowledge of computers as tools and a basic understanding of the consequences of computers being accessed by multiple users.

Level 2: Pupils use computers to complete basic and explicit information gathering and management tasks.

Level 3: Pupils demonstrate the capacity to work independently when using computers as information gathering and management tools.

Level 4: Pupils select the most relevant information to use for communicative purposes. They evaluate usefulness of information based on criteria associated with need and evaluate the reliability of information based on its content and probable origin.

Figure 1 – Variation in computer and information literacy scores across and within countries, 2013



Source: IEA, ICILS 2013.

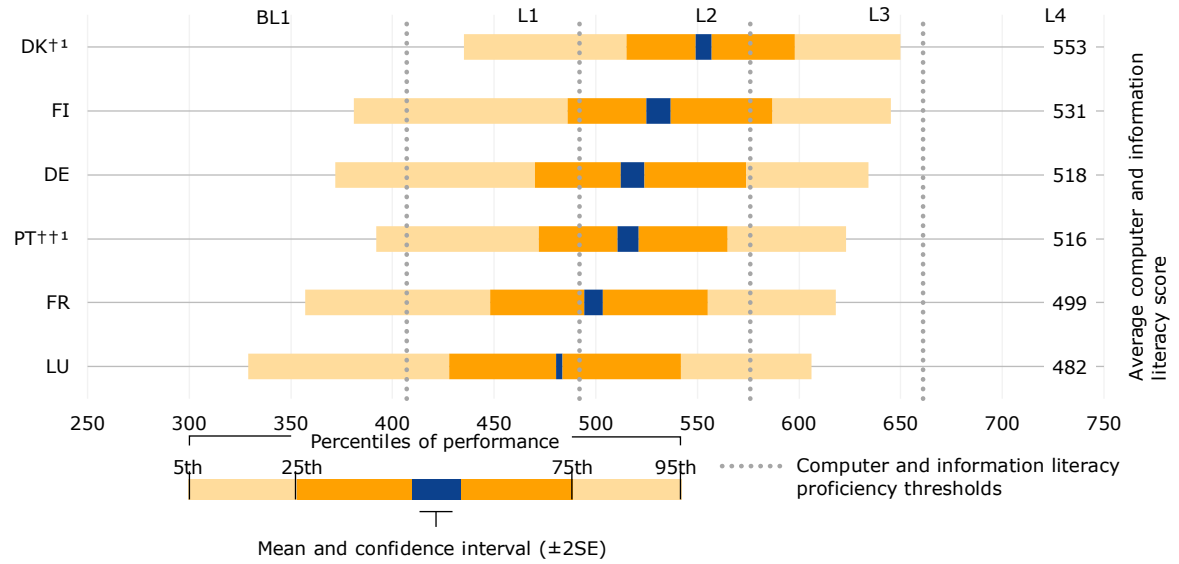
Note: Computer and information literacy achievement levels: below level 1 (below 407 scale points), level 1 (407-491 scale points), level 2 (492-576 scale points), level 3 (577-661 scale points), level 4 (above 661 scale points).

¹ Met guidelines for sampling participation rates only after replacement schools were included.

² Did not meet the sample participation rate.

19 Fraillon, J. Ainley, J., Schulz, W., Friedman, T., Duckworth, D. (2019). Preparing for Life in a Digital World: IEA International Computer and Information Literacy Study 2018 International Report. Amsterdam: International Association for the Evaluation of Educational Achievement (IEA). Pages 57-59.

Figure 2 – Variation in computer and information literacy scores across and within countries, 2018



Source: IEA, ICILS 2018.

Note: Computer and information literacy achievement levels: below level 1 (below 407 scale points), level 1 (407-491 scale points), level 2 (492-576 scale points), level 3 (577-661 scale points), level 4 (above 661 scale points). Italy participated in ICILS 2018, but the results are not comparable with those of other Member States and have been excluded from the figure.

† Met guidelines for sampling participation rates only after replacement schools were included.

†† Nearly met guidelines for sampling participation rates after replacement schools were included.

¹ National defined population covers 90%-95% of the national target population.

The average pupil scores are situated within the lower end of the level 2 proficiency interval of the computer and information literacy scale (492-576 score points) in all Member States, with the exception of Luxembourg and Italy[20] (Figure 1 and Figure 2). At this level, pupils demonstrate basic use of computers as information resources, and are able to complete basic and explicit information-gathering and management tasks. This is where we find the highest percentage of pupil scores across Member States in both ICILS cycles, as shown in Figure 3.

Average scores across countries, however, do not provide a complete picture of the situation in the Member States. If we consider the percentiles of performance, we see that the within-country variation is greater than the variation in average scores (Figure 1 and Figure 2). Between countries, the difference between the highest average score and the lowest average score in countries with comparable results is 71 score points. In comparison, the variation between the highest 5% and lowest 5% (5th and 95th percentiles) of the pupil scores within countries is above 200 score points in all Member States.

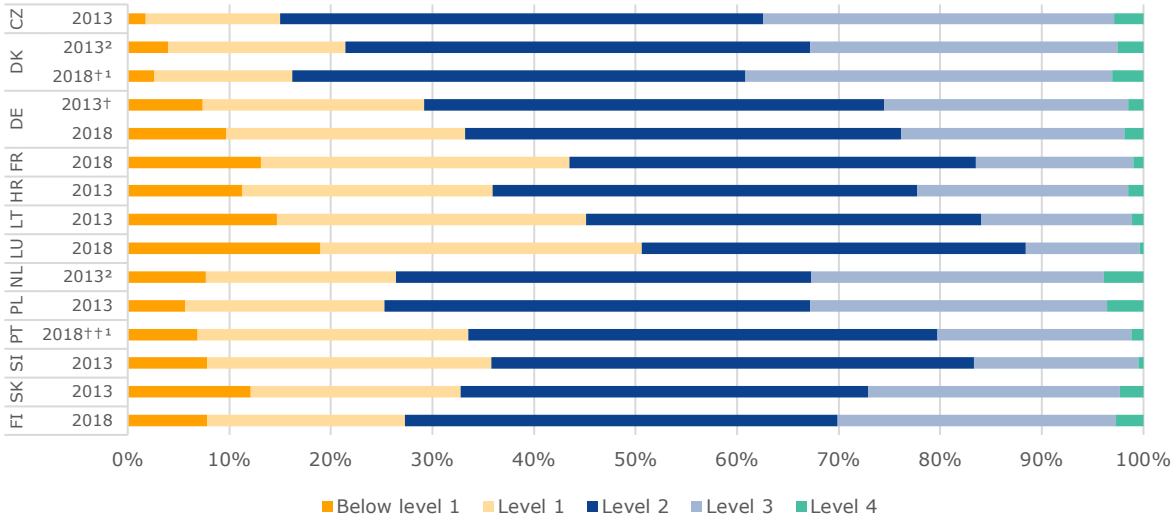
20 See note 17 for information on the comparability of the Italian results.

Box 4 – Improving pupils' digital competences in the Netherlands

A digitalisation agenda for primary and secondary education was adopted in 2019 as part of the Dutch digitalisation strategy. The objectives are to foster innovation in education, improve teachers' and pupils' digital skills, ensure that IT infrastructure is secure and reliable and to raise awareness of the ethics of digitalisation. In addition, there are a number of other related programmes such as the national training programme 'Digital Teacher', which aims to improve the digital skills of primary teachers. The programme 'Pass IT on!' (*Geef IT Door*) allows secondary schools to invite IT professionals to give a guest lecture. The government-funded centre of expertise Mediawijzer.net provides links to over 1 000 media literacy organisations to organise public campaigns, conduct research, and offer educational services. *Kennisnet*, the public organisation for ICT in education, developed a step-by-step school guide to choosing digital learning resources and created a catalogue based on information from education publishers and providers to give schools a free, transparent and comprehensive overview of available digital learning resources.

Figure 3 presents the distribution of pupil scores for the different proficiency levels of the computer and information literacy scale for each Member State, giving a more nuanced picture than the average score for all countries. Regardless of overall ranking, the average score presented in Figure 1 and Figure 2 indicates that the pupil population in Member States range from pupils lacking very basic digital skills to pupils excelling in the use and application of digital tools and competence.

Figure 3 – Distribution of computer and information literacy scores across achievement scale levels, 2013 and 2018



Source: IEA, ICILS 2018 & ICILS 2013.

Note: Computer and information literacy achievement levels: below level 1 (below 407 scale points), level 1 (407-491 scale points), level 2 (492-576 scale points), level 3 (577-661 scale points), level 4 (above 661 scale points). Italy participated in ICILS 2018, but the results are not comparable with those of other Member States and have been excluded from the figure.

† Met guidelines for sampling participation rates only after replacement schools were included.

†† Nearly met guidelines for sampling participation rates after replacement schools were included.

¹ National defined population covers 90%-95% of the national target population.

² Did not meet the sample participation rate.

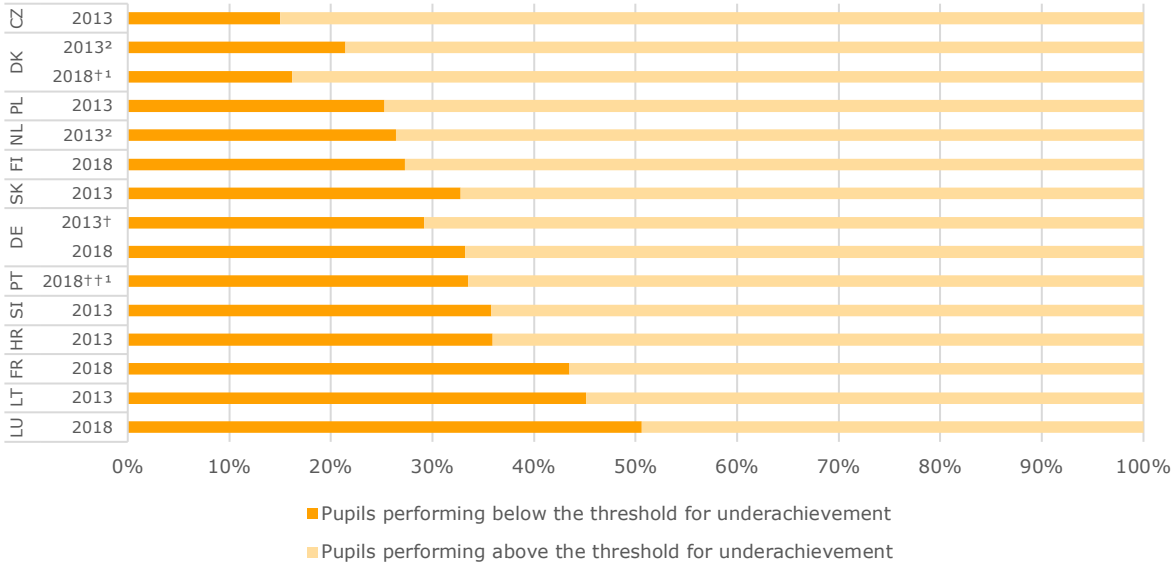
An interesting observation from the distribution of pupil scores presented in Figure 3 is the contrast between the proportions of students achieving the highest level (level 4) and those failing to reach the level 2 threshold. While only 0.2%-3.9% of pupils in all countries achieved scores above the level 4 threshold, the percentage of pupils scoring below the level 2 threshold ranged from 15.0%-62.7%. In all but two countries, Denmark (2018) and Czechia (2013), a higher proportion of pupils performed below the lowest level (level 1) than were at level 4.

The ICILS results help dispel the myth that being born in a digital world automatically makes a person digitally competent. Contrary to the common view of the young of today as a generation of 'digital natives', the ICILS results indicate that young people do not develop sophisticated digital skills just by growing up using digital devices. This is underlined by the high share of pupils with scores below the level 2 threshold on the computer and information literacy achievement scale, which exceeded 30% in 8 out of 13 Member States participating in ICILS (Figure 4)[21].

1.1.2 Underachievement in digital competence

Underachievement in digital competence can be defined as failing to reach level 2 of the computer and information literacy achievement scale. Below this threshold, a pupil lacks the basic digital competence required for participation in a digital society. Key factors differentiating level 1 achievement from the higher levels are the breadth of students' familiarity with conventional software commands, the degree to which they can search for and locate information, and their capacity to plan how they will use information when creating information products.

Figure 4 – Underachievement in computer and information literacy, 2013 and 2018



Source: IEA, ICILS 2018 & ICILS 2013.

Note: Underachievement is defined as performance below the level 2 threshold (492 score points) on the ICILS computer and information literacy scale. Italy participated in ICILS 2018, but the results are not comparable with those of other Member States and have been excluded from the figure.

† Met guidelines for sampling participation rates only after replacement schools were included.

†† Nearly met guidelines for sampling participation rates after replacement schools were included.

¹ National defined population covers 90% to 95% of the national target population.

² Did not meet the sample participation rate.

Figure 4 shows the share of underachieving pupils in the participating Member States. In the first ICILS cycle, the share of underachievers ranged from 15.0% in Czechia to 45.1% in Lithuania. The second cycle has a similar distribution, with the share of underachievers in countries with comparable results ranging from 16.2% in Denmark to 50.6% in Luxembourg. Of the two countries participating in both cycles, only the German results are comparable[22]. The difference in the percentage of students achieving scores at level 2 or above in Germany did, not change significantly between 2013 and 2018, however.

21 Member States with comparable results. For the case of Italy, see note 17.

22 Denmark did not meet the sample participation rate in 2013.

Box 5 – 8-Point Plan for digital learning – Austria

From 2020/2021, a single gateway, the portal 'Digital Schule', should become the prime platform for applications and communication between students, teachers and parents. A reduction in the number of management systems in learning is planned. Uneven ICT skills among teachers became more apparent during the COVID-19 school closures. The plan aims to prepare all teachers well for blended and distance learning, which will include intensified continued professional training, already in summer 2020. *Eduthek* provided access to learning and teaching material during the crisis, and its content will now be more closely harmonised with curricula. A new good practice label should help teachers choose effective learning apps. By 2021/2022, a purchasing programme starting with school levels 5 and 6 will upgrade IT infrastructure so that all students have access to devices. Purchasing is based on local demand and is linked to compulsory digital and pedagogical plan for each school.

Source: Federal Ministry of Education, Science and Research (2020b), Digital Education.

1.1.3 Gender differences in pupils' digital competence

In both ICILS cycles, there is evidence of a gender gap in digital competence. Female pupils perform, on average, better than male pupils in the participating countries. The highest recorded gap is observed in Finland and Slovenia, where there was a score difference of 29 in the average scores for girls and boys. At the other end of the scale, we find Czechia and Portugal, where the difference was 11 score points. The differences in scores for girls and boys were statistically significant in all Member States[23].

1.1.4 Individual background factors influencing students' digital competence

ICILS 2018 and ICILS 2013 reveal that digital competence is linked to socio-economic background[24]. Characteristics reflecting higher socioeconomic status, as measured, for example, by parents' educational attainment, their occupational status and the number of books at home, are positively linked to pupil achievement. The consistent and statistically significant relationship between socio-economic status and pupil achievement across the Member States offers evidence of a digital divide, in which pupils from lower socioeconomic backgrounds on average perform more poorly in computer and information literacy than their peers from more privileged backgrounds

Box 6 – Remote School – tackling digital exclusion in Poland

To prevent digital exclusion in education during the COVID-19 crisis, on 1 April Poland launched the 'Remote School' initiative, followed by 'Remote School+' in mid-May. Around EUR 81 million (PLN 366 million) was allocated to local governments to buy over 100 000 laptops for primary and secondary school students and teachers under the ERDF Operational Programme 'Digital Poland' (2014-2020). Closing educational institutions for many weeks forced new standards of conducting lessons remotely. Many children, however, were left without access to the internet or equipment on which they could continue their studies. The funds are primarily targeted at students with disadvantaged backgrounds, and disadvantaged families with a minimum of three children. The funds can also be used to purchase appropriate software, internet connections and insurance. Once schools are re-opened, the equipment will be placed in schools and made available to all students. Thanks to the Remote School initiatives, numerous Polish municipalities were able to distribute laptops, tablets or mobile

23 IEA, ICILS 2018. Table 3.7 and IEA, ICILS 2013, Table 4.1.

24 IEA, ICILS 2018. Table 3.8 and Table 3.9, and IEA, ICILS 2013, Tables 4.3-4.7.

internet to children who did not have them, to allow them to attend the classes online. By mid-June, 4 738 of 5 267 eligible local authorities had applied for funds.

Additionally, the delivery of equipment and Wi-Fi infrastructure to schools has been speeded up under the ERDF project the 'Polish Educational Network' (*Ogólnopolska Sieć Edukacyjna*) (2017-2020), which aims to create an internet network connecting all Polish schools by the end of 2020. Schools will be centrally provided with internet access, security services and free educational content for teachers and students. The capital costs estimated at EUR 76.2 million will come from the ERDF. The Ministry of National Education has modernised the Integrated Educational Platform (www.epodreczniki.pl), currently used by schools for distance learning. The platform has two functions:

1. a repository of proven and valuable teaching materials;
2. tools for use in remote learning and learning.

The platform currently offers over 6 000 pieces of educational material, intended for all stages of education, both general and vocational. Almost all teaching material includes open-ended questions or interactive exercises.

All content posted on the platform is free. The materials are available through a web browser and do not require installation or additional software. Users can search for material by keywords or by the content of the core curriculum. Users can save the content as favourites or share it with other users.

Source: Ministry of Digitalisation's website (Remote School; Remote School+): on remote schools and on digitalisation.

Migrant status[25] and language spoken at home are other factors identified in ICILS as being associated with pupil achievement. Pupils from non-migrant families score on average higher compared to pupils from migrant families. With the exception of Czechia and Poland in ICILS 2013, and Portugal in ICILS 2018, the difference is statistically significant in all participating Member States. The outcome is similar when comparing pupil performance between pupils speaking the same language as the test language at home, and pupils speaking a different language than the test language at home. With the exception of the three countries above, where the difference was not statistically significant, speaking the test language at home was positively associated with pupil achievement.

1.1.5 Comparing computational thinking between and within countries

Computational thinking and related concepts such as coding and programming have received increasing attention in the education field in the past decade. The concept of computational thinking is related to, yet different from, computer and information literacy. While computer and information literacy is primarily concerned with the ability to collect and manage information and to produce and exchange information, computational thinking encompasses an 'individual's ability to recognise aspects of real-world problems, which are appropriate for computational formulation and to evaluate and develop algorithmic solutions to those problems so that the solution could be operationalised with a computer'[26]. The two domains can be regarded as complementary aspects of a broader notion of digital competence as described in the DigComp framework.

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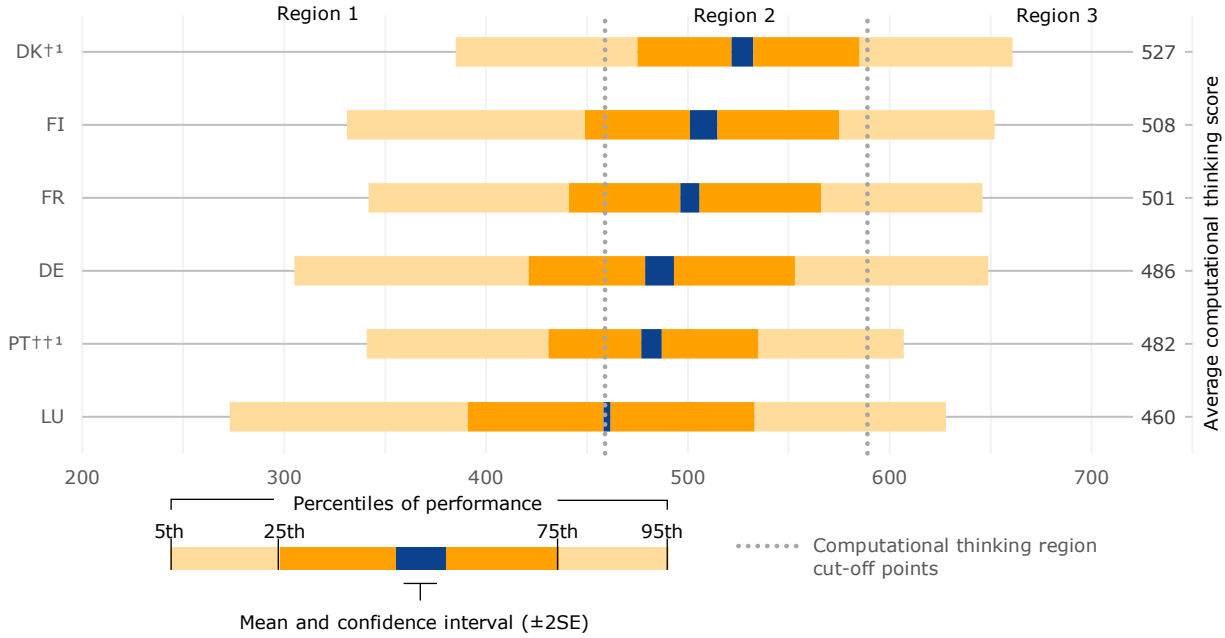
25 In ICILS a student is defined as coming from a 'migrant family' (the term 'immigrant' is used in ICILS) if both parents were born abroad (regardless of where the student was born), and as a 'non-migrant family' if when at least one parent was born in the country where the survey was conducted.

26 Fraillon, J., Ainley, J., Schulz, W., Duckwoth, D., Friedman, T. (2018). IEA International Computer and Information Literacy Study 2018 Assessment Framework. Amsterdam: International Association for the Evaluation of Educational Achievement (IEA). Page 27.

The assessment of computational thinking was an optional module introduced into ICILS 2018. Six of the seven Member States participating in this cycle opted to take part in this module (Figure 5). Aspects of computational thinking, such as creating algorithms or creating visual presentations of data, are emphasised differently in the national curriculum of the participating Member States. However, all countries, including Luxembourg from September 2020 have at least some aspects of computational thinking in the national curriculum[27].

Figure 5 – Variation in computational thinking scores across and within countries, 2018



Source: IEA, ICILS 2018.

Note: Computational thinking regions: lower region below (459 scale points), middle region (459-589 scale points), upper region (above 589 scale points).

† Met guidelines for sampling participation rates only after replacement schools were included.

†† Nearly met guidelines for sampling participation rates after replacement schools were included.

¹ National defined population covers 90%-95% of national target population.

Achievement on the computational thinking scale is measured across three distinct regions rather than different levels as used for the computer and information literacy scale: a lower region (below 459 scale points), a middle region (459-589 scale points) and an upper region (above 589 scale points)[28]. Pupils were given a set of tasks to assess their achievement on the computational thinking scale. An example of a task is a farm drone simulator where pupils were required to use a visual coding environment to make a drone perform a series of actions, such as dropping water on specific areas but not others. Score points were awarded according to the completion of objectives and the effectiveness of the solution.

Figure 5 gives an overview of the variation in computational thinking across and within Member States. Average scores range from 460 points in Luxembourg to 527 points in Denmark, and are situated within the middle region of the scale. Variation within countries is larger than the variation between countries, similar to the assessment of computer and information literacy. Variation within countries is not clearly associated with high or low achievement compared to other countries, however.

27 IEA, ICILS 2018, Table 2.5.

28 Fraillon, J. Ainley, J., Schulz, W., Friedman, T., Duckworth, D. (2019). Preparing for Life in a Digital World: IEA International Computer and Information Literacy Study 2018 International Report. Amsterdam: International Association for the Evaluation of Educational Achievement (IEA). Pages 92-94.

On average, in all countries there is a strong positive and statistically significant correlation between pupils' scores in computer and information literacy and scores in computational thinking[29]. The same individual background factors influence pupils' scores in both domains. Socio-economic status is positively associated with pupils' computational thinking achievement, while migrant background and speaking a different language than the test language at home adversely affects scores[30].

Gender differences in computational thinking do not reflect the results seen in the computer and information literacy domain. There were statistically significant differences between female and male pupils in only two Member States, Finland and Portugal[31]. Interestingly, the differences pointed to opposite directions in the two countries. In Finland, girls scored on average 13 points higher than boys, while boys in Portugal scored on average 16 points higher than girls. Although the difference between girls and boys was not statistically significant in the remaining countries, the average score for male pupils appears to be higher. The exception is Denmark, where there is no notable difference in average scores between the genders.

1.2 Pedagogical use of digital technology

Making better use of digital technology for teaching and learning is essential to reap the benefits of technological innovation and improve education. Pedagogical use of digital technologies depends on the availability, accessibility and quality of ICT resources[32]. At the same time, empirical evidence suggests that improvements in infrastructure alone do not systematically lead to the integration and pedagogical use of digital technology in schools across Europe[33]. If digital technology is to benefit pupils and educators, the right environment and support is needed.

Outcomes of the use of digital technologies in education depend on a variety of conditions, both individual and systemic. The digital competence level of lower secondary school pupils was addressed in the previous section. This section expands the scope and addresses the structural and pedagogical conditions that support digital education at lower secondary level, such as curricula and learning outcomes, resource availability, teachers' digital competence and use of digital tools for teaching.

1.2.1 School curricula and learning outcomes

Digital technologies change rapidly, which requires the school curriculum to keep pace so as not to become outdated too quickly. Data from the Eurydice network shows that 17 Member States or regions within Member States[34] are currently reforming the curricula related to digital competence in primary and general secondary education[35]. At lower secondary level, nearly all Member States have explicitly included learning outcomes related to all five areas of digital competence identified in the DigComp framework (Figure 6). Only two Member States (and the French Community and German-speaking Community of Belgium) have no explicit learning outcomes related to digital competence.[36]

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29 Fraillon, J. Ainley, J., Schulz, W., Friedman, T., Duckworth, D. (2019). Preparing for Life in a Digital World: IEA International Computer and Information Literacy Study 2018 International Report. Amsterdam: International Association for the Evaluation of Educational Achievement (IEA). Pages 110-111.

30 IEA, ICILS 2018, Table 4.3 and Table 4.4.

31 IEA, ICILS 2018, Table 4.2.

32 OECD (2019). PISA 2021 ICT Framework (April 2019). Page 6.

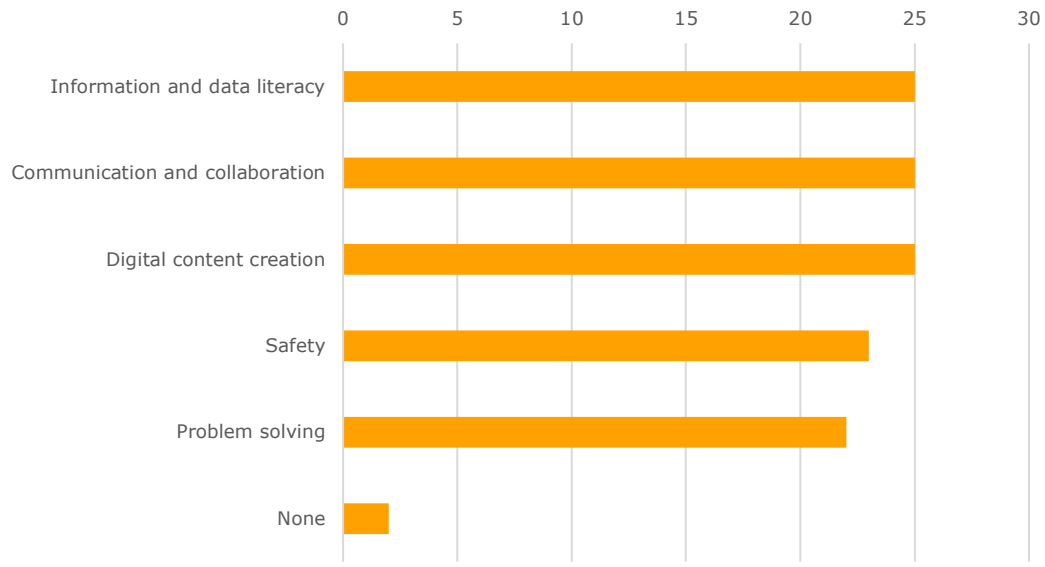
33 European Commission/EACEA/Eurydice (2019). Digital Education at School in Europe. An Eurydice Report. Page 91.

34 BE (fr and nl), BG, CZ, DE, IE, EL, FR, HR, CY, LV, LT, NL, AT, PL, PT, RO.

35 European Commission/EACEA/Eurydice (2019). Digital Education at School in Europe. A Eurydice Report. Pages 33-34 and 115-122. Data from the school year 2018/19.

36 Current reforms are addressing these issues.

Figure 6 – Digital competence areas addressed in terms of learning outcomes in national curricula (ISCED 2), 2018/19



Source: European Commission/EACEA/Eurydice (2019). Digital Education at School in Europe. Annex 1b.

Note: The aggregate total includes Belgium, as Belgium nl covers all five competence areas. Belgium fr and Belgium de do not have learning outcomes/objectives related to digital competence. This is not reflected in the chart total as it counts each Member State once.

Box 7 – Teaching computer science at primary level in Lithuania

Lithuania is one of the few countries in the EU where fostering digital awareness is promoted from pre-primary level. The ongoing competence-based curriculum reform aims to enhance digital competences even at primary level, where they have not previously been addressed, update content and strengthen particular areas such as computer science which will be taught starting at primary level. In 2018 a European Social Fund study was launched to test whether Lithuanian primary schools could integrate informatics into their curriculum. About 100 primary schools were selected for this 4-year project which covers the development of digital content, algorithms and programming, data and information, problem solving, virtual communication and security. Teachers have been provided with training of about 120 hours. The purchase of ICT equipment such as tablets and board education games has also been announced. Public events have been organised in local municipalities to discuss the importance of informatics in primary schools and to share information with stakeholders. The purpose of this project is to provide recommendations for the integration of computer science at primary level.

Source: European Commission (2020) Education and Training Monitor, Volume II – Lithuania

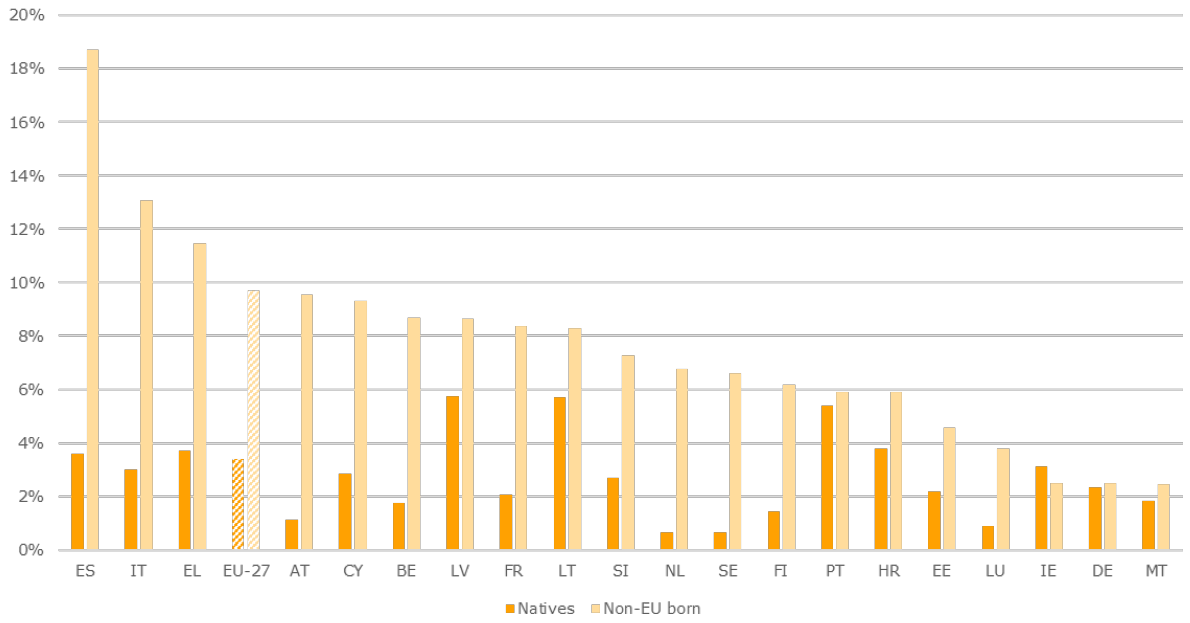
1.2.2 Digital infrastructure

A key part of digital education is ensuring equity and quality of access and infrastructure. Shortage of resources affects schools in EU countries to varying degrees. The COVID-19 situation has highlighted that this goes beyond the domain of schools, however. Access by households to digital equipment and internet connection at home are key prerequisites for participation in distance learning. It follows that COVID-19 may have exacerbated education inequalities. In 2018, 3.9% of households in the EU-27 could not afford a computer. For households with income below 60% of median equalised income, the figure was 12.8% (13.4% in households with dependent children). In contrast, 2.1% of households with income above 60% of the median equalised income could not

afford a computer (1.7% of households with dependent children)[37]. The percentage of persons who could not afford an internet connection is similar, with 4% of households in the EU in 2018[38].

Unequal distribution of access is also present when comparing EU natives to non-EU born persons. Figure 7 shows that the share of persons who could not afford a computer was higher amongst non-EU born persons than natives in all but one EU Member State in 2018. At the EU level, 9.7% of non-EU born persons could not afford a computer compared to 3.4% of EU natives. The difference is not as high when comparing natives to non-EU natives who could not afford an internet connection, with 3.9% and 4.8% respectively[39].

Figure 7 – Persons who cannot afford a computer, by group of country of birth, 2018 [%]



Source: Eurostat, EU-SILC. Special extraction.

Note: Sorted in descending order by share of non-EU born. Data not shown for BG, CZ, DK, HU, PL, RO and SK due to low n. Unreliable data for non-EU born for DE, IE, LT, LU, NL and FI.

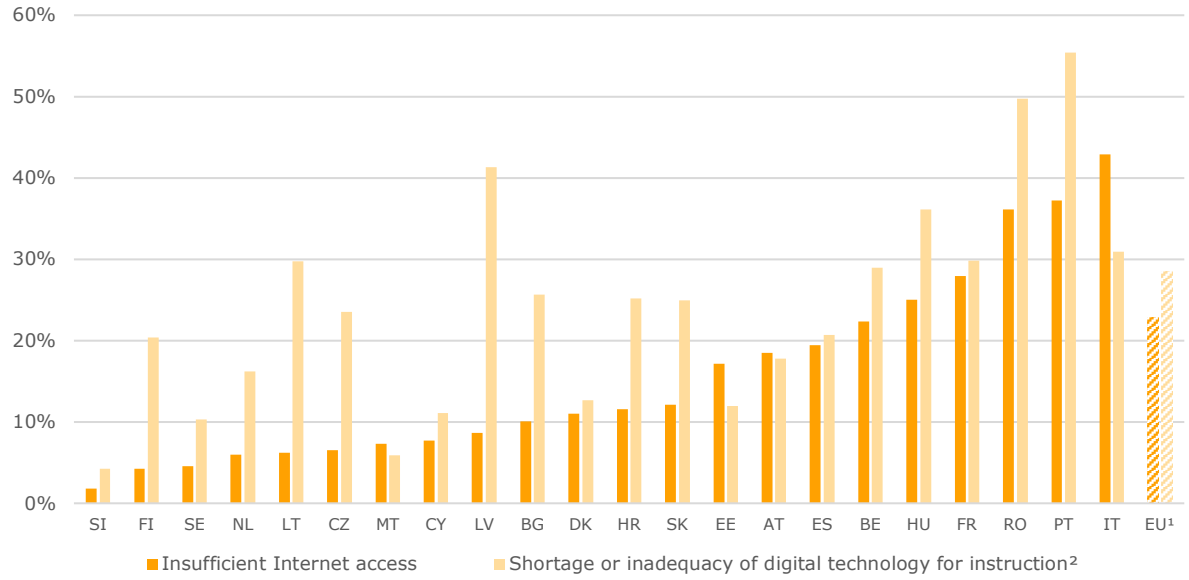
Figure 8 shows that insufficient internet access is identified as pertinent issue by lower secondary school principals in Italy (42.9%), Portugal (37.2%) and Romania (36.2%). This is also a concern in France, Hungary and Belgium for at least one principal in five. At the other end of the scale, we find Slovenia, Finland and Sweden, where fewer than 1 principal in 20 sees insufficient internet access as an obstacle to providing quality instruction.

37 'Persons who cannot afford a computer'. Eurostat. EU-SILC survey, online data code: [ilc_mddu03].

38 'Persons who cannot afford an internet connection'. Eurostat, EU-SILC survey. Special extraction.

39 'Persons who cannot afford an internet connection'. Eurostat, EU-SILC survey. Special extraction.

Figure 8 – Percentage of school principals who report that the following shortages of resources hinder the school's capacity to provide quality instruction 'quite a bit' or 'a lot'



Source: OECD, TALIS 2018 Database, Table I.3.63.

Note: Results based on responses of lower secondary principals.
¹ Weighted EU average based on the 22 participating Member States in TALIS 2018.
² Such as software, computers, tablets and smart boards.

In the EU Member States, shortage or inadequacy of digital technology for instruction (such as software, computers and smartboards) is perceived among principals as more of a hindrance to school capacity than insufficient internet access (Figure 8)[40]. In Portugal 55.4% of principals report a shortage, closely followed by Romania (49.8%) and Latvia (41.3%). There are only two Member States (Malta and Slovenia) where fewer than 1 principal in 10 reports a shortage of digital technology as an issue affecting instruction.

Box 8 – Consolidation of Latvia's school network

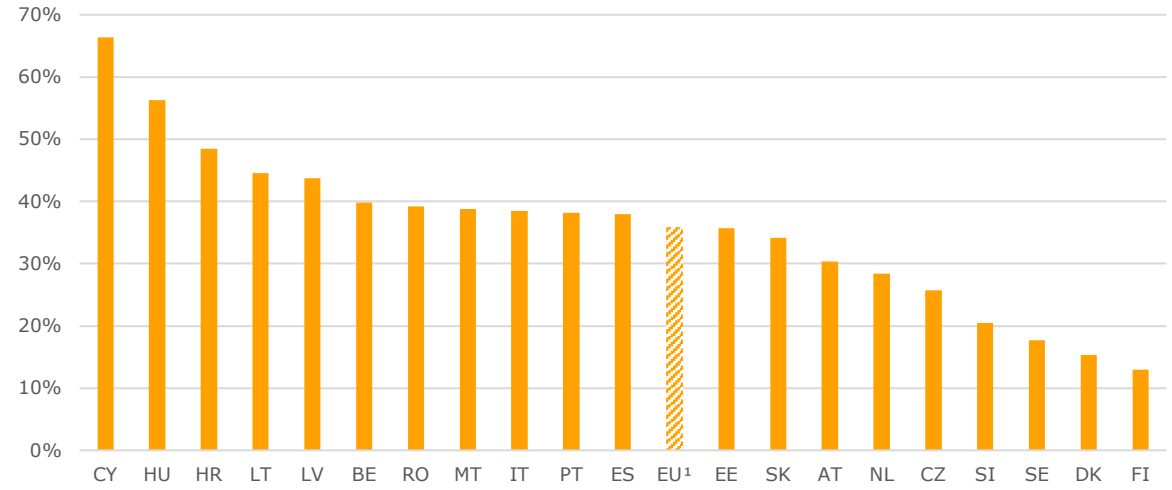
Latvia is working on the consolidation of its large and inefficient school network. In 2019 the Education law was amended to give the government the power to set the minimum number of students per class in upper secondary schools. The Ministry of Education and Science has proposed four regional categories of schools, with different requirements for the minimum number of students per school (from 450 in larger towns to just 15 in border areas) and per class (from 25-5). The goal is a network of fewer but bigger upper secondary schools better able to provide quality education for students and better remuneration for teachers, narrowing educational gaps between urban and rural areas. Progress so far has been slow, but the administrative and territorial reform due to come into force in 2021, which reduces the number of municipalities from the current 119 to fewer than 40, could provide an opportunity to speed the process along

Source: European Commission (2020). Country report – Latvia 2020.

40 The exceptions are EE, IT, and AT, where insufficient internet access is reported as a concern by a higher percentage of principals.

Teachers agree with principals; on average, 35.9% of lower secondary teachers in the EU identify investing in ICT to be of high importance (Figure 9). In Cyprus (66.3%) and Hungary (56.3%) more than 50% of teachers see this as a priority. This is contrasted by the Nordic countries Denmark (15.3%), Sweden (17.6%) and Finland (13%), which are the only countries where fewer than 20% of teachers consider investments in ICT to be a high priority. The relative importance of ICT equipment is further emphasised by the recent results from the '2nd Survey of Schools: ICT in Education', in which equipment-related obstacles were perceived as the most important issue adversely affecting the use of digital technologies by teachers[41].

Figure 9 – Percentage of teachers who reported investing in ICT to be of 'high importance'



Source: OECD, TALIS 2018 Database, Table I.3.66.

Note: Results based on responses of lower secondary teachers. Respondents were not asked to prioritise. They were able to attribute 'high importance' to all spending priorities.

¹ Weighted EU average based on 20 of 22 participating Member States in TALIS 2018 (data for BG and FR is not available).

1.2.3 Teachers and digital competence

Competence of educators refers to their ability to understand and use digital technology, and their capacity to use digital technology for teaching and learning. Teachers need to be equipped with the necessary competence to take advantage of the potential of digital technologies to enhancing teaching and learning and prepare pupils for life in a digital society. This means that teachers must be digitally prepared when they join the profession, and that they can further develop and reinforce their specific digital competence throughout their career. The European Commission released the Digital Competence framework for Educators (DigCompEdu) in 2017, defining and describing 22 competences along 6 areas to help with addressing these competences for educators.[42] A self-reflection tool for educators is also under development.[43]

41 European Commission (2019). 2nd Survey of Schools: ICT in Education. Objective 1: Benchmark progress in ICT in schools.

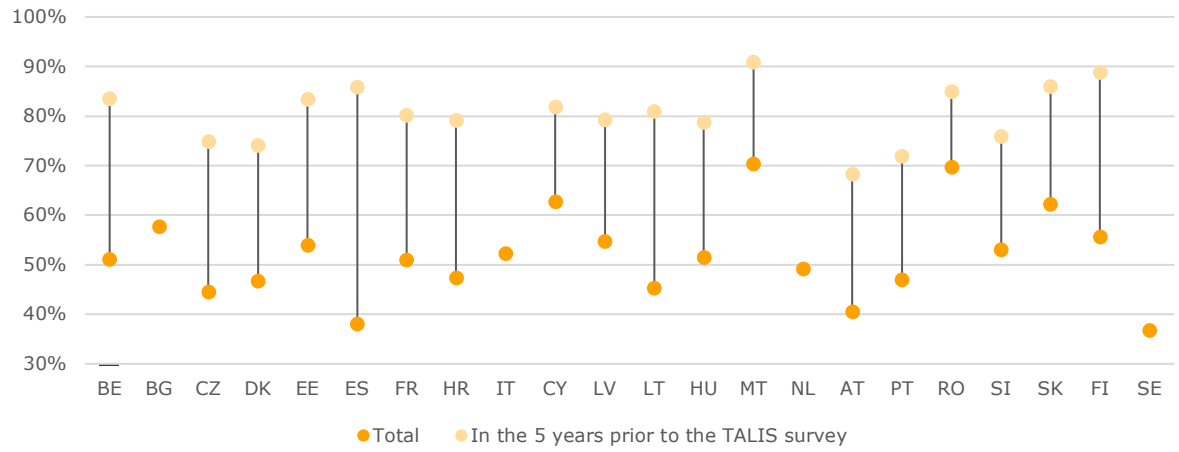
42 Redecker, C. (2017). European Framework for the Digital Competence of Educators: DigCompEdu. JRC Science for Policy Report.

43 See website

Six EU Member States have developed a specific framework referring to teacher-specific digital competence (Spain, Croatia, Lithuania and Austria) or standards (Estonia and Ireland). In a further 15 countries, digital competence are included in a general teacher competence framework[44]. The remaining countries either do not acknowledge digital competence in their teacher competence frameworks (Czechia, Portugal and Sweden) or have no teacher competence framework at all (Greece, Cyprus, Malta and Finland)[45].

Evidence from TALIS 2018 indicates that the use of ICT for teaching was rarely included in the education and training of lower secondary teachers in EU countries. On average in the EU, fewer than half of all teachers (49.1%) report that ICT was included in their formal education or training. If we only consider teachers who have recently completed their formal education or training, the situation changes. Figure 10 compares all TALIS responses to the responses of teachers who completed their formal education in the 5 years prior to the TALIS survey. For all countries with available data by year of completion, a higher percentage of recently educated teachers received training in the use of ICT for teaching.

Figure 10 – Percentage of teachers for whom use of ICT for teaching was included in their formal education, by year of completion



Source: OECD, TALIS 2018 Database, Table I.4.13.

Note: Results based on responses of lower secondary teachers. Data is not available by year of completion for BG, IT, NL and SE.

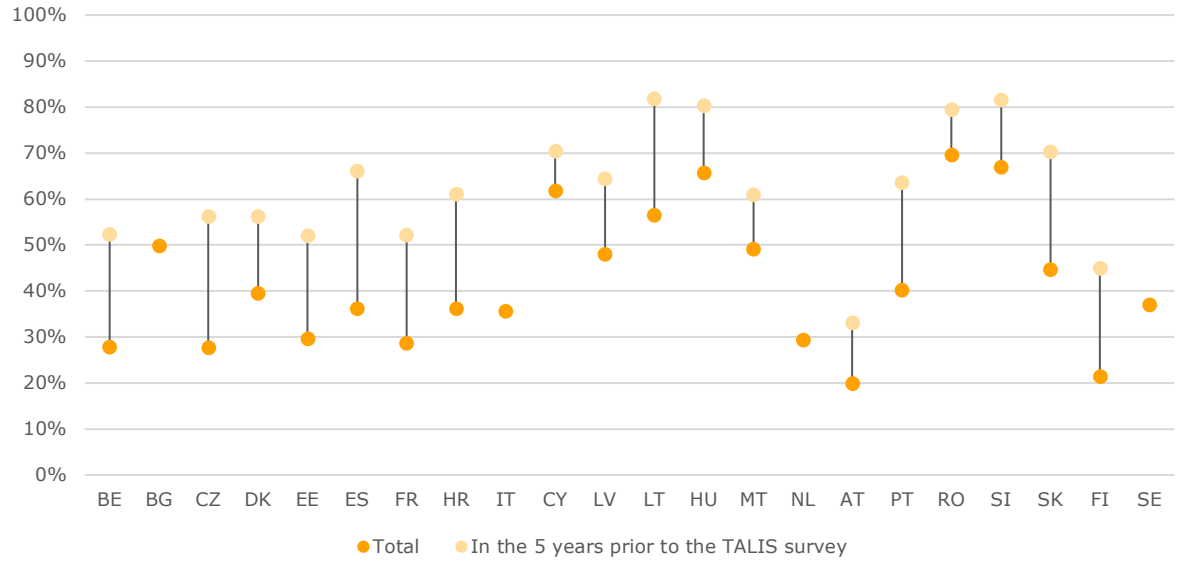
Teachers' sense of preparedness for the use of ICT for teaching is related to the year of completion of their formal education or training. A higher percentage of teachers who completed their formal education or training in the 5 years prior to the TALIS survey felt well or very well prepared to use ICT for teaching, compared to the survey total (Figure 11). Conversely, teachers' confidence in supporting pupil learning through the use of digital technology does not appear to be affected by experience, with statistically significant differences between novice teachers (≤ 5 years' experience) and more experienced teachers in only two countries (Czechia and the Netherlands)[46].

44 BE (BE fr and BE nl), BG, DK, DE, ES, FR, IT, LV, LU, HU, NL, PL, RO, SI, SK.

45 European Commission/EACEA/Eurydice (2019). Digital Education at School in Europe. An Eurydice Report.

46 OECD, TALIS 2018, Table I.2.20.

Figure 11 – Percentage of teachers who felt 'well prepared' or 'very well prepared' for the use of ICT for teaching, by year of completion

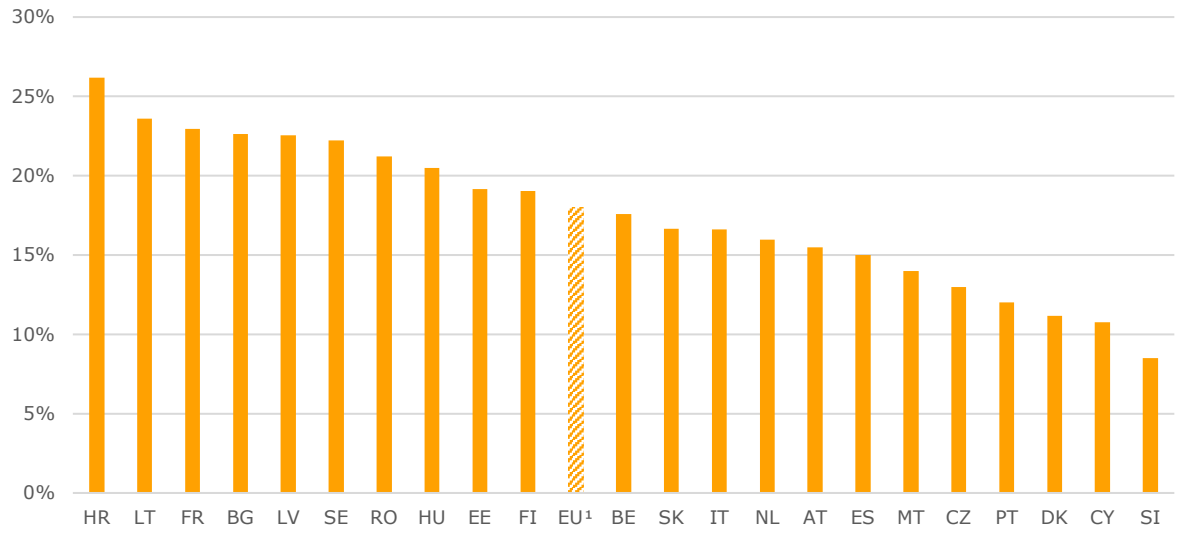


Source: OECD, TALIS 2018 Database, Table I.4.20.

Note: Results based on responses of lower secondary teachers. Data is not available by year of completion for BG, IT, NL and SE.

ICT skills for teaching is an area where teachers say they need more training, surpassed only by 'teaching students with special needs'. When asked about their level of need of training in ICT skills, an average of 18% of teachers in the EU reported a 'high level of need' (Figure 12). The need is the highest in Croatia (26.2%), where about one in four teachers reports a high need of continuous professional development (CPD) in ICT skills for teaching. In Slovenia in comparison, less than one in ten teachers report a high need for training in ICT skills.

Figure 12 – Percentage of teachers reporting a high level of need of professional development in ICT skills for teaching



Source: OECD, TALIS 2018 Database, Table I.5.21.

Note: Results based on responses of lower secondary teachers.

¹ Weighted EU average based on the 22 Member States in TALIS 2018.

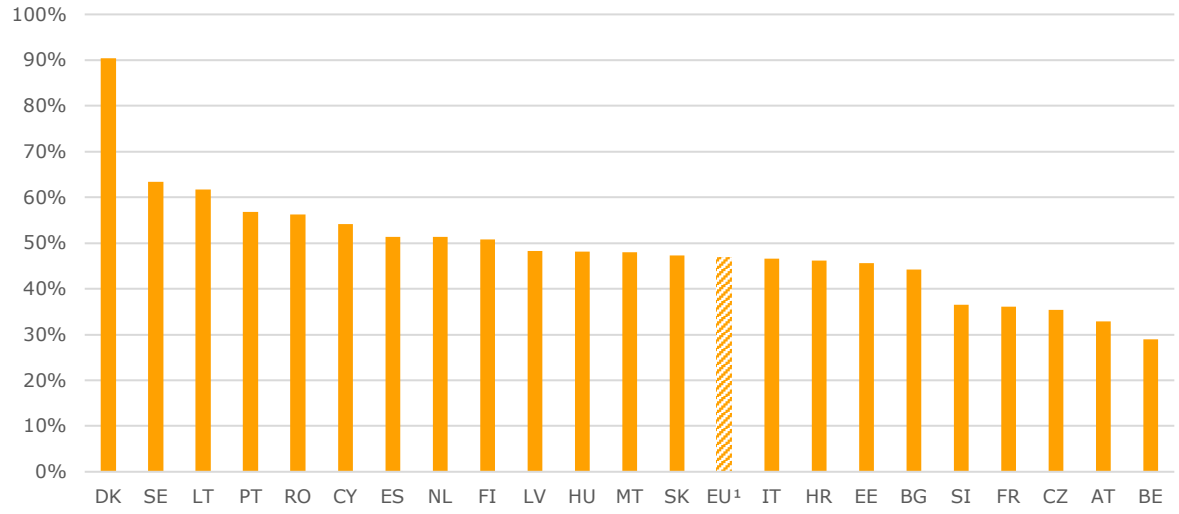
An interesting observation from the TALIS data is that the percentage of teachers reporting a high need of professional development in ICT skills for teaching has decreased over time. In 10 out of the 12 Member States with available data, there were statistically significant reductions in the reported need of professional development in ICT skills for teaching between TALIS 2008 and TALIS 2018[47].

1.2.4 Use of digital tools for teaching

Effective and systematic use of digital tools for teaching and learning in schools is still a challenge in many Member States. To help schools with their digital capacity building, the European Commission has developed SELFIE, a free, online, multi-lingual self-reflection tool[48]. It includes questionnaires for school leaders, teachers and students and creates a report, a snapshot of where the school stands in the area of digital technologies, enabling to plan actions and monitor progress. SELFIE is one of the 11 priority actions of the 2018 Digital Education Action Plan (DEAP). More than 660,000 school leaders, teachers and students from 7200 schools in 57 countries in EU, SEET and other countries have already used the tool. A new version was released in August 2020, addressing new items stemming from the COVID-19 shift to digital and online learning. SELFIE combines obligatory items with optional ones and open ones to be inserted by the schools themselves.

One of the items of SELFIE is on project work enabled by digital tools. TALIS 2018 reveals that the extent to which teachers let pupils use ICT for projects or class work varies across the EU countries (Figure 13). On average in the EU, 46.9% of teachers report that they frequently or always let their pupils use ICT for projects or class work. Teachers in Denmark (90.4%) are most likely to let their pupils use ICT, while teachers in Belgium (28.9%) are least likely to let their pupils use ICT.

Figure 13 – Percentage of teachers who reported that they 'frequently' or 'always' let pupils in the target class use ICT for projects or class work in their class



Source: OECD, TALIS 2018 Database, Table I.2.1.

Note: Results based on responses of lower secondary teachers. These data are reported by teachers and refer to a randomly chosen class they currently teach from their weekly timetable.

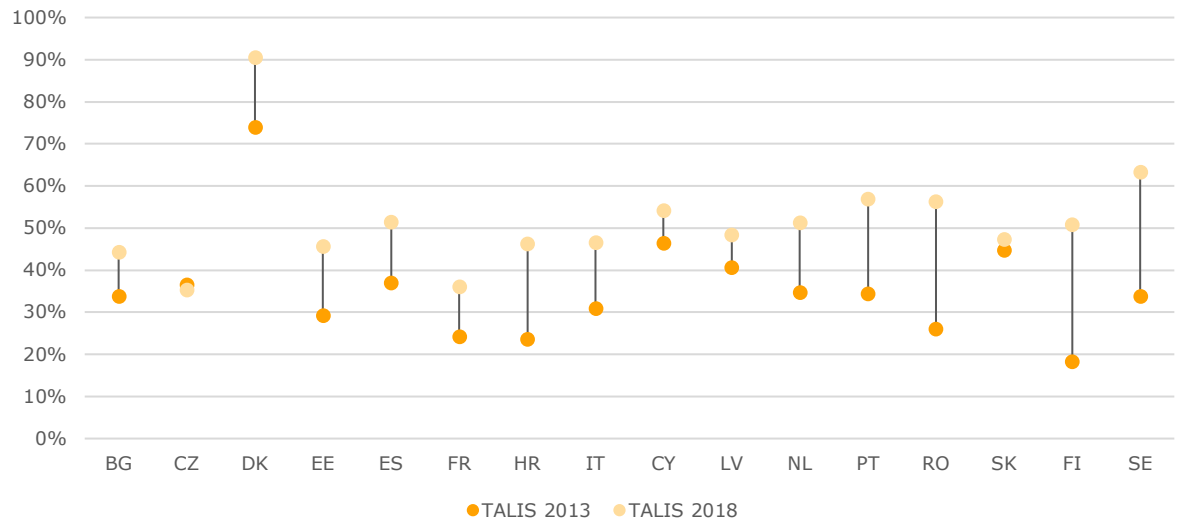
¹ Weighted EU average based on the 22 Member States in TALIS 2018.

47 AT (-8.3 pps), BG (-4.3 pps), DK (-8.9 pps), EE (-8.7 pps), ES (-11.2 pps), IT (-9.2 pps), LT (-12.5 pps), MT (-8.9 pps), PT (-12.2 pps) and SI (-16.6 pps) and experienced a statistically significant reduction in the percentage of teachers reporting a high need for professional development in ICT skills for teaching from TALIS 2008 to TALIS 2018. This was also the case for BE fr (-5.4 pps). In HU (-2.5 pps) and SK (+1.8 pps) the differences were not statistically significant.

48 See SELFIE.

The percentage of teachers who report they 'frequently' or 'always' let their pupils use ICT for projects or class work has increased over time. Figure 14 shows the difference between the responses from TALIS 2013 and TALIS 2018. In the majority of the Member States where data is available, there has been a statistically significant increase. The biggest increases are present in Finland (+32.5 pps), Romania (+30.2 pps) and Sweden (+29.6 pps). In Czechia and Slovakia, the change was not statistically significant.

Figure 14 – Percentage of teachers who reported that they 'frequently' or 'always' let pupils use ICT for projects or class work in their class, change from 2013 to 2018



Source: OECD, TALIS 2018 Database, Table I.2.4.

Note: Results based on responses of lower secondary teachers. These data are reported by teachers and refer to a randomly chosen class they currently teach from their weekly timetable.

Box 9 – Integrating traditional textbooks with self-produced digital educational content in Italy

Avanguardie Educative (Educational Avant-Garde) is a network of Italian schools set up by INDIRE, Italy's national institute for research in education, with the objective of rethinking the Italian school model, still strongly classroom-lecture-activity-based and constrained by rigid organisation of the timetable. Among the innovative ideas promoted by *Avanguardie Educative* is *CDD/Libri di testo* (where CDD stands for *Contenuti Didattici Digitali*, Digital Didactic Content). The idea is to go beyond the traditional printed textbook associated with lecture-centred schooling by involving students in making the content of their books. The project's starting point is that the textbook should be a 'canvas' that guides class activity, filled with content connected to the particular context of the school. The aim is to overcome the concept of studying as just rote learning: creating digital content implies cooperation among the whole class, critical use of different tools and resources in the analysis of various language forms, and the development of social skills. For teachers, it can be a way to produce content adapted to different learning needs, motivate students through their active involvement and to link content to the local area.

Source: http://innovazione.indire.it/avanguardieeducative/cdd

Part 2

The Education and Training 2020 targets

2 The Education and Training 2020 targets

2.1 Early leavers from education and training (ELET)

Key findings

In 2019, the ELET rate stood at 10.2% in the EU-27, down from 14.0% in 2009. Nineteen EU countries have met the 2020 target of having an ELET rate below 10%. Countries that had low proportions of early school leavers in 2009 mostly continue to do so in 2019. Young women are less likely than young men to leave education early as are native-born students compared to foreign-born students. At EU level, the ELET rate is lower in cities than in rural areas and towns. Overall, the socio-economic background of students has a strong impact on early school leaving, with parental education playing a key role.

Evidence shows that the completion rate of upper secondary education and the ELET rate are strongly negatively correlated in most countries. In 2019, 83.5% of people aged 20-24 in the EU-27 had at least upper secondary education, an increase of 4.8 pps since 2009.

The policy framework to reduce early school leaving, adopted by the Commission and Member States, is composed of three pillars: (1) *prevention measures* aiming to reduce the risk of early school leaving before problems start; (2) *intervention measures* aiming to avoid early school leaving by improving the quality of education and training; and (3) *compensation measures* aiming to help those who left school prematurely to re-engage in education. Whereas compensation measures appear to be relatively well-established across Europe, there is more variation between countries when it comes to prevention and intervention.

2.1.1 Progress towards the EU target

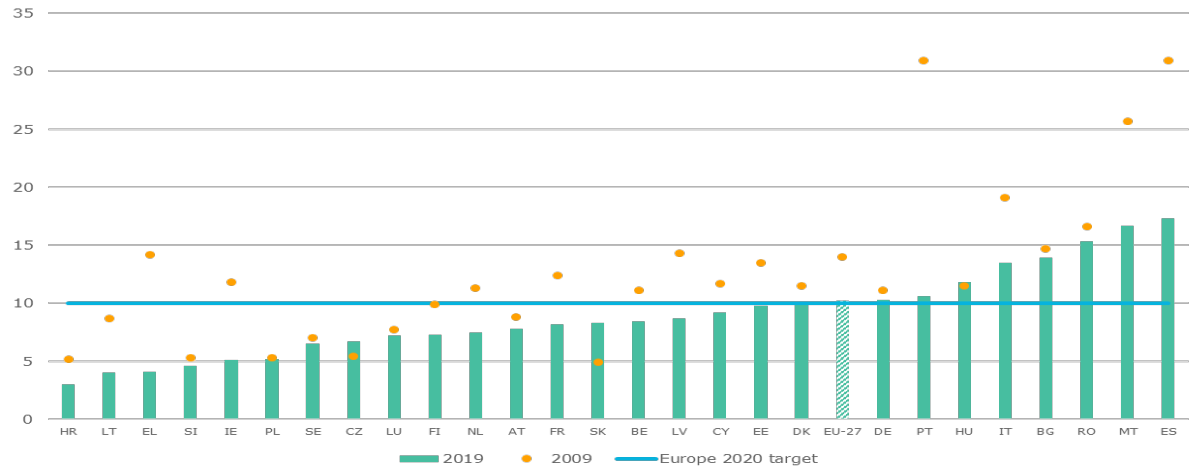
The 'early leavers from education and training' (ELET) indicator (also named 'early school leavers') measures the proportion of 18-24 year-olds with, at most, lower secondary educational attainment (i.e. ISCED 0-2 levels) and who are no longer in formal or non-formal education and training. According to the Europe 2020 target[49], the ELET rate should be lower than 10% by 2020.

In 2019, the ELET rate stood at 10.2% in the EU-27, down from 14.0% in 2009 and very close to the 2020 target. The three countries with the highest rates are Spain (17.3%), Malta (16.7%) and Romania (15.3%). High ELET rates – more than 3 pps higher than the EU average – can also be observed in Bulgaria (13.9%) and Italy (13.5%). In 19 countries, the ELET rate is below 10% and is below 5% in Croatia (3.0%), Lithuania (4.0%), Greece (4.1%) and Slovenia (4.6%).

Countries that had low proportions of early school leavers in 2009 mostly continued to do so in 2019, with the exception of Slovakia, where the ELET rate grew from 4.9% to 8.3%. Spain improved the ELET rate by 13.6 pps while Greece improved the rate by 10.1 pps. Greece has now reached and even surpassed the target (standing at 4.1% in 2019). Despite their substantial progress, Portugal and Spain have still not attained the 10% target (recording rates of 10.6% and 17.3% in 2019, respectively), as shown in Figure 15.

[49] This is both a headline target of the Europe 2020 strategy – the EU agenda for growth and jobs from 2010 to 2020 – and a target of the ET2020 strategic cooperation framework.

Figure 15 – Change in the rate of early school leavers from education and training, 2009-2019



Source: Eurostat, EU Labour Force Survey. Online data code: [edat_lfse_14].

A closer look at the percentages of early leavers by sex, country of birth and degree of urbanisation provides further insights. In the EU-27, fewer young women than young men leave education early (8.4% v 11.9% respectively), and this gap has remained broadly constant over the last decade. Also, on average in Europe, native-born people have lower ELET rates than foreign-born people (8.9% v 22.2% respectively). As regards the urban/rural divide, the pattern is more nuanced. At EU level, the ELET rate is lower in cities (9.1%) than in rural areas (10.7%) or towns (11.2%). The rural disadvantage is very strong in Romania and Bulgaria, where the difference between the ELET rate in rural areas and in cities is 18.1 pps and 16.0 pps, respectively. By contrast, in Austria (+7.3 pps), Belgium (+4.8 pps), Cyprus (+2.9 pps) and Germany (+1.3 pps), more young people leave education prematurely in cities than in rural areas (see Figure 16), although this could also be an effect of demographic ageing.

Figure 16 – Early leavers from education and training by sex, country of birth and degree of urbanisation, 2019 [%]

	Total	Men	Women	Native-born	Foreign-born	Cities	Towns and suburbs	Rural areas
EU-27	10.2	11.9	8.4	8.9	22.2	9.1	11.2	10.7
BE	8.4	10.5	6.2	7.3	15.7	11.1	7.2	6.3
BG	13.9	14.5	13.3	14.0	:	8.5	13.8	24.5
CZ	6.7	6.6	6.8	6.7	8.3	5.8	7.9	6.4
DK	9.9	12.1	7.6	9.7	13.1	7.2	11.4	12.3
DE	10.3	11.8	8.8	8.1	24.2	10.3	11.1	9.0
EE	9.8	12.7	6.9	9.6	:	6.6	14.3	12.3
IE	5.1	5.9	4.3	5.3	4.2	3.7	6.9	5.4
EL	4.1	4.9	3.2	2.9	26.9	3.2	3.7	7.3
ES	17.3	21.4	13.0	14.4	31.1	15.3	19.5	19.6
FR	8.2	9.6	6.9	7.8	13.4	8.0	9.2	8.0
HR	3.0	3.1	3.0	3.1	:	1.9	1.8	4.9
IT	13.5	15.4	11.5	11.3	32.3	13.5	12.9	14.6
CY	9.2	11.1	7.5	4.8	23.3	9.9	9.3	7.0
LV	8.7	10.5	6.8	8.8	:	3.9	13.1	11.1
LT	4.0	5.1	2.8	4.0	:	2.3	6.9	4.9
LU	7.2	8.9	5.5	6.8	8.1	:	10.0	4.6
HU	11.8	12.7	10.9	11.9	:	3.8	12.2	18.1
MT	16.7	18.3	14.8	15.4	27.0	20.7	12.6	:
NL	7.5	9.5	5.5	7.2	11.6	7	8.3	8.9
AT	7.8	9.5	6.1	5.7	19.2	11.7	7.6	4.4
PL	5.2	6.7	3.6	5.2	:	4.0	6.3	5.6
PT	10.6	13.7	7.4	10.3	14.4	9.1	11.8	11.7
RO	15.3	14.9	15.8	15.4	:	4.3	15.7	22.4
SI	4.6	5.2	3.8	4.0	11.6	3.4	5.1	4.7
SK	8.3	8.8	7.9	8.3	:	:	11.7	7.9
FI	7.3	8.5	6.0	7.0	11.5	5.2	9.7	8.7
SE	6.5	7.4	5.5	4.6	13.6	4.6	7.3	8.4

Source: Eurostat, EU Labour Force Survey 2019. Online data code: [edat_lfse_14], [edat_lfse_02] and [edat_lfse_30].
Note: The ELET data by sex and labour market status has low reliability in 2019 for HR. The ELET data by sex and country of birth has low reliability in 2019 for CZ, DK, EE, HR, LV, HU, PL, SL, SK and FI. The ELET data by sex and degree of urbanisation has low reliability in 2019 for HR.

2.1.2 How many young people complete upper secondary education?

Having an upper secondary qualification is the minimum requirement for a satisfactory employment prospects in today's economy, and a passport to full participation in society.

Eurostat publishes data on the share of people aged 20-24 with at least upper secondary education (ISCED 3 level), which corresponds to completion of upper secondary education (the 'completion rate'). People aged 20-24 (instead of 18-24, as in the ET2020 ELET indicator) is the most appropriate age group, as the statutory age for completing most ISCED 3 education programmes is between 18 and 19 years old[50].

The main difference compared to the ET2020 ELET indicator is that the focus here is on completion of formal education. Therefore, a person with an ISCED 0-2 qualification and still in (either formal or non-formal) education/training would be treated as an early leaver according to a completion indicator, while they would not be considered as an early leaver in the ET 2020 ELET indicator. Besides, the completion rate measures how many (young) people in a cohort get an education at a certain level (relevant for a country's economy and economic growth) whereas the focus of ELET is on the ability of the education system, or education institutions, to keep people that are already in education from dropping out. Even if both measures are a reverse of each other, due to the limitations of surveys, they do not lead to the same results yet the youth enrolled even in informal training course would not be counted in the ELET indicator which may distort the picture of 'educational poverty'. In the new, post-2020 strategy, there will be a change of focus away from ELET, over to the 'completion rate'.

Box 10 – Tackling early school leaving in Romania

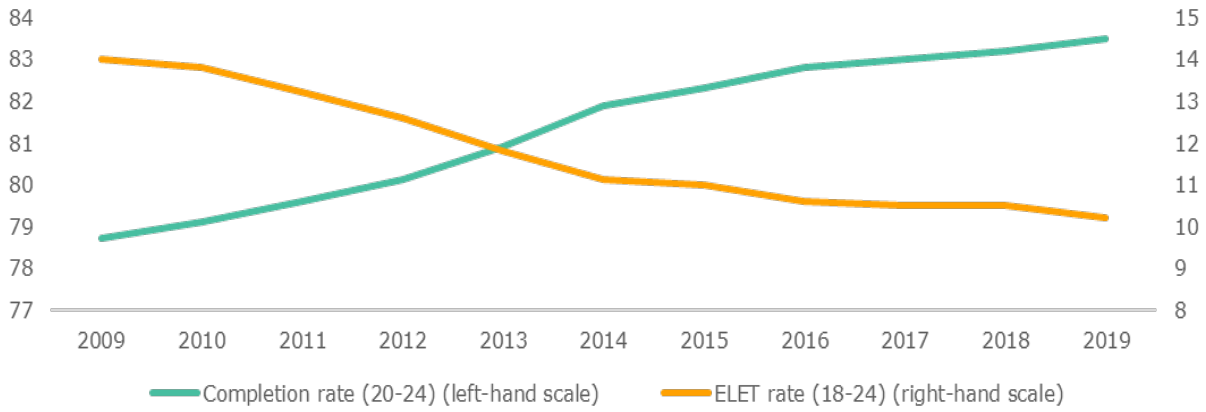
To prevent early school leaving, the Ministry of Education and Research is working together with the European Commission to fully implement and deploy an early warning mechanism (EWM). The project will develop a dedicated EWM module in the existing integrated IT system for education and pilot the module in 10 selected counties. It offers hands-on support to 10 schools to develop and carry out their early warning action plan, and provides training to key stakeholders at central, regional and local level. The project, implemented by the World Bank, started in June 2020 and will run for 2 years. It aims to equip education authorities with all the necessary tools and capacity to scale-up the EWM at national level.

The EWM has been developed as part of a previous call under the structural support reform programme. It includes a comprehensive package of measures focusing on prevention, intervention and compensation, and a set of practical instruments for schools, county inspectorates and central authorities.

In 2019, 83.5% of people aged 20-24 in the EU-27 had at least upper secondary education, with an increase of 4.8 pps since 2009. In most countries, when the completion rate is higher (lower) than the EU average, the ELET rate is lower (higher) than the EU average. There are, however, a few exceptions to this pattern. In Luxembourg and the Netherlands, both the ELET rate and the completion rate are lower than the EU average, while the opposite is the case in Bulgaria and Hungary.

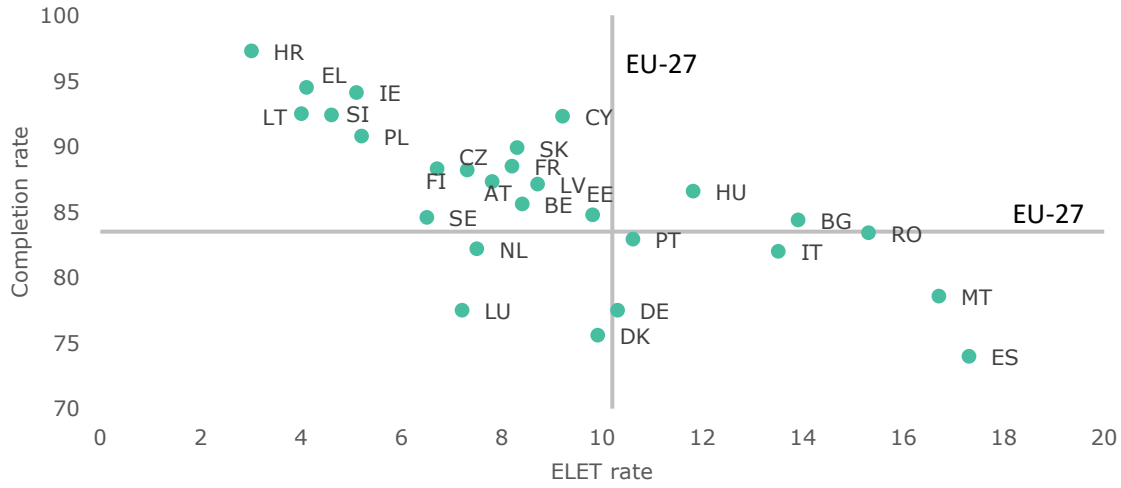
50 It would probably be worthwhile exploring slightly older age groups (25-34 or 30-34) as some young people leave formal education temporarily and finish secondary education in schools for adults (often up to the age of 30).

Figure 17 – Evolution of the ELET and completion rates in the EU-27 (2009-19)



Source: Eurostat, EU Labour Force Survey. Online data code: [edat_lfse_14] and [edat_lfse_03]
Note: Mind the different age groups for both indicators.

Figure 18 – ELET rate versus completion rate (2019)



Source: European Commission, DG EAC.

2.1.3 A policy framework to tackle early school leaving

In 2011, the Commission and Member States developed a comprehensive policy framework to reduce early school leaving[51]. Its three pillars are prevention, intervention and compensation.

Prevention measures aim to reduce the risk of early school leaving before problems start. They may include – in addition to high-quality early childhood education and care – an early screening of language competence, development problems and special education needs that allows action to be taken at an early stage.

Intervention measures aim to avoid early school leaving by improving the quality of education and training at the level of the educational institutions, by reacting to early warning signs and by providing targeted support to pupils or groups of pupils at risk of early school leaving. They may

51 Council of the European Union (2011). Council Recommendation of 28 June 2011 on policies to reduce early school leaving.

include staff support, involvement of parents and local communities, and extra-curricular activities in the youth field. In addition, career guidance can play an important role in easing transitions between different education levels and between education and the labour market.

Compensation measures aim to help those who have left school prematurely to re-engage in education, offering routes to re-enter education and training and gain the qualifications they missed. They may include second chance education programmes, and various routes back into mainstream education and training, as well as recognising and validating prior learning.

Box 11 – Tackling the early school leaving rate in Spain

Although declining, the ELET rate in Spain is still above the EU average. Within the country, some regions face more challenges than others in reducing their ELET rates. At the end of 2019, the Ministry of Education and Vocational Training commissioned an analysis report on the different programmes aimed at reducing early school leaving, including both the Territorial Cooperation Programmes (PCT) carried out since, and other initiatives developed by the educational administrations of the regions.

This analysis is the basis for the recommendations for a renewed program, named the programme for territorial cooperation for educational guidance, progress and enrichment, '#PROA+' (2020-21), whose basic lines were approved last May by the regions.

The main objective of this Programme is to reinforce those schools that present greater complexity and higher rates of educational poverty (significant educational lag, disconnection from school, low attainment rates, high rates of repetition and early school leaving or risk of school failure). Such schools will have to comply with the EC recommendations on educational inclusion. They will need additional support to respond to the demand for organizational, curricular, methodological readjustments and teacher reinforcement necessary to compensate for the impact of the lockdown and the closure of schools during the pandemic.

The schools taking part in '#PROA+ 20-21' will be able to choose, in accordance to their current needs, among the following actions:

1. Adjustment of the education project to the needs of the school: attention to reception, reinforcement of school ties and the transitions between educational stages; adaptation of the curriculum and promotion of inclusive pedagogical innovation.
2. Promotion of essential teaching and guidance competencies, in coordination with the training services or regional networks.
3. Plans that provide mentoring, motivation, and personalized school reinforcement for those students with specific educational needs (support given by instructors and student-mentors).
4.. Enhancement of the involvement and collaboration of families and the community environment with the school project in the comprehensive support of vulnerable students.

Another reached agreement was to reinforce technical cooperation and the evaluation of the Programme based on agreed indicators, with a view to the accountability of the regional educational administrations, future improvements and, where appropriate, their subsequent expansion and adaptation in the next school years.

Source: Spanish Ministry of Education

A recent study[52] shows that compensation measures are comparatively well-established across Europe. Most EU countries offer 'second chance' education schemes of some description, often combined with career guidance and financial, childcare and/or psychological support.

Intervention policies are also relatively widespread within countries, although with more variation. Coverage is highest for intervention measures focused on in-school support, including targeted support for learners experiencing personal, social or academic difficulties, as well as continuing professional development for teachers and school leaders to manage diversity. Implementation of infrastructural measures shows the weakest overall coverage, including measures relating to school networks, early warning systems, and extra-curricular provision.

Although coverage of prevention policies within countries is also fair overall, most countries have some gaps, and around a quarter have more marked gaps. As for intervention measures, there seems to be less emphasis on implementing systemic policies (e.g. anti-segregation policies) appears less prevalent than measures implemented within schools or other institutions (e.g. improving accessibility of early childhood education and care to all, developing curriculum flexibility and choice).

Educational attainment is a major factor in determining employment prospects for young people. Early leavers from education and training and those lacking basic skills have particular barriers to employability. Therefore, early leavers from education and training should be brought to the scope of the Youth Guarantee where they can be helped to return to education or training, or referred to other relevant services.

The Youth Guarantee can have a role in prevention, intervention and compensation of early leaving. This aspect is strengthened in the Commission's recent proposal for a Reinforced Youth Guarantee[53], which recommends that Member States strengthen their early warning systems and tracking capabilities to identify those at risk of early leaving from education and training. This requires close cooperation with e.g. the education sector, parents and local communities, and the involvement of youth policy as well as social and employment services.

Success factors in tackling early school leaving include the existence of:

- a comprehensive strategy;
- a national coordinating mechanism or structure;
- a corresponding set of policy measures – prevention, intervention and compensation;
- an implementation plan, with clear targets and milestones;
- proportionate resources for implementation;
- synergies with other EU and national funding opportunities;
- clear lines of accountability;
- systematic monitoring, evaluation and feedback.

Some important challenges have been insufficiently addressed so far. For example: (i) integrating measures to tackle early school leaving within broader educational policies; (ii) specific targeting of measures at disadvantaged groups (e.g. migrants, ethnic minorities, or people living in remote areas); and (iii) monitoring and evaluation.

2.1.4 What socioeconomic factors influence early school leaving?

Besides specific policy measures, a number of contextual socio-economic factors can influence early school leaving. A study of EU-28 data from 2006 to 2017 provides some evidence on how strong those factors are in the EU.

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52 European Commission (2019). Assessment of the Implementation of the 2011 Council Recommendation on Policies to Reduce Early School Leaving.

53 Proposal for a COUNCIL RECOMMENDATION on A Bridge to Jobs - Reinforcing the Youth Guarantee and replacing Council Recommendation of 22 April 2013 on establishing a Youth Guarantee, COM/2020/277 final.

The following variables were selected based on the literature on early school leaving[54] and data availability. The proportion of low-educated[55] women aged 45-54 is a proxy for low parental education. Research has consistently found low parental education to be as a good predictor of poor educational attainment and suggests that mothers' education has a stronger impact than that of fathers[56]. The unemployment rate for low-educated 15-24 year-olds (the 'youth unemployment rate') captures the cyclical labour market conditions and indicates how difficult it is to find a job for potential early school leavers. The higher the rate, the higher the incentive to stay in education or training, which should translate into a lower ELET rate[57]. Expenditure per student in secondary education as a percentage of GDP per capita[58] measures the amount of financial resources that a country spends on each student compared to its level of economic development. In principle, one could expect that more spending helps to prevent early school leaving, but in practice there is no guarantee that additional resources are used to support measures against early school leaving. Therefore, it is not possible to draw any firm conclusion about the impact of this variable.

Being born abroad increases the risk of becoming an early school leaver, as shown in Section 2.1.1 above. The model accounts for this by including the proportion of foreign-born people aged 15-24. However, this variable is available for the sub-period 2009-2017 only. The 'at risk of poverty or social exclusion' (AROPE) rate for 15-24 year-olds may capture other family disadvantages that go beyond low parental education or a migrant background. It can also be a useful additional indicator of the impact of socio-economic background on early school leaving.

The strongest impact comes from low parental education (Figure 19), where a 1 percentage point increase is associated with a 0.4 percentage point increase in the ELET rate. In the sub-period 2009-2017, an increase of 1 percentage point in the proportion of foreign-born young people is associated with a 0.3 percentage point increase in the ELET rate. The other variables are not statistically significant.

These results provide suggestive evidence of the key role of parental background in shaping educational outcomes. As a policy message, they suggest that finding ways to compensate for adverse background may help education systems prevent early school leaving. One possible measure is to involve low-educated parents in the activities of their children's school. This is consistent with the recent literature focusing on parental engagement and student outcomes[59]. For instance, results from a large-scale randomised experiment in France show that a series of meetings targeted at parents of low-achieving students towards the end of lower secondary education helped families choose a better-suited upper secondary educational programme. One year after this exercise, dropout rates fell from 9% to 5% and the probability of repeating a grade decreased from 13% to 9%[60]. Such programmes must of course ensure to avoid unduly reducing students' aspirations (e.g. as a result of unconscious bias) as this would risk reinforcing existing inequalities[61].

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54 See Flisi, S., Goglio, V. and Meroni, E. (2014). Monitoring the Evolution of Education and Training Systems: A Guide to the Joint Assessment Framework for a literature review.

55 With at most lower secondary education (i.e. ISCED 0-2 levels).

56 Black, S.E., Devereux, P. J. and Salvanes, K. G. (2005). Why the Apple Doesn't Fall Far: Understanding Intergenerational Transmission of Human Capital, *American Economic Review*, Vol. 95, No 1, 2005, pp. 437-49.

57 The ELET rate includes people who may have left education in previous years and their decision would have been influenced by the labour market conditions at that time, not by the current ones. To account for this, we use the unemployment rate of the previous year (technically speaking, the unemployment rate with a lag of one period) as a variable.

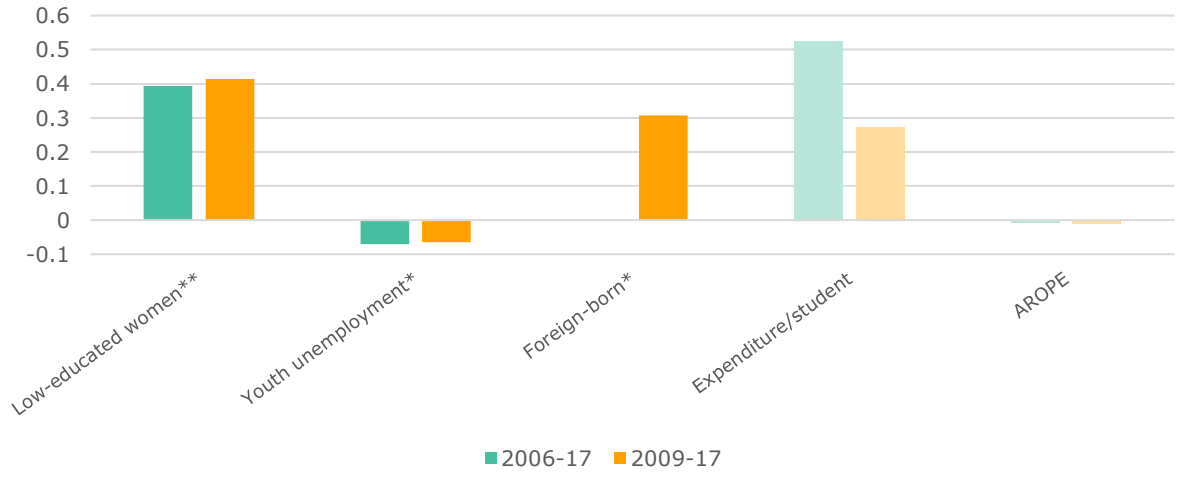
58 Expressed in purchasing power standards.

59 Behaghel, L., Gurgand, M., Kuzmova, V. and Marshalian, M. (2018). European Social Inclusion Initiative review paper, Abdul Latif Jameel Poverty Action Lab J-PAL.

60 Goux, D., Gurgand, M. and Maurin, E. (2017). Adjusting Your Dreams? High School Plans and Dropout Behaviour. *The Economic Journal*, Vol. 127, No. 602, pp. 1025-1046.

61 Weinberg, D et al. (2019). The pathways from parental and neighbourhood socioeconomic status to adolescent educational attainment: An examination of the role of cognitive ability, teacher assessment, and educational expectations, PLOS ONE.

Figure 19 – Contextual factors influencing ELET: value of the regression coefficients



Source: DG EAC calculations.

Dependent variable: ELET rate. Estimation method: fixed effect panel model with robust Arellano heteroskedasticity and autocorrelation-consistent standard errors.
Statistically significant values are in darker tone. * denotes significance at 5% level. ** denotes significance at 1% level. Number of observations = 325 for 2006-2017 and 231 for 2009-2017.

2.2 Tertiary educational attainment (TEA)

Key findings

The EU has met its target of raising the rate of tertiary educational attainment to at least 40% of the population aged 30-34. In 2019, 40.3% of people aged 30-34 held a tertiary degree. On average, women's (45.6%) TEA is higher than men's (35.1%). Interestingly, in 2019 the annual increase in the male TEA level (1 percentage point) outperformed, for the first time in 20 years, the annual increase in the female TEA level (0.8 pps).

Among the countries with a low proportion of people with tertiary degree, only Romania and Italy have not reached 30%. In 2019, 12 EU Member States showed TEA rates of 40% to 50%. In the Netherlands, Sweden, Ireland, Luxembourg, Lithuania and Cyprus, more than 50% of the population aged 30-34 holds a tertiary degree.

Sub-national TEA levels according to the degree of urbanisation show a clear qualification gap between cities, towns and suburbs, and rural areas in all Member States. In the EU, the average tertiary education gap between rural areas and cities today is bigger than 20 pps. Moreover, this urban-rural divide is above 30 pps in eight Member States (Luxembourg, Romania, Slovakia, Bulgaria, Hungary, Denmark, Lithuania and Poland), and in only two countries (Belgium and Slovenia) is it below 15 pps.

Tertiary educational attainment has grown in each Member State since 2009, on average by 9.2 pps in the last 10 years. However, the increase has varied significantly, from only 1.4 pps in Finland to an impressive 22.5 pps in Slovakia. Overall, those countries that started with a TEA rate below the EU target in 2009 seem to have substantially boosted their performance since then. The opposite seems to be true for the group of countries with a TEA rate above the EU target back in 2009, i.e. for Belgium, Denmark, Ireland, Spain, France, Cyprus, Lithuania, Luxembourg, Finland and Sweden.

Graduating from tertiary education has become increasingly important as an ever-changing European labour market needs more people with academic degrees who can easily upskill and re-skill, and thereby better contribute to economic and societal innovation. In addition, higher educational attainment is associated with higher earnings, lower unemployment risk, better health and more active participation in society.

Therefore, back in 2009 – in the context of the Europe 2020 strategy on promoting economic growth and employment – EU countries agreed to raise the share of people with an academic degree and set a headline target of bringing the number of 30-34 year-olds with tertiary educational attainment to at least 40% by 2020. Today, 40.3% of people aged 30-34 hold a tertiary degree, so the EU has reached the 40% target.

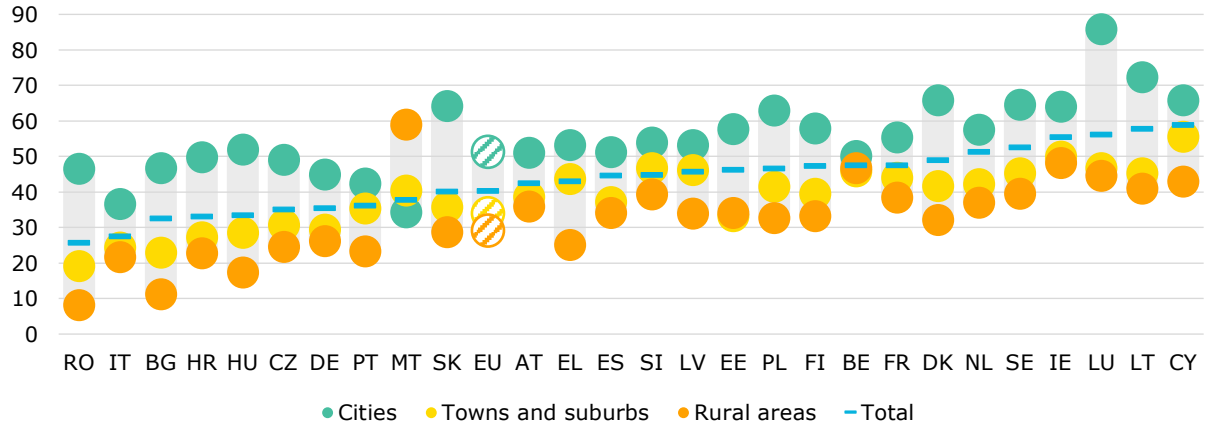
2.2.1 Gaps between and within countries

The overall achievement, however, hides substantial differences between countries and between regions within countries, for historical, structural, accessibility or other reasons. Among the countries with a low proportion of tertiary graduates, only Romania and Italy have not reached 30%. In 2019, 12 EU Member States showed TEA rates of 40% to 50%. In the Netherlands, Sweden, Ireland, Luxembourg, Lithuania and Cyprus, more than 50% of the population aged 30-34 holds a tertiary degree.

Sub-national TEA levels according to the degree of urbanisation[62] show a clear qualification gap between cities, towns and suburbs, and rural areas in all Member States. While urban labour markets evidently attract more people with a tertiary degree in any country, the urban-rural TEA gap is remarkably country-specific.

In the EU, the average tertiary education gap between rural areas and cities today is more than 20 pps. Moreover, this urban-rural divide is larger than 30 pps in eight Member States (Luxembourg, Romania, Slovakia, Bulgaria, Hungary, Denmark, Lithuania and Poland), while in only two countries (Belgium and Slovenia) is it smaller than 15 pps. Unfortunately, the gap is growing as, in most countries, TEA levels are increasing faster in cities than in rural areas. For example, in 2009, there was no country with an urban-rural TEA gap over 30 pps and the largest difference was only 19 pps.

Figure 20 – Urban-rural divide in tertiary educational attainment (30-34) by country, 2019 [%]

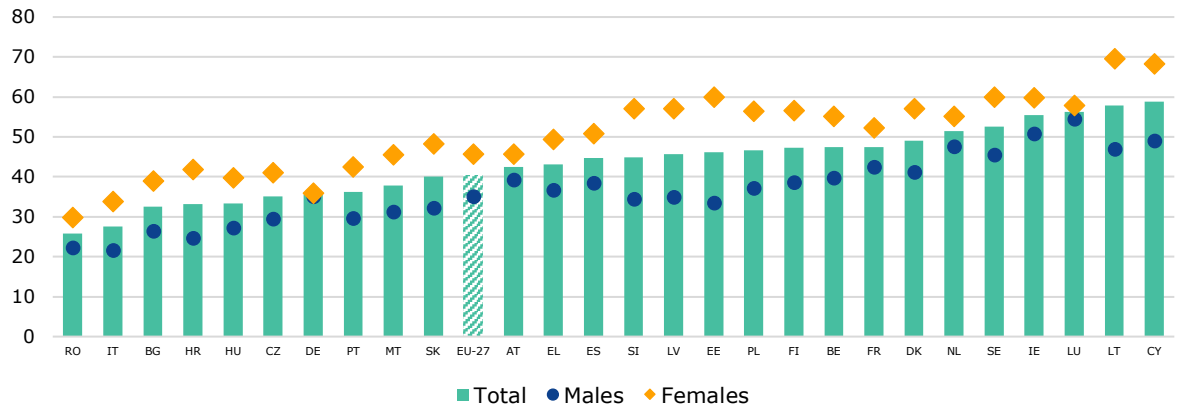


Source: Eurostat, EU Labour Force Survey. Online data code: [edat_lfs_9913].
Note: The TEA level for rural areas in Malta are considered 'low reliability' due to small sample size. This data can be shown in the chart but is not discussed in the analysis.

62 The degree of urbanisation classifies local administrative units (at LAU2 level) as cities, towns and suburbs, or rural areas, based on a combination of geographical contiguity and minimum population thresholds applied to 1 km² population grid cells. More details on the methodology can be found at Eurostat, Statistics Explained.

Sex and migrant status also seem to be important factors in the EU when it comes to higher educational attainment. Today, women's tertiary educational attainment among 30-34 year-olds (45.6%) is on average more than 10 pps higher than men's (35.1%). This gender difference has built up in the EU over the last two decades by continuously faster increasing female TEA levels. Interestingly, in 2019, for the first time in 20 years, the annual TEA level increase for males (1 percentage point) outperformed the annual increase for females (0.8 pps). It remains to be seen if the widening of the gender gap has indeed been halted, and whether it could even be reversed.

Figure 21 – TEA rate (30-34 year-olds) by country and sex, 2019 [%]



Source: Eurostat, EU Labour Force Survey. Online data code: [edat_lfse_03].

Regarding migrant status, EU citizens whether from the reporting country or not, have a higher percentage of tertiary level education than migrants (non-EU citizens). This currently stands at 41.1% for EU citizens from the reporting country, 37.3% for EU citizens who are not from the reporting country, and 34.4% for non-EU citizens. The tertiary education gaps between national citizens, foreign EU citizens and non-EU citizens have persisted at EU level over the last decade, given that the increase in TEA levels was of a similar order of magnitude for all three groups (around 8-10 pps).

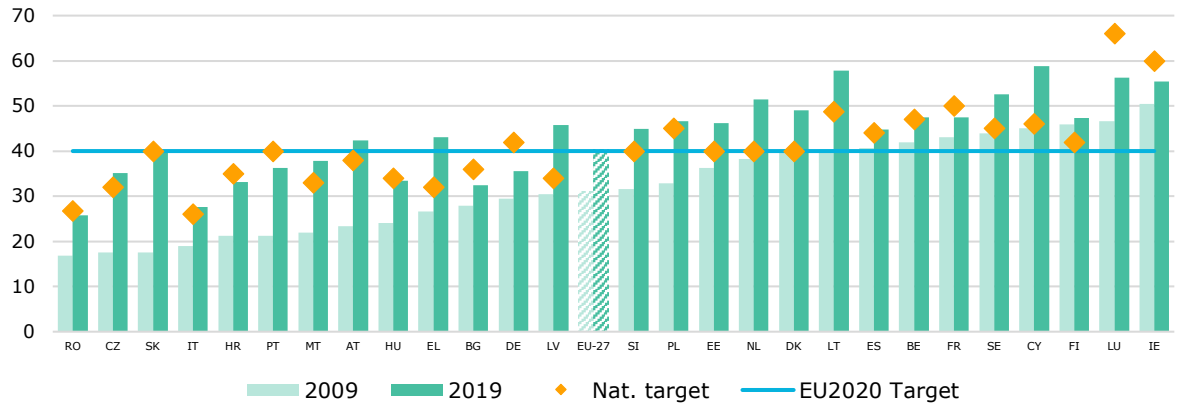
2.2.2 Progress towards the EU target

Targets that measure and compare progress in the field of education are perceived in Europe as one of the most powerful tools for motivating national governments to drive their reform agendas and improve education systems. Looking back, the ET2020 target of 40% for tertiary educational attainment was a realistic objective 10 years ago and the target has been successfully met. This achievement gives reason to review the course of progress since the setting of the target in 2009.

Tertiary educational attainment has grown in each Member State since 2009, on average by 9.2 pps. However, the increase varied significantly, from only 1.4 pps in Finland to an impressive 22.5 pps in Slovakia.

Although countries also set national targets back in 2009, some more ambitious than others, those countries that started with a TEA rate below the EU target in 2009 generally seem to have substantially boosted their performance since then. The opposite seems to be true for the group of countries with a TEA rate above the EU target back in 2009, i.e. Belgium, Denmark, Ireland, Spain, France, Cyprus, Lithuania, Luxembourg, Finland and Sweden.

Figure 22 – TEA rate (30-34 year-olds) by country, 2009, 2019 and national targets [%]



Source: Eurostat, EU Labour Force Survey. Online data code: [edat_lfse_03].

Note: The national target for DE includes post-secondary non-tertiary education (ISCED level 4) which is however not included in the [edat_lfse_03] data. For FR, the 50% national target refers to the age group 17-33. For FI, the national target excludes technological institutes.

The comparison of the progress of TEA rates between 1999 and 2009 and between 2009 and 2019 shows that the annual increase slowed down across the EU in the last decade to 0.9 pps from 1 percentage point in the decade before. The main factor is that, in the group of countries that already had a TEA rate in 2009 above the EU target, the average annual increase measured by the indicator slowed down significantly from 1.3 pps in 1999-2009 to 0.5 pps in 2009-2019. In contrast, in the 18 countries with a TEA rate below 40% in 2009, the annual increase was, on average, 0.3 pps higher in the 10 years after 2009 compared to the 10 years before (1999-2009).

Box 12 – Measures to improve quality of higher education in Slovakia

A new legal framework for quality assurance in higher education (Act no 269/2018) and the amendment to the act on higher education institutions (Act no 270/2018) came into force in November 2018 to improve the quality of the Slovakian higher education system. The main challenges result from factors such as fragmentation, the high outflow of secondary school graduates from the country, limited teaching quality, and a lack of internationalisation and job market orientation. The recent changes concern the new system of accreditation and the increased importance of quality assurance processes. The amendment simplifies the process of creating study programmes and introduces interdisciplinary studies.

On May 13, 2019 an amendment to the act on higher education (Act No 131/2002 Coll.) was adopted which provides a platform for rationalising the network of higher education institutions. Based on the 2018 legal framework, a new Slovak Accreditation Agency for Higher Education (SAAHE) has been created, acting as an advisory body to the government. An international list of external assessors is being compiled and the Agency will develop:

- internal quality assurance system standards;
- study programme standards for accreditation;
- standards for accreditation to award the titles of 'docent' and 'professor';
- relevant assessment methodologies.

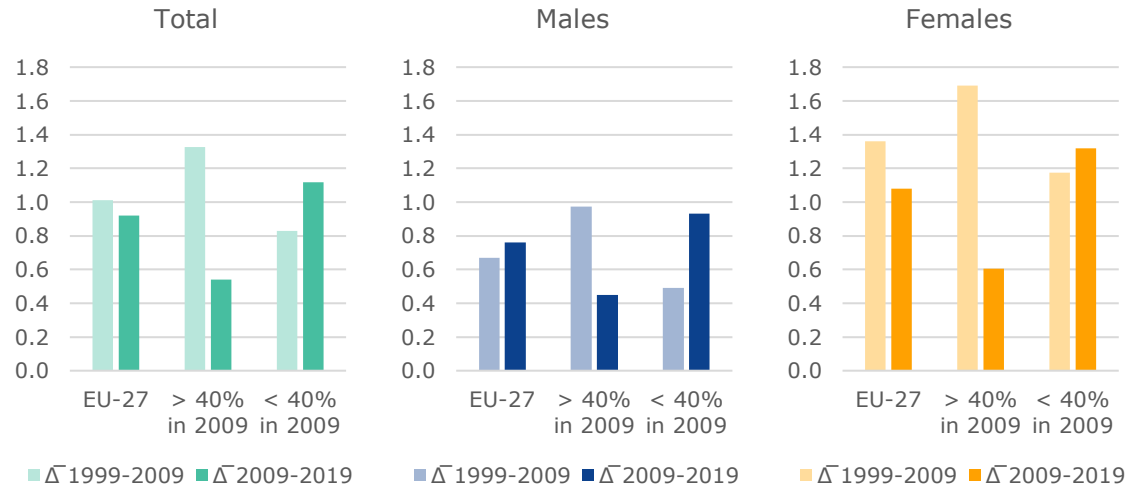
The Student Council for Higher Education presented four pillars to improve higher education: social support, education, infrastructure, and science and research. It also advocates bringing quality assurance in line with the Standards and Guidelines for Quality Assurance in the European Higher Education Area.

Source: European Commission (2020). Education and Training monitor, Volume II – Slovakia

Moreover, the group of countries that were challenged by the EU-wide TEA target in 2009 have since made much better progress in fighting the gender gap than the nine countries that already had a TEA rate over 40% at that time. The comparison shows that, in countries with a TEA rate below the EU target in 2009, the share of male graduates has grown annually by 0.9 pps since then. This was more than twice the annual increase of the male TEA rate in the group of countries that were already performing above the TEA target when it was set.

The opposite was the case in the preceding 10 years (1999-2009), when male TEA rates grew half as fast in the group of 18 countries which were performing below the EU target of 0.5 pps a year that was set in 2009. The group of nine countries that had a TEA rate above 40% in 2009 reported an annual growth rate of 1 percentage point for male graduates in the same period.

Figure 23 – Average annual increase of TEA rate in 1999-2009 and 2009-2019 in groups of countries above and below the EU-target in 2009 (pps)



Source: Eurostat, EU Labour Force Survey, special data extraction, 2020.

Note: The TEA rate is based on weighted average for the groups of countries with a TEA rate above (Belgium, DK, IE, ES, FR, CY, LT, LU, FI, SE) and below (BG, CZ, DE, EE, EL, HR, IT, LV, HU, MT, NL, AT, PL, PT, RO, SI, SK) the EU-target in 2009.

While the evolutions of rising male TEA rates were almost completely reversed in the two groups of countries – those with overall TEA rates above 40% and those with overall TEA rates below 40% in 2009 – the same comparison for female TEA rates does not show such a clear pattern. The slowdown in the increase of female graduates from the decade before 2009 to the decade after was much more pronounced in the group with overall TEA rates above 40% in 2009 (1 percentage point) than the speed of increase of female graduates in the group with TEA rates below 40% in 2009 (0.2 pps) for the same period.

Despite these promising trends, the widening of the gender gap from 0.4 pps in 1999 to up to 10.7 pps in 2018 has only stopped recently. The reason is that the increase of female TEA rates has continuously outperformed the increase of male TEA rates in the course of the last 20 years, no matter what the overall national TEA rate was. In 2019, the EU finally reported a slight narrowing of the gender gap, with an overall distance between male and female TEA rates of 10.5 pps.

The outcomes of the analysis could give reason to speculate that the share of people with an academic degree will reach around 50%, a saturation point in today's developed societies. In particular, the evolution of female TEA rates would suggest so. The consequence would be that the closer education systems get to a population where every second person has a university degree, the lower would be the increase of TEA rates, which would eventually stagnate around 50%.

The ET2020 target of 40% for TEA may have played a role in supporting national efforts to succeed and make visible and measurable progress in increasing the number of graduates from tertiary education.

2.3 Early childhood education and care (ECEC)

Key findings

The number of children participating in early childhood education and care (ECEC) has been steadily rising for the last decade. The EU-27 average of children in ECEC from 4 years-old to the compulsory primary school age[63] Figure 67 – ECEC summary table 1: Legal framework, 2019/20 remains just below the target of 95%: from 94.9% in 2016 and 2017 to 94.8% in 2018. The EU-27 average is 92.2% for children aged 3 and upwards and 57.1% for all children under the compulsory primary school age.

We cannot discern from administrative data how far vulnerable children are participating in ECEC with a minimum educational component. Survey data shows that children from socially disadvantaged groups participate in the wider formal ECEC sphere – including services both with and without a minimum educational component – to a lesser extent.

Recognising the importance of all children having access to basic services, many countries have taken action to improve affordability and availability of ECEC.

2.3.1 Evolution of the early childhood education and care target

Promoting social integration of children and levelling educational opportunities through ECEC remain key objectives of the European policy agenda, and European policymakers have set several objectives to increase participation. In 2002, the Barcelona European Council[64] set two targets on the availability of high quality and affordable childcare facilities for pre-school children, i.e. 90% of children from the age of 3 until compulsory (primary) school age and 33% of children under 3 years-old. In 2009, the strategic framework for European cooperation in education and training set the scene for the ECEC target, aiming at participation of 'at least 95% of children between 4 years-old and the age for starting compulsory primary education'[65]. To be classified as early childhood education for the ECEC target, early childhood education and care services must include a certain minimum level of instruction activity – they cannot simply be formal childcare facilities as specified by the Barcelona target.

The ECEC target comprises participation in any childcare provision for children from the age of 4 through to compulsory primary education that falls within a national regulatory framework, classified as ISCED level 0[66] and included in reporting[67]. Many differences apply to the age when education becomes compulsory[68] in different Member States; the compulsory starting age for primary education is generally around the age of 6 in Europe[69].

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63 This definition has its limitations as in many EU Member States compulsory education starts at 4. See Figure 67.

64 European Council (2002). Presidency conclusions. Barcelona European Council, 15-16 March 2002.

65 Council conclusions of 12 May 2009 on a strategic framework for European cooperation in education and training (ET2020).

66 There are two categories of ISCED level 0 programmes: early childhood educational development (ISCED 01) and pre-primary education (ISCED 02). The former has educational content designed for younger children (in the age range of 0 to 2 years), while the latter is designed for children from the age of 3 to the start of primary education. For the specifics of the definitions, see 'International Standard Classification of Education ISCED 2011'; for further details on the characteristics of the programme content of ISCED 0, see section 9.

67 It is, however, worth noting that there is not always a perfect overlap between ISCED 0 and the definition of ECEC used in the ECEC target. ISCED 0 covers children up to the start of primary education, while the target takes into account children up to the start of compulsory primary education. These concepts overlap in all EU target except Ireland, where primary education starts before compulsory education, and therefore the calculation of the target includes levels ISCED 0 and 1.

68 In France and Hungary for example, education is mandatory from the age of 3 since 2019. Another example is Belgium, where education has become mandatory from the age of 5 since September 2020. For more examples, cf. Eurydice, Key

Box 13 – Policies to provide access for minority and disadvantaged children to quality early education in Germany

The German Federal Ministry of Family Affairs, Senior Citizens, Women and Youth has launched several initiatives to tackle the inequalities between children from minority backgrounds regarding early childhood education enrolment, which is lower than for more advantaged children. Two programmes have been initiated for this purpose. The first one, the 'Language Day Care' federal programme, targets kindergartens where many children need language support. It promotes inclusion in pedagogy and includes families. It also funds staff in expert services who mentor ECE teams regarding language promotion. Between 2017 and 2020, about 7 000 additional part-time positions have been created. The second one is the 'Access to Day Care Programme', which targets families who have recently arrived or are socio-economically disadvantaged. Between 2017 and 2019, it provided coordination, staff and additional financial supplements to support about 1 000 different activities in around 150 locations.

Source: OECD (2019). Providing Quality Early Childhood Education and Care: Results from the Starting Strong Survey 2018, TALIS.

2016 marks the year in which the ECEC target was officially reached: 95.3% (94.9% in the EU without the United Kingdom) of children between the age of 4 and the age of starting compulsory primary education participated in ECE[70]. From 95.4% in 2017, the EU-28 percentage dropped very slightly to 95.3% in 2018. Post-Brexit, the EU-27 average is similar, even though the numbers remain just below 95%: from 94.9% in 2016 and 2017 to 94.8% in 2018.

In 2018, 15 Member States had reached the target. In descending order, these were Denmark, Ireland, France, the United Kingdom (still a Member of the EU at that time), Belgium, Spain, the Netherlands, Luxembourg, Germany, Latvia, Austria, Sweden, Hungary, Cyprus and Malta. Of the countries with a participation rate below 95%, Finland, Poland, Slovakia and Slovenia saw an increase compared to 2017 of between 1 and 4 pps. While the decrease of most of the others remained below 2 pps, two countries took a bigger step backwards: Greece (6.3 pps; this is due to a break in the time series) and Romania (3.3 pps). Seven countries were close to the target, with rates between 91% and 95%: in ascending order, these were Lithuania, Czechia, Estonia, Poland, Slovenia, Portugal and Italy (which, having had a participation rate above 95% in the past few years, slipped just below the target in 2018). Greece (because of breaks in the data)[71], Croatia, Slovakia and Bulgaria have the lowest participation rates among EU countries.

Of the countries with an attendance rate above 95%, Denmark, Ireland, France and the United Kingdom had a full participation rate, while participation among children from 4 years of age upwards is also close to 100% in Belgium and Spain. Most other Member States above 95% showed slight changes in the percentage from 2016 to 2018 (around 1 percentage point or less). Cyprus stands out, with a participation rate that went from 89.7% in 2016 to over 92% in 2017 and 95.3% in 2018[72], as does Croatia, where the percentage of children participating in early childhood education increased from 75.1 (2016) to 81.0% (2018).

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indicators 2019, p. 66. Cf. also European Commission/EACEA/Eurydice (2020). Structural indicators, 2020, p. 9 on the legal framework.

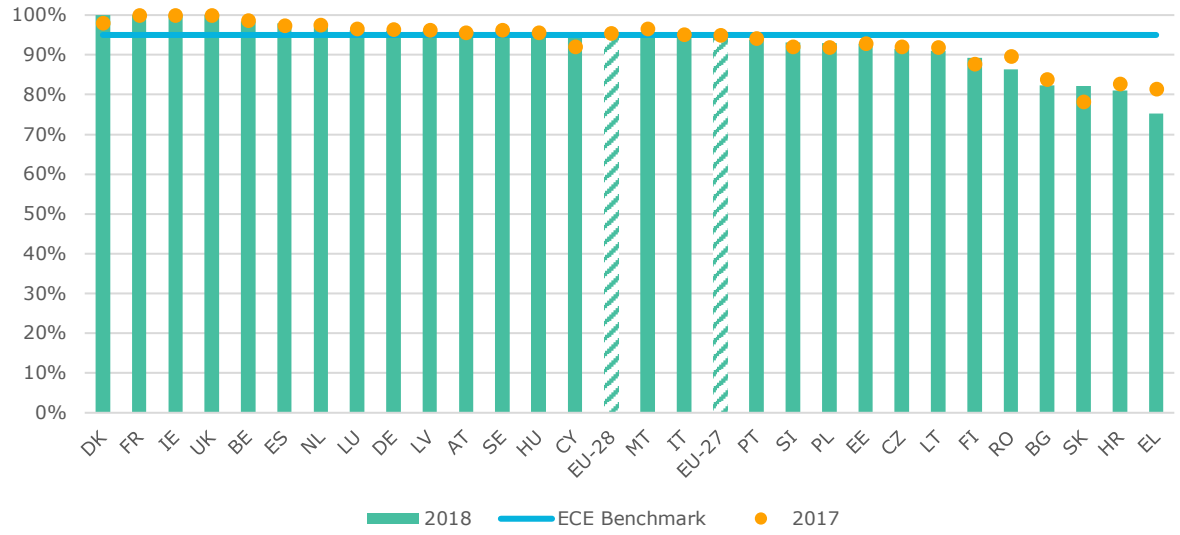
69 European Commission/EACEA/Eurydice (2019). Key indicators 2019, p. 66.
Cf. also European Commission/EACEA/Eurydice, The structure of the European education systems 2019/20.
European Commission/EACEA/Eurydice (2019). Compulsory Education in Europe – 2019/20. Eurydice Facts and Figures.

70 European Commission. Education and training monitor. 2018 edition.

71 There is under-coverage for Greece in the 2018 data, because some 3 and 4 year-olds are not included. Better coverage was reported in 2017, and Greece hopes to provide full coverage in the next data collection (and revise the 2018 data).

72 Mostly due to a rise in attendance in private facilities, as is clear from educ_uoe_enrp01.

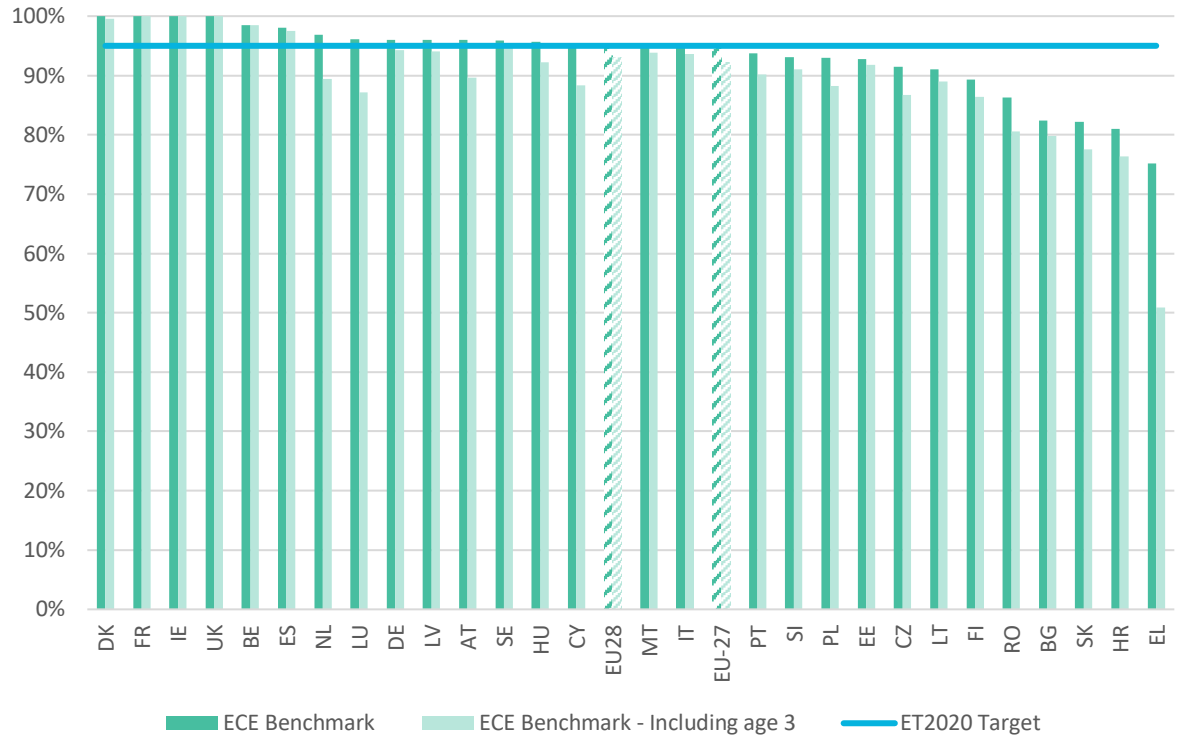
Figure 24 – Participation in ECEC by children between 4-years-old and the starting age of compulsory education, 2017 and 2018 [%]



Source: Eurostat, educ_uoe_enra10.

When considering a wider group, of children from 3 years of age upwards, Greece, Croatia, Slovakia and Bulgaria have participation rates in ECE below 80%. The highest participation rates, all over 95%, are seen in Ireland, France, and the United Kingdom (all three with 100%), Denmark, Belgium, Spain and Sweden. With a rate of 92.2%, the EU-27 average still has room for improvement.

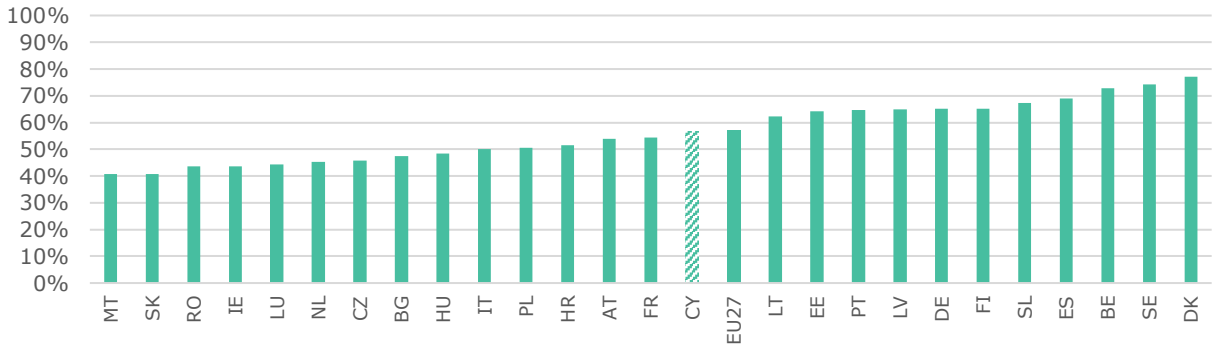
Figure 25 – Participation in ECE by children between 4-years-old, respectively 3-years-old, and the starting age of compulsory education, 2018 (%)



Source: Eurostat, educ_uoe_enra10 and educ_UOE_enra21.

Expanding the age range even further, to all children from 0 up to the start of compulsory primary education, allows us to look at the ECE system as a whole. Participation rates in the overall group are much lower than in the older age categories of 3 and above and 4 and above[73]. Malta and Slovakia have the lowest participation rates, while Belgium, Sweden and Denmark are at the other end of the range, with participation rates above 70%. The EU-27 average for this age group is 57.10%.

Figure 26 – Participation in ECE of children from birth to the starting age of compulsory primary education, 2018 [%]



Source: Eurostat calculation from educ_uoe_enra02 on 2018 data (demo_pjan)

Research suggests that integrated ECEC systems – i.e. where care and education are considered as a whole – offer more continuity, quality and coherence across ECEC policy (e.g. regulation and funding, curriculum, workforce education/training and working conditions, monitoring and evaluation systems) and allocate more resources to younger children and their families. In addition, the literature suggests that unitary systems, which cover the whole age range, from birth up until the start of primary education, lead to better quality, more equitable service provision and result in greater financial efficiency[74]. Countries that provide integrated ECEC services for all children under primary school age were likely to guarantee a place in publicly funded provision for each child from an early age (6 to 18 months) and contribute to high standards across all ECEC services[75].

2.3.2 Inclusion/equity in access to early childhood education and care

Scientific literature has long shown that children participating in qualitative ECEC enjoy long-term emotional, social and cognitive benefits[76]. More study is needed, however, on the impact of policy changes to scale up universal ECEC for very young children and especially on the links between scaling up and the quality of this process.[77] To benefit children's early development and

73 ESTAT calculation on from educ_uoe_enra02 2018 data. Data is missing for Greece, because data on 0-2 year-olds enrolled in ISCED 01 are incomplete. Participation rates are underestimated for Belgium (under-coverage, only the Flemish Community has reported data on ISCED 01) and Malta (under-coverage, enrolments in ISCED 01 are not included).

74 Kaga, Y., Bennett, J., and Moss, P. (2010). Caring and Learning Together: A Cross-National Study of Integration of Early Childhood Care and Education within Education. Paris: UNESCO. Proposal for key principles of a Quality Framework for Early Childhood Education and Care, Report of the Working Group on Early Childhood Education and Care under the auspices of the European Commission, DG Education and Culture, 2014.

75 Key Data on Early Childhood Education and Care in Europe, 2019 Edition (European Commission/EACEA/Eurydice, 2019).

76 Literature review on the effects of early childhood education and care, in Vandenbroeck, M., Lenaerts, K., Beblavý, M. (2018). Benefits of early childhood education and care and the conditions for obtaining them. An EENEE Analytical Report No. 32, January 2018. Utrecht University and CARE consortium (2017). CARE: Curriculum Quality Analysis and Impact Review of European ECEC. Kottelenberg, M. J., and Lehrer, S. F. (2017). Targeted or universal coverage? Assessing heterogeneity in the effects of universal child care. Journal of Labour Economics, 35(3), 609-653.

77 OECD, Literature review on early childhood education and care for children under the age of 3 (forthcoming).

subsequent school performance, labour market participation, social mobility and social integration, ECEC needs to be of a high quality[78].

The beneficial effects of participation in ECEC seem to be especially pronounced for children from disadvantaged backgrounds[79]. ECEC broadens the educational experiences of children, has been shown to facilitate access to employment and may have a positive impact on parental aspirations and behaviour.

Administrative enrolment data currently does not track any information on children's socio-economic background, so it is not possible to track the extent to which vulnerable children are participating in ECEC services with a minimum educational component. It is clear from participation rates in the wider formal ECEC sphere (which includes services both with and without a minimum educational component). It is clear from participation rates in formal ECEC, however, that there is a clear tendency towards lower participation rates among children from a lower socio-economic background than for those from a higher one, i.e. a social gap in ECEC attendance, which is evident in several Member States[80]. In many European countries, children from socially disadvantaged groups do not fully enjoy the benefits of ECEC. Recent OECD analysis[81] reveals that several countries continue to struggle with equity issues regarding 0 to 2 year-olds' participation rates in ECEC. Approximately half of the countries in the most recent available OECD Family Database (2017 or latest)[82] show considerable differences in access depending on the income range of the families.

Recognising the importance of all children having access to basic services, the European Commission 2020 work programme announced the development of a European Child Guarantee, to be included in the next EU budget (2021-2027). Also, the Council Recommendation on High-Quality Early Childhood Education and Care Systems advocates the improvement of inclusiveness of ECEC[83]. In order to reach as many children as possible, many countries have worked over the past 5 years on extending a legal entitlement to ECEC or introducing compulsory ECEC of at least 1 year before primary education[84]. Most EU countries guarantee a place from a certain age, but only seven EU Member States (Denmark, Germany, Estonia, Latvia, Slovenia, Finland and Sweden) guarantee a place in ECEC for each child from an early age (6-18 months), often immediately after the end of childcare leave. From the age of 3, a place in publicly subsidised ECEC is ensured in Belgium, Czechia, Spain, France, Luxembourg, Hungary and Poland. [85]

Like availability, affordability contributes to ensuring access for as many children as possible. In EU, most families have to pay ECEC fees for the youngest children[86]. The older the children, the more countries provide ECEC free of charge for everyone. For children aged 3 or older, almost half

78 Schleicher, A. Helping our Youngest to Learn and Grow. Policies for Early Learning. OECD (2019). Council Recommendation on High-Quality Early Childhood Education and Care Systems of 22 May 2019.

79 Schleicher, A. Helping our Youngest to Learn and Grow. Policies for Early Learning. OECD (2019). Vandenbroeck, M., Lenaerts, K., Beblavý, M. (2018). Benefits of early childhood education and care and the conditions for obtaining them. An EENEE Analytical Report No. 32, January 2018. Utrecht University and CARE consortium (2017). CARE: Curriculum Quality Analysis and Impact Review of European ECEC.

80 Flisi, S. and Blasko, Zs. (2019). A note on early childhood education and care participation by socio-economic background, JRC Science for Policy Report. See also European Commission (2019). Education and training monitor. 2019 edition.

81 OECD, Literature review on early childhood education and care for children under the age of 3 (forthcoming).

82 OECD Family Data Base, chart PF3.2.B. Participation rates in early childhood education and care by income, 0 to 2 year-olds (OECD estimates, based on EU-SILC data).

83 Council Recommendation of 22 May 2019 on High-Quality Early Childhood Education and Care Systems, 9014/19.

84 Key data on early childhood education and care in Europe – 2019 edition. European Commission/EACEA/Eurydice. Structural indicators for monitoring education and training systems in Europe – 2019 and 2020.

85 Participation is compulsory from the age of 3 in France and Hungary.

86 See more details in Key data on early childhood education and care in Europe – 2019 edition. European Commission/EACEA/Eurydice, pp. 54-62.

of European countries offer a form of free ECEC. During the last year before compulsory primary education, free places are almost universal in Europe. Many countries provide targeted measures regarding availability or affordability, to facilitate ECEC access for children living in poverty. Price reductions (through lower fees and/or free meals) and priority admission are the most common measures for young children. Measures tackling inequalities by increasing affordability, through fee reductions, are more common than those that increase availability. Targeted groups are children living in poverty, children of single parents, children whose parents' work situation puts them at a disadvantage, number of siblings, children with disabilities/difficulties (SEN), children from migrant backgrounds and those from regional or ethnic minorities.

2.4 Underachievement in basic skills in the digital age

Key findings

The EU has scored no progress on the acquisition of basic skills since 2009. Reducing underachievement among 15 year-old pupils still represents a challenge. More than one in five pupils in the EU has insufficient proficiency in reading, mathematics or science. On average across the EU, the EU2020 target – an underachievement rate of less than 15% – has not been reached in any of the three areas tested by PISA 2018. The underachievement rate stands at 22.5% in reading[1], 22.9% in mathematics, and 22.3% in science. The persisting large share of underachievers across the three subjects is a burden on the EU economy and society.

Marked gender differences in underachievement levels only persists in reading – with higher shares of underachievers among boys. Overall, the results for top performance largely mirror the picture of underachievement: the countries with low shares of underachievers tend to have a high proportion of top performers.

Socio-economic differences persist and pupils with a migrant background achieve lower scores. The performance gap between urban and rural areas is also wide in many countries. Reduction of underachievement in basic skills has remained an unreached goal of the outgoing strategy and a persisting challenge.

2.4.1 The 2018 PISA study

The strategic framework for European cooperation in education and training (ET 2020) set a 15% target for 15 years-olds' underachievement[87] in reading, mathematics and science. The results from PISA 2018 show that the majority of EU Member States perform below the ET2020 target. As highlighted in the sections below, since 2009, the EU share of underachievement has increased in both science and reading, while remaining stable in mathematics. More than one in five 15 year-olds in the EU cannot complete even simple tasks in the three subject areas tested under PISA. Specifically, PISA 2018 shows that 21.7% of pupils in the EU-28 underachieve in reading[88], 22.4% in mathematics and 21.6% in science. Underachieving in basic skills implies not being equipped to thrive in the labour market and the broader society. Therefore the cost of underachievement is significant both for the individual and for society at large.

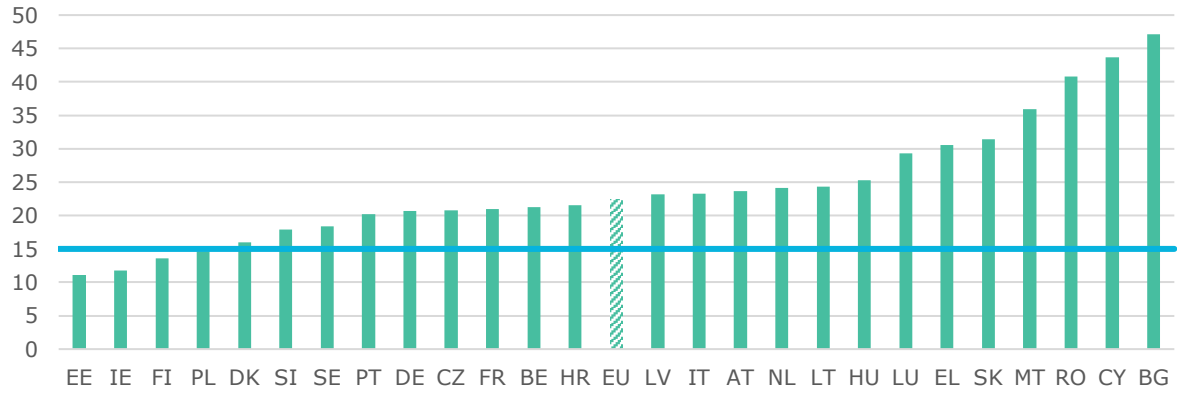
87 Underachievers in PISA are those pupils who fail to reach proficiency Level 2, i.e. the minimum level necessary to participate successfully in society.

88 All EU averages in reading exclude Spain, because Spanish data are not available at the time of writing.

2.4.2 Underachievement in reading

Reading literacy was a PISA 2018 core subject[89] and reading performance shows a large variation between EU Member States (Figure 27).

Figure 27 – Underachievement rate in reading, 2018 [%]

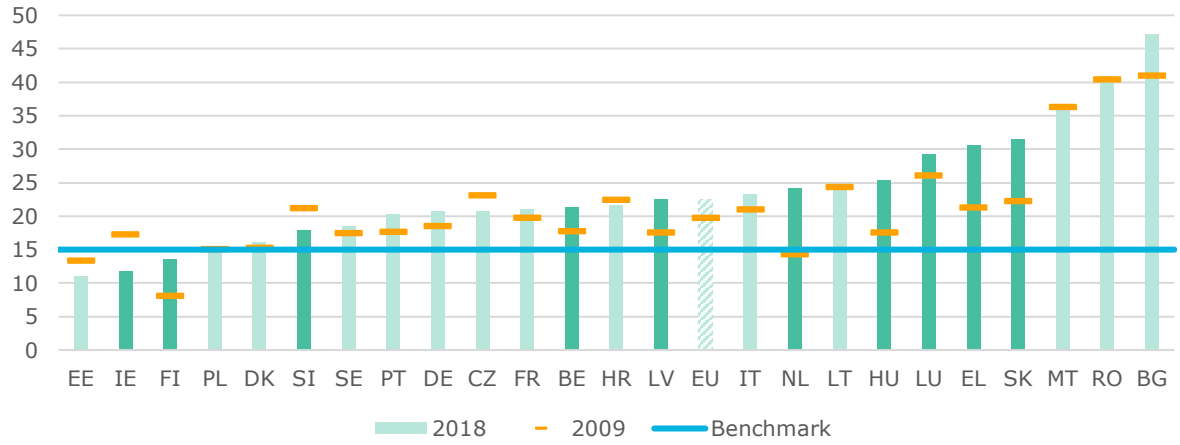


Source: PISA 2018, OECD.
Note: Data not available for ES.

Four EU countries met the 15% ET2020 target for underachievement: Estonia (11.1%), Ireland (11.8%), Finland (13.5%) and Poland (14.7%) and were in fact among the 10 best OECD performers globally[90]. Within the EU, Denmark was just above the target (16.0%). By contrast, the underachievement rate exceeded 30% in Malta (35.9%), Slovakia (31.4%) and Greece (30.5%), and even 40% in Bulgaria (47.1%), Cyprus (43.7%) and Romania (40.8%).

Since 2009, performance has not significantly changed in most countries, signalling that no improvement has been registered since the ET2020 framework was adopted (Figure 28).

Figure 28 – Long-term change in underachievement rate in reading, 2009-2018 [%]



Source: PISA 2018 and 2009, OECD.
Note: Darker vertical bars denote statistically significant changes between 2009 and 2018. Data not available for AT, CY and ES.

89 OECD defines reading literacy, the core subject for PISA 2018, as 'understanding, using, evaluating, reflecting on and engaging with texts in order to achieve one's goals, to develop one's knowledge and potential, and to participate in society'. OECD, PISA 2018 Results (Volume I) – What Students Know and Can Do, 2019, p. 15.

90 OECD, PISA 2018 Results (Volume I) – What students know and can do, 2019, p. 57.

In eight countries (the Netherlands, Slovakia, Greece, Hungary, Finland, Latvia, Belgium and Luxembourg), the underachievement rate increased in a statistically significant way. Only Ireland and Slovenia experienced a statistically significant decline. Overall, EU reading performance deteriorated, with an average underachievement rate of 19.2% in 2009.

Box 14 – Equity and inclusion – Estonia

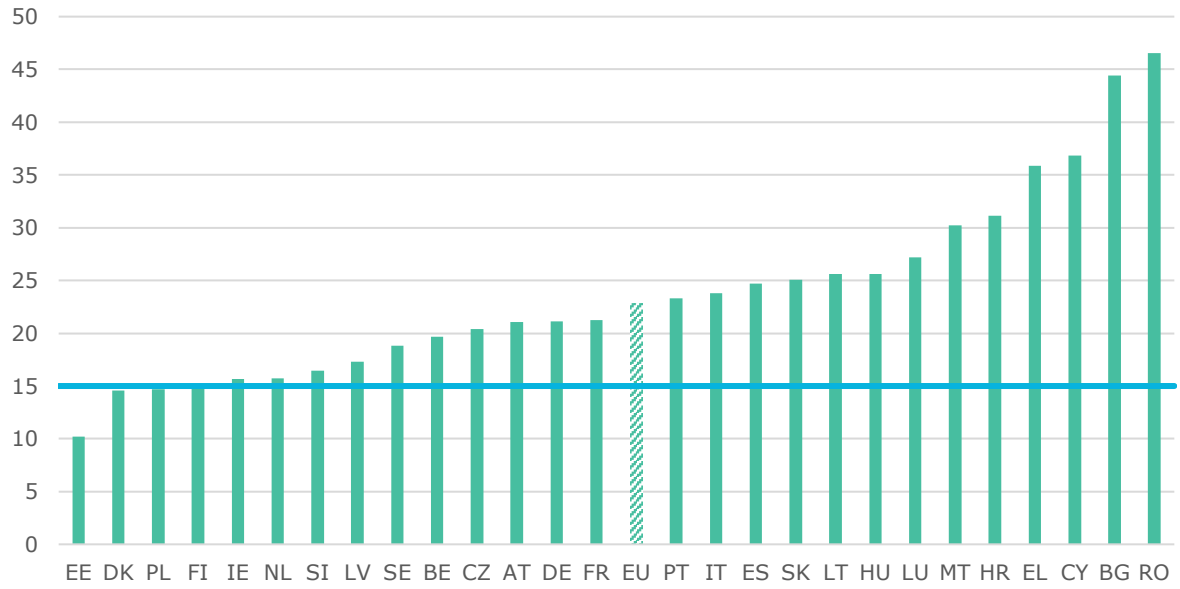
Estonia's success can be explained by a continuing willingness to modernise, in a society where education is highly valued. Despite its good results, the country has kept questioning and addressing its weaknesses in order to improve its performance, basing its education on evidence-based policy making and making effective use of European funds. Estonia pays particular attention to equity and inclusiveness: every school has coordinators who provide services to pupils with special needs, and have a mandate to give additional personalised support to prevent pupils from dropping out of education, so that no one is left behind. Compulsory attendance at school until completion or until the pupil is 17 years-old, coupled with the high autonomy of schools, which must conduct self-evaluations every 3 years, contribute to the strong performance.

Source: European Commission (2019). PISA 2018 and the EU – Striving for social fairness through education.

2.4.3 Underachievement in mathematics and science in the EU

The 2018 pattern of underachievement in mathematics is similar to that of reading.

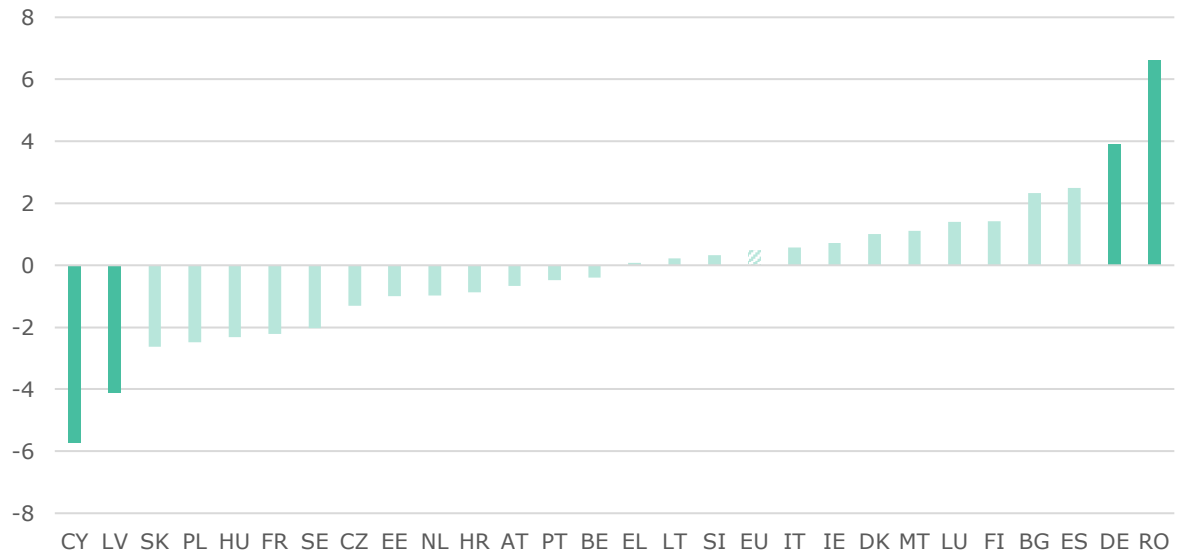
Figure 29 – Underachievement rate in mathematics, 2018 [%]



Source: PISA 2018, OECD.

Four countries met the 15% ET2020 target: Estonia (10.2%), Denmark (14.6%), Poland (14.7%) and Finland (15.0%). Ireland (15.7%), the Netherlands (15.8%) and Slovenia (16.4%) were just above the target. The underachievement rate exceeded 30% in Romania (46.6%), Bulgaria (44.4%), Cyprus (36.9%), Greece (35.8%), Croatia (31.2%) and Malta (30.2%). Performance remained rather stable in many Member States between 2015 and 2018.

Figure 30 – Change in underachievement rate in mathematics, 2015-2018 [pps]



Source: PISA 2018 and 2015, OECD.
Note: Darker vertical bars denote statistically significant changes between 2015 and 2018.

A slight majority of countries experienced a decline in the underachievement rate, but it was statistically significant[91] only in Cyprus (-5.7 pps) and Latvia (-4.1 pps). The only statistically significant increases took place in Romania (+6.6 pps) and Germany (+3.9 pps). Consequently, the EU average, at 22.4%, remained stable compared to 2015, when it stood at 22.2%.

Box 15 – Irish initiatives for equality in education

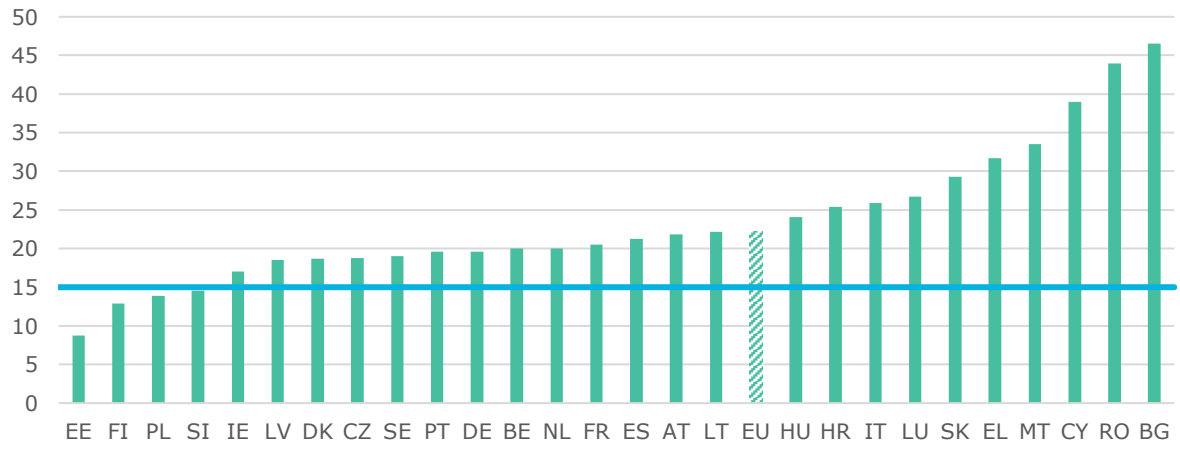
A strong focus on equity is also one of the main features of the Irish education system. Over the past decade, Ireland has continued to improve the quality of education at all levels, expand participation in early childhood education and care and reduce educational inequalities from early years. Pupil performance has benefited from the 'Strategy to Improve Literacy and Numeracy', the 'Delivering equality of opportunity in schools' programme and from extensive support for special educational needs. These initiatives have made Irish secondary schools positive forces for inclusion: the impact of pupils' socio-economic background on their performance has been reduced, and this extends to pupils from an immigrant background. Teachers are recruited from among high academic performers, and they benefit from extensive professional development. Committed to continuous quality improvement, Ireland is continuing its reform momentum and updating its methods to focus on pupil-centred learning, a competence-based approach and cross-discipline collaboration.

Source: European Commission (2019). PISA 2018 and the EU – Striving for social fairness through education.

[91] The results of the PISA assessments are estimates, because they are based on samples of pupils, rather than on the total pupil population, and on a limited set of assessment tasks rather than all possible ones. An observed difference between two estimates based on samples is called 'statistically significant' if it is likely that a real difference exists in the populations from which the samples are drawn.

Similarly, underachievement in science also shows a mixed picture across EU countries.

Figure 31 – Underachievement rate in science in 2018 [%]



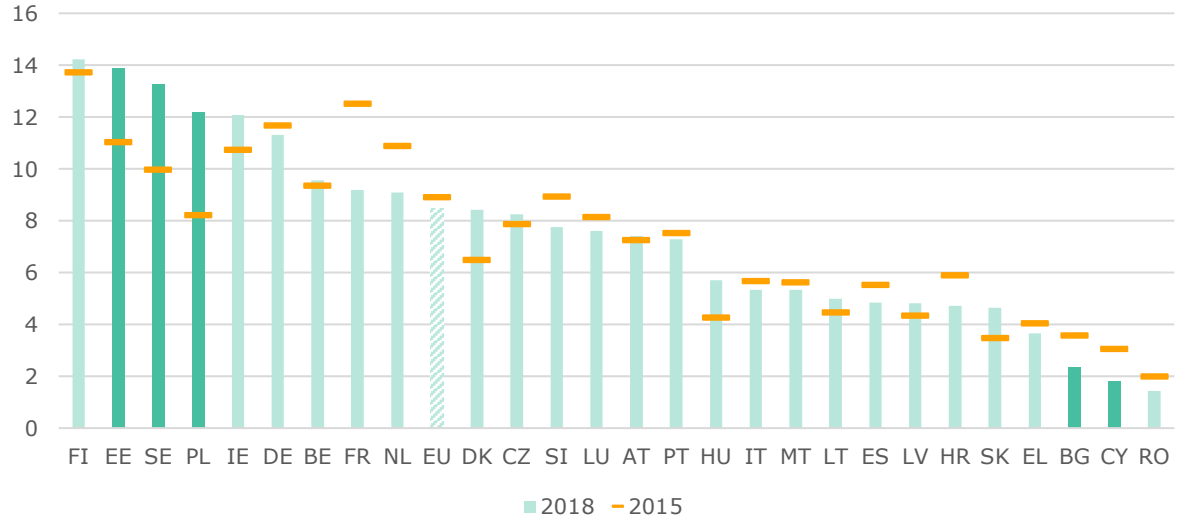
Source: PISA 2018, OECD.

Four countries met the 15% ET2020 target in 2018: Estonia (8.8%), Finland (12.9%), Poland (13.8%) and Slovenia (14.6%). In contrast, the underachievement rate was higher than 30% in Bulgaria (46.5%), Romania (43.9%), Cyprus (39.0%) and Greece (31.7%). In a few Member States the underachievement rate had increased in a statistically significant way since PISA 2015 (+8.6 pps in Bulgaria, +3.0 pps in Spain, +2.8 pps in Denmark), while Cyprus and Poland experienced a statistically significant decline (-3.2 pps and —2.4 pps, respectively).

2.4.4 Top performers

PISA also provides an important insight into top performers' share. This indicator captures the extent to which a school system can produce excellent results in basic skills. Top performers are pupils who reach PISA Level 5 or above. For instance, top performers in reading are able to distinguish between facts and opinions, while the ability to discern the source of information is emerging as a crucial skill in the digital age. PISA 2018 has shown that top performers in reading ranged from 14.2% in Finland to 1.4% in Romania.

Figure 32 – Top performers in reading, 2018 and 2015 [%]

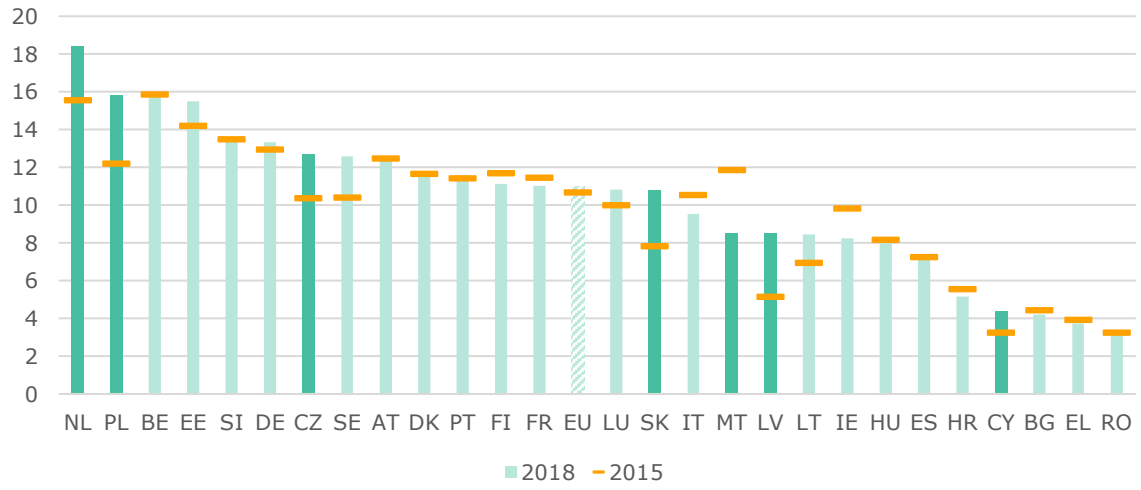


Source: PISA 2018 and 2015, OECD.
Note: Darker vertical bars denote statistically significant changes between 2015 and 2018. Data for ES not available.

In only six countries did the proportion of top performers exceed 10%: Finland (14.2%), Estonia (13.9%), Sweden (13.3%), Poland (12.2%), Ireland (12.1%), and Germany (11.3%).

For mathematics, the proportion of top performers is somewhat higher than for reading in most countries.

Figure 33 – Top performers in mathematics, 2018 and 2015 [%]

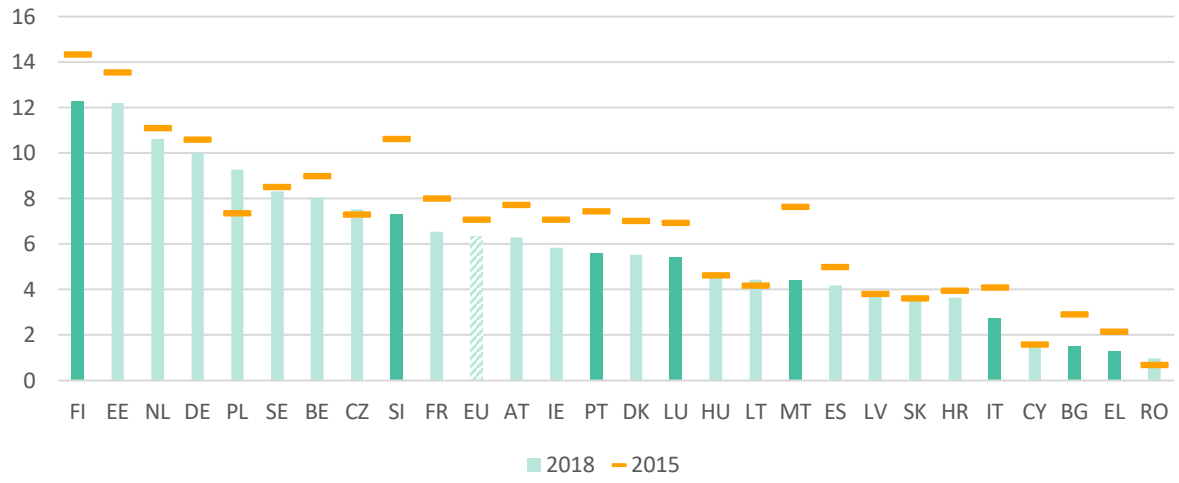


Source: PISA 2018, OECD.
Note: Darker vertical bars denote statistically significant changes between 2015 and 2018.

In the Netherlands (18.4%), Poland (15.8%), Belgium (15.7%) and Estonia (15.5%), more than 15% of pupils are top performers. Compared to 2015, this percentage increased significantly in Poland (+3.6 pps), Latvia (+3.3 pps), the Netherlands (+2.9 pps), Slovakia (+2.9 pps), Czechia (+2.3 pps), and Cyprus (+1.2 pps), while it decreased significantly in Malta (-3.4 pps).

In science (Figure 34 below), the proportions of top performers are the lowest among the three subject areas. The countries with the highest proportions are Finland (12.3%), Estonia (12.2%), the Netherlands (10.6%) and Germany (10%). In many countries, the percentage decreased between 2015 and 2018. This decline was statistically significant in Slovenia (-3.3 pps), Malta (-3.2 pps), Finland (-2.1 pps), Portugal (-1.8 percentage point), Luxembourg (-1.5 percentage point), Bulgaria (-1.4 pps), Italy (-1.3 pps) and Greece (-0.8 pps). No country experienced a statistically significant increase.

Figure 34 – Top performers in science, 2018 and 2015 [%]

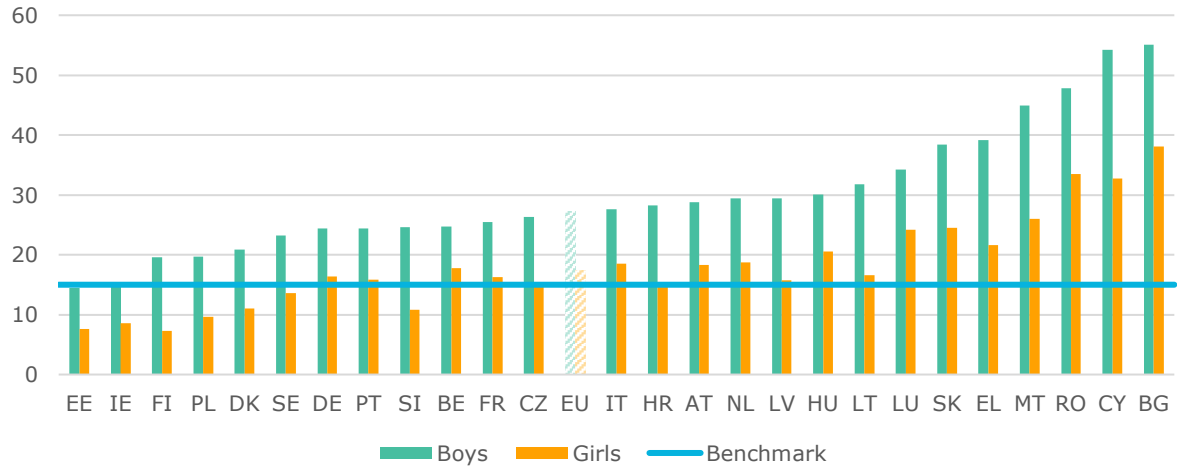


Source: PISA 2018, OECD.
Note: Darker vertical bars denote statistically significant changes between 2015 and 2018.

2.4.5 Underachievement by sex

As in previous PISA cycles, and in line with the OECD global trend, girls significantly outperform boys in reading in all EU countries[92]. The gap in underachievement between boys and girls ranges from 6.4 pps in the United Kingdom to 21.5 pps in Cyprus. The EU average is 26.3% for boys and 16.9% for girls (Figure 35). Specifically, the gender gap increased by 1.7 pps at EU level between 2015 and 2018[93].

Figure 35 – Underachievement rates of boys and girls in reading, 2018 [%]



Source: PISA 2018, OECD.
Note: Data not available for ES. All gender differences in 2018 are statistically significant.

No innate gender-related ability explains gender differences in reading literacy. These differences rather depend on the social and cultural context, pupils' non-cognitive abilities (motivation and self-esteem), and gender stereotypes that translate into parents', teachers' and pupils' gender-oriented expectations[94]. These factors play their role as early as during the first grades of primary education[95]. Disengaged adolescent boys suffer from a lack of male role models, both in school and outside. In European schools, women account for the large majority of teachers. Outside schools, boys may perceive reading as a female activity, not fitting a young man's self-image[96]. Attracting more men into the educational professions, and promoting reading styles that are appealing to boys and that involve male reading partners, are all effective measures to close the gender gap in reading[97]. Finally, it is important to highlight the potential of integrating of digital technologies in European curricula in closing the gender gap. In fact, evidence suggests that the combination of digital tools, social interaction and formative feedback effectively reduces both learning gender gaps and underachievement trends in literacy (and mathematics)[98].

92 OECD, PISA 2018 Results (Volume II) – Where all students can succeed, 2019, p. 142.

93 European Commission, (2019). PISA 2018 and the EU: Striving for social fairness through education.

94 Pansu, P. Regner, I. Max, S. Cole, P., Nezlek, J. B. and Huguet, P. (2016). A burden for the boys: Evidence of stereotype threat in boys' reading performance. Journal of Experimental Social Psychology, 65, pp. 26-30. Marcenaro-Gutierrez, O. Lopez-Agudo, L. Ropero-Garcia, M. (2018). Gender Differences in Adolescents' Academic Achievement. Young, 26 (3), pp. 250-270. Smith, M. and Wilhelm, J. (2012). 'Reading don't fix no Chevys': Literacy in the lives of young men, Portsmouth: Boynton/Cook. Freedmon, B. (2003). Boys and literacy: Why Boys? Which boys? Why now? Paper presented at the Annual Meeting of the American Educational Research Association.

95 OECD (2010). Learning to Learn: Student Engagement, Strategies and Practices.

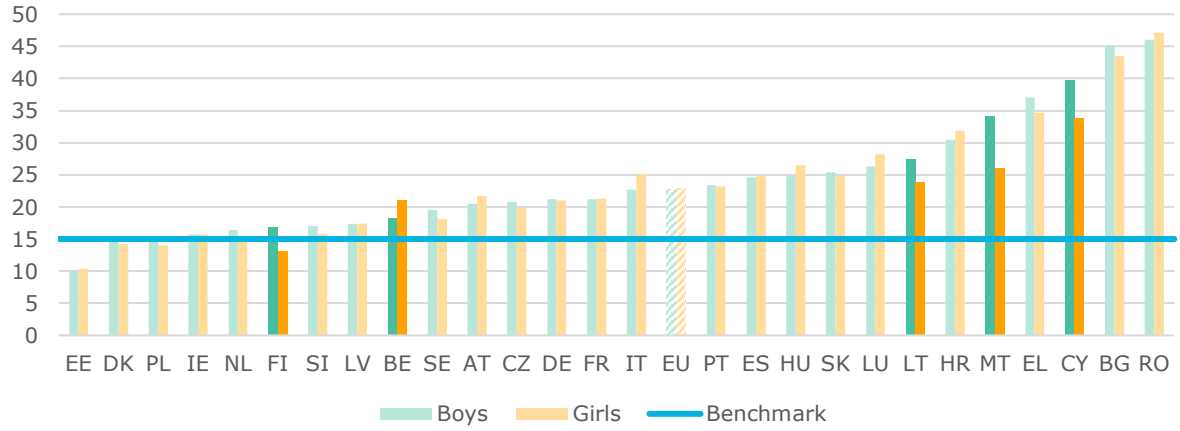
96 Freedmon, B. (2003). Boys and literacy: Why Boys? Which boys? Why now? Paper presented at the Annual Meeting of the American Educational Research Association.

97 European Commission (2012). EU high level group of experts on literacy. Final report.

98 Genlott, A. A. Gronlund, A. (2016). Closing the gaps – Improving literacy and mathematics by ICT-enhanced collaboration. Computers & Education, 99, pp. 68-80.

The picture in mathematics is more mixed than in reading. The differences between boys and girls are much smaller than in reading and vary from country to country. Only a few countries stand out as having statistically significant differences: girls perform better than boys in Malta (8.2 pps), Cyprus (6.0 pps), Finland (3.8 pps) and Lithuania (3.6 pps), while the opposite is the case in Belgium (2.7 pps). Underachievement at EU level is similar among girls (22.6%) and boys (22.2%), while in 2015 boys still outperformed girls[99]

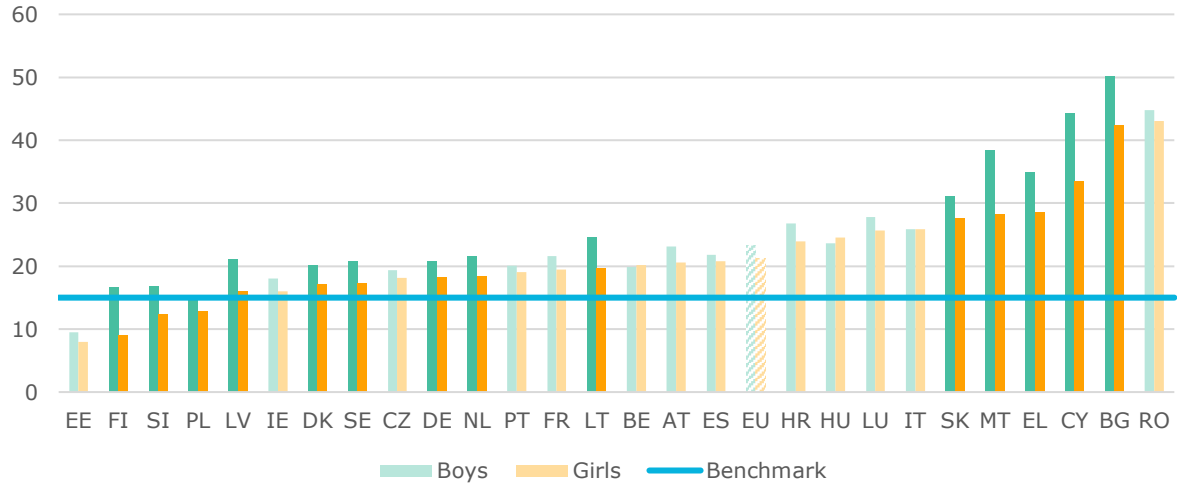
Figure 36 – Underachievement rates of boys and girls in mathematics, 2018 [%]



Source: PISA 2018, OECD.
Note: Darker vertical bars denote that the gender difference in 2018 is statistically significant.

The picture for science is quite similar to mathematics (Figure 37). Gender differences are rather small, with the proportion of underachievement generally higher among boys than girls. This gender gap (in favour of girls) is statistically significant in Cyprus (10.7 pps), Malta (10.2 pps), Bulgaria (7.8 pps), Finland (7.7 pps), Greece (6.3 pps), Latvia (5.1 pps), Lithuania (5.0 pps), Slovenia (4.4 pps), Slovakia (3.5 pps), Sweden (3.5 pps), the Netherlands (3.2 pps), Denmark (3.1 pps), Germany (2.6 pps) and Poland (2.2 pps). At EU level, the advantage of girls over boys stood at 1.8 pps in 2018, with an increase of 1.4 pps compared to 2015.

Figure 37 – Underachievement rates of boys and girls in science, 2018 [%]



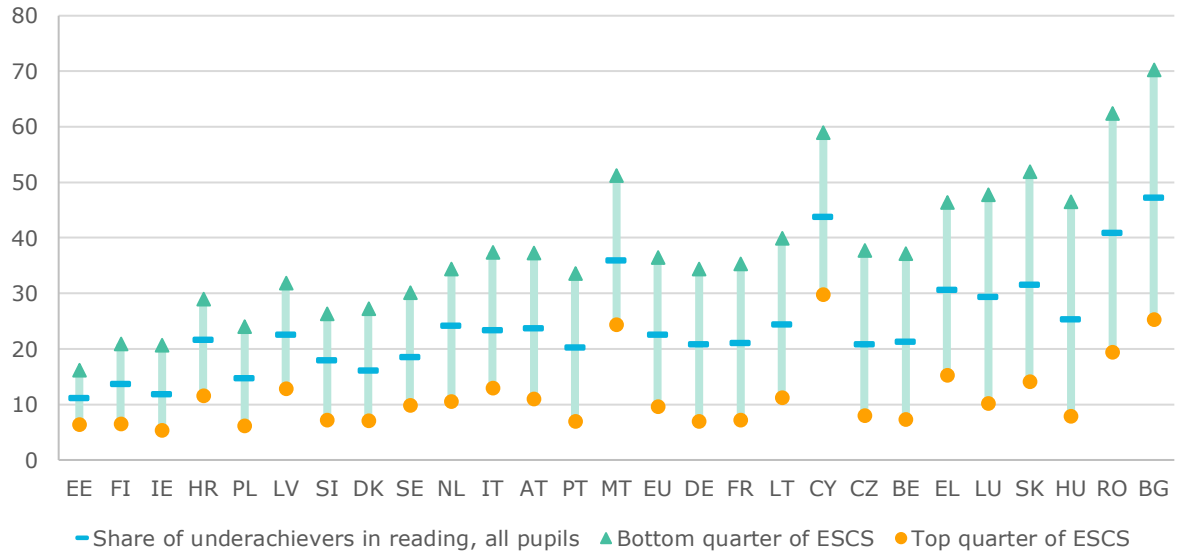
Source: PISA 2018, OECD.
Note: Darker vertical bars denote that the gender difference in 2018 is significant.

99 European Commission, (2019). PISA 2018 and the EU: Striving for social fairness through education.

2.4.6 Pupils' performance and socio-economic context

Education systems can be one of the main drivers in breaking negative social heritage and equipping pupils with the skills necessary to achieve their full potential in life. However, this does not happen in most EU Member States, where socio-economic background is a strong predictor of educational attainment. In PISA, pupils' socio-economic background is estimated by the PISA index of economic, social and cultural status (ESCS)[100], which is based on information about the pupils' home and background. As Figure 38 shows, the proportion of underachievers in reading in most countries is much larger in the bottom quarter of the ESCS index compared with pupils in the top quarter, rising to more than 40 pps in Romania and Bulgaria.

Figure 38 – Underachievers in reading [%] by socio-economic status (ESCS), 2018



Source: PISA 2018, OECD.
Note: Countries are sorted in ascending order according to the underachievement gap between the bottom and top quarter of the socio-economic index. Data not available for ES.

On the other hand, some countries seem better able to counter the impact of socio-economic background on the educational success of pupils: for example, Estonia, Ireland, Finland, Poland, Croatia and Latvia. Overall, countries with a low share of underachievers in reading also tend also to have a smaller difference in the proportions of underachievers at the top and bottom of the ESCS scale. Cyprus is an exception to this pattern. It has a very high share of underachievers, but socio-economic background seems to have a smaller impact on educational attainment compared to other similar Member States.

Addressing underachievement among socio-economically disadvantaged pupils is key to improving the overall performance of EU education systems. This requires a concerted effort involving many actors and resources. Any successful strategy should start from early childhood education and care. In fact, social inequalities affect pupils' academic outcomes from the early stages of their schooling. Lack of intervention in the early years will likely widen the performance gap throughout school, eventually resulting in underachievement and lack of social mobility across generations[101].

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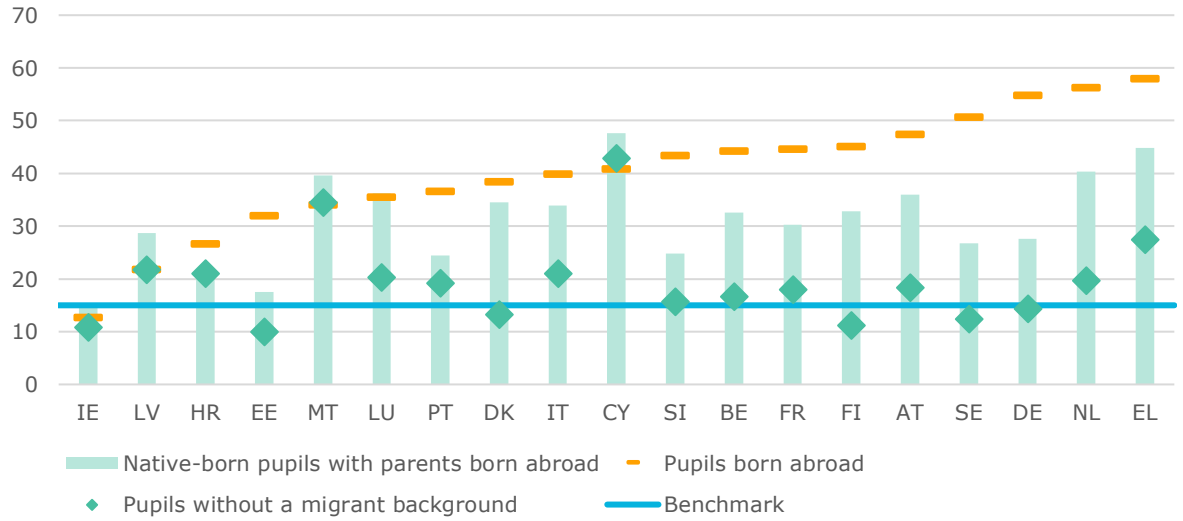
100 The OECD measures the ESCS index taking into consideration multiple variables related to pupils' family background, namely: parents' education, parents' occupation, home possessions, number of books and educational resources available at home.

101 Emma Garcia, Elaine Weiss, 'Education inequalities at the school starting gate, Gaps, trends, and strategies to address them', Economic Policy Institute, September 27, 2017. Duckworth, K. et al. (2009). Influences and leverage on low levels of attainment: a review of literature and policy initiatives. Centre for Research on the Wider Benefits of Learning Research Report 31, London, DCSF.

2.4.7 Pupils' performance by migrant background

The proportion of underachievers in reading[102] among pupils with a migrant background is much higher than for pupils without a migrant background in many EU Member States[103]. Not speaking the language of instruction at home can play a negative role in the reading performance of pupils with a migrant background, to a greater extent than for the other two tested subjects. The situation is usually worse for pupils born abroad (their underachievement rate exceeds 50% in Greece, Germany, the Netherlands and Sweden) than for native-born pupils with parents born abroad[104]. Greece has the highest underachievement rate in the EU among foreign-born pupils (58%), while Germany has the widest gap in underachievement rates in reading between pupils born abroad and pupils without a migrant background (40 pps).

Figure 39 – Underachievers in reading [%] by migrant background, 2018



Source: PISA 2018, OECD.
Note: The countries are sorted in the ascending order of the underachievement rate among the pupils born abroad. Data is not available for ES. Countries where less than 5% of the pupils have a migrant background are not included in the chart.

Being born and growing up in the country of assessment is an advantage compared to moving there as a child or as a young person. It may help with learning the language of instruction and getting familiar with the country and its education institutions, but it is not usually sufficient to reach the same levels as pupils with a non-migrant background. However, patterns are quite different among EU Member States. A few countries (Germany, Sweden, Slovenia, France and Estonia) face a large gap between pupils born abroad and non-migrant pupils, but native-born pupils with parents born abroad largely catch up. In Finland, Austria, the Netherlands and Greece there is some catching up, but the gap remains wide also between native-born pupils with parents born abroad and non-migrant pupils. In countries like Italy, Denmark and Luxembourg there is little variation between the two groups of pupils with a migrant background. Finally, only in Ireland, Croatia, Latvia, Malta and Cyprus are the differences small between both groups with a migrant background and pupils with a non-migrant background. A possible explanation is the specific composition of migrant populations in those countries (related to e.g. knowledge of the language of instruction or cultural similarities).

102 Results by migrant background are available only in the main subject area tested in each PISA round.

103 The proportion of pupils with a migrant background varies widely between EU Member States. To avoid calculations based on very small sample sizes, this report shows results only for EU Member States where the percentage of pupils with a migrant background is at least 5%.

104 The definition of pupils 'born abroad' and pupils 'native-born with parents born abroad' employed in this report corresponds to what the OECD defines respectively as 'first-generation immigrant students' and 'second-generation immigrant students'.

Member States can use a variety of education policies to promote inclusion of migrant pupils, ranging from language support for pupils whose mother tongue differs from the language of instruction, to education and career guidance, to increasing the flexibility and permeability of educational pathways. Participation in high-quality ECEC is crucial for achieving better educational outcomes. It is also important to promote a culture of inclusion in schools where diversity is increasing, and the availability of high quality resources and extracurricular activities has proved beneficial in this respect. Finally, equipping teachers with the skills they need to teach multicultural and multilingual classrooms requires appropriate initial teacher education and continuing professional development[105].

2.4.8 The urban-rural divide

PISA 2018 shows that the difference in reading performance between pupils attending schools in cities and those enrolled in schools in rural areas[106] is statistically significant and rather large in many Member States. In Hungary, Bulgaria, Romania, Slovakia and Portugal it even exceeds 100 PISA score points, corresponding to approximately 3-4 years of schooling.

Schools in rural areas often struggle to provide quality education due to their geographical isolation and small size, which increase the risks of suffering from insufficient infrastructure, a limited educational offer and a lack of experienced teachers. Policies to counter these risks may include adjusting the school network, making effective use of technology and better preparing teachers and school leaders to work in rural locations[107].

2.5 Employability of recent graduates

Key findings

In 2019, the EU-27 was 1 percentage point short of the ET2020 target of 82%. The latest data for the employment rates of recent graduates shows only a moderate improvement compared with recent years, but at the same time it is the highest value since the financial crisis of a decade ago. There is a clear education level gradient among the recent graduates: the higher the level achieved, the higher the employment rates. The level of wages also rises consistently with the level of educational attainment.

2.5.1 The target on the employment rate of recent graduates

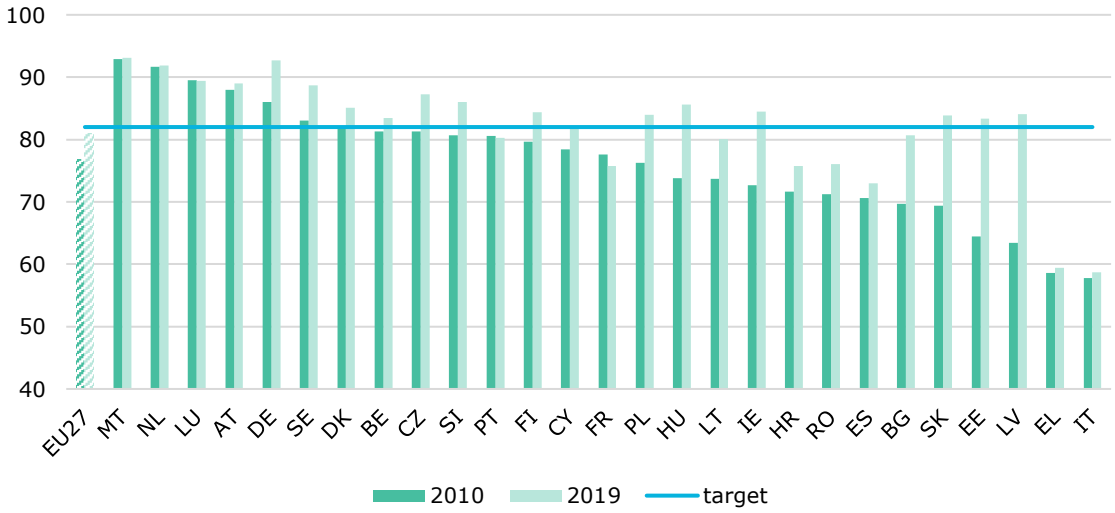
While the employment rate of recent graduates (80.9% in 2019) has still not reached the ET2020 target of 82%, it was still at its highest level since 2008 (it stood at 81.8%, just before the financial crisis). Compared to 2010, the situation has improved in most countries, particularly Poland, Hungary, Ireland, Slovakia, Estonia and Latvia – all of which have surpassed the EU target value of 82%. That said, the situation is likely to worsen in the wake of the COVID-19 crisis. However, the situation in Spain, Greece and Italy has improved only to a limited extent, while it has deteriorated in France and Portugal. Separating employment rates of higher education graduates from other graduates gives allows us to see more change over time. There was a positive evolution of the employment rate among recent graduates from higher education (ISCED 5-8), from 77.8% in 2016 to 85.3% in 2019. The employment rate of recent higher education graduates is 85.2%, being above the EU-28 average (85%) and currently representing 9.5% more than in 2016.

105 OECD (2018). The resilience of students with an immigrant background, OECD Reviews on Migration Education.

106 According to PISA 2018, cities have over 100 000 inhabitants, while rural areas have fewer than 3 000 inhabitants.

107 Echazarra, A. and Radinger, T. (2019). Learning in rural schools: insights from PISA, TALIS and the literature, OECD Education Working Paper No. 196.

Figure 40 – The employment rate of recent graduates, 2010-2019

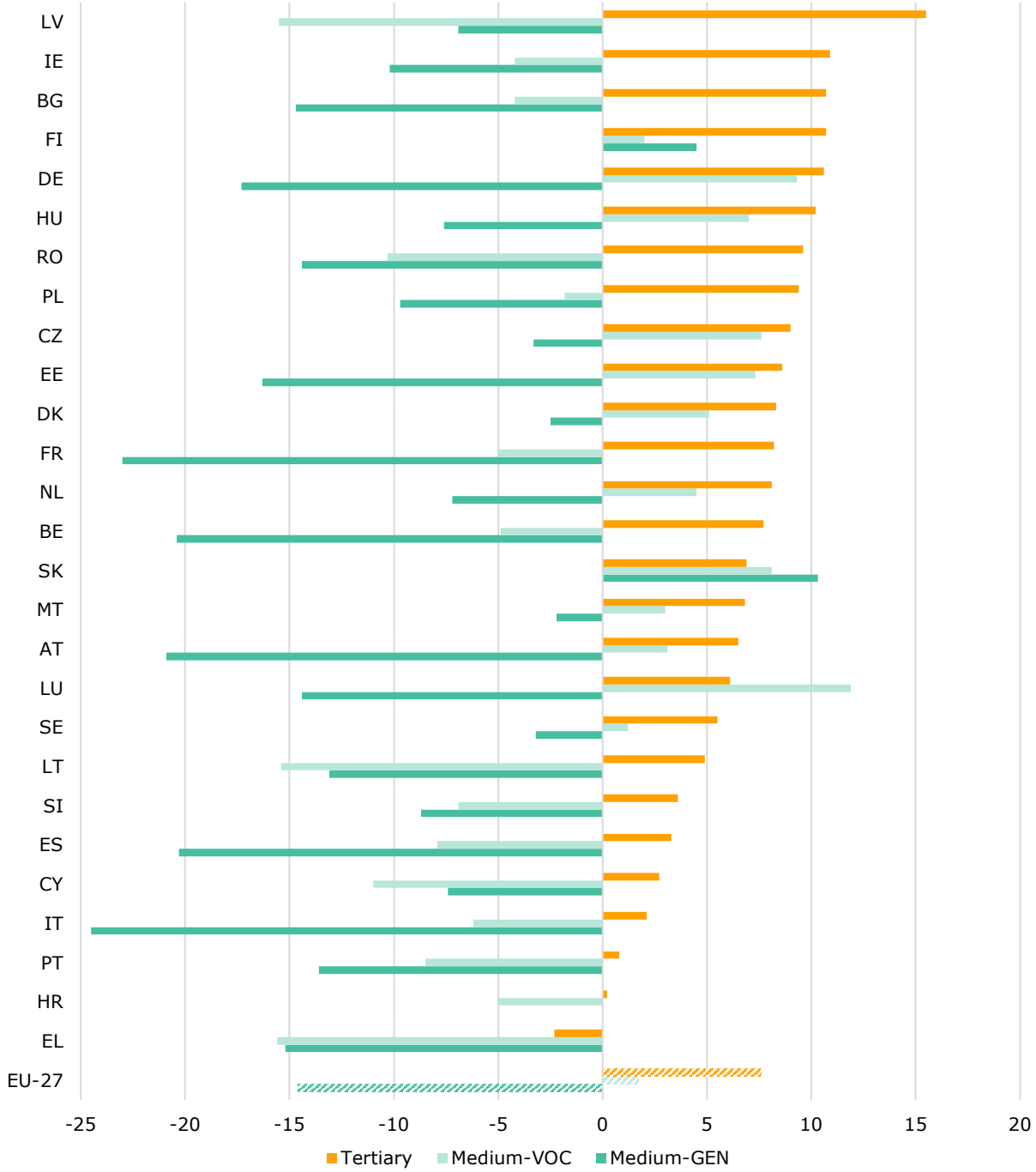


Source: Eurostat, LFS, online data code: [edat_lfse_24].

Notes: The indicator of the employment rate of recent graduates measures the employment rates of people aged 20 to 34 who have completed formal education 1-3 years before the survey with a medium-level qualification diploma (ISCED levels 3 and 4) or a high-level qualification diploma (ISCED levels 5-8), and who are currently not enrolled in any further formal or non-formal education or training among all people in the same age group. 'The average employment rate' should be understood as 'all ISCED levels'.

Employment rates tend to be linked to education level as well as labour market relevance of particular programmes. Among recent graduates with different levels of education (as compared to the average employment rate of young adults aged 20-34 who are not in further education or training), it is evident that those with only a medium-level generalist qualification, compared to all recent graduates, suffered a significant employment penalty in all countries except Slovakia and Finland. In contrast, those with a high-level of qualification had a higher employment rate compared to the average employment rate of all young adults in almost all countries except for Greece. A more diverse picture emerges for employment rates of recent graduates with a medium-level vocational (VET) qualification. On average in the EU-27, recent VET graduates had a slight employment rate premium of 1.7 pps compared to the average employment rate of young adults not in education, with the highest such premium in Luxembourg (11.9 pps), Germany (10.6 pps) and Slovakia (8.1 pps). In some other Member States, though, the recent VET had a lower employment rate than young adults in general. This is the case in Greece (—15.6 percentage points), Latvia (—15.5) and Lithuania (—15.4). This pattern is also found in Cyprus, Romania Portugal, Spain, Slovenia, Italy, France, Croatia, Belgium, Bulgaria, Ireland and Poland. These employment penalties signal challenges in the VET systems

Figure 41 – The employment rate premium of recent graduates by level and orientation of education compared to the average employment rate of young adults aged 20-34 who are not in further education or training, 2019

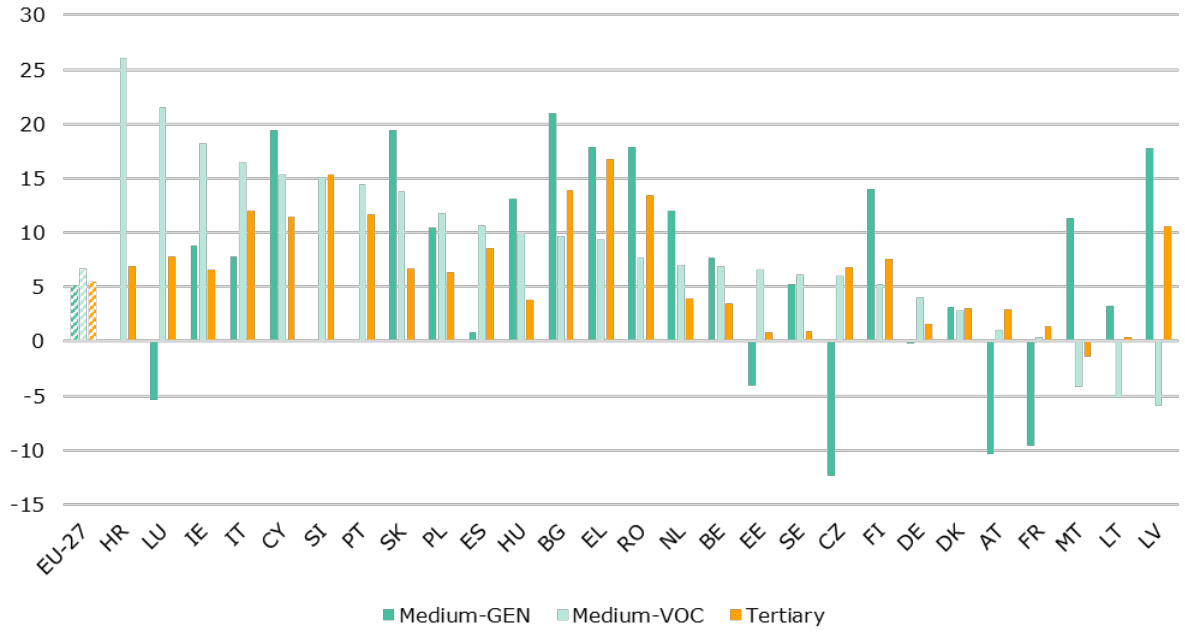


Source: Eurostat, LFS, online data code: [edat_lfse_24].

Notes: Countries are ordered by the tertiary education premium. The indicator of the employment rate of recent graduates measures the employment rates of people aged 20 to 34 who have completed education 1-3 years before the survey, with a medium-level qualification diploma (ISCED levels 3 and 4) or a high-level qualification diploma (ISCED levels 5-8), and who are currently not enrolled in any further formal or non-formal education or training among all people in the same age group. In this analysis, the reference level (set at 0% mark in each country) is the average employment rate of all young adults (20-34) not enrolled in further education and training. The employment rate advantage (premium) or disadvantage (penalty) of a particular group is calculated as the difference in employment rates between the selected group of graduates as compared to the average employment rate of all young adults 20-34 not in further education or training. In this way, the labour market relevance of particular education systems is revealed more clearly, eliminating the effects of cross-country differences in economic situation or labour regulation (i.e. labour market duality). Data for Croatia 'medium-GEN' was considered unreliable hence it is not presented in the chart.

On the back of a broad improvement in economic condition, the EU-27 employment rate of all three main categories of recent graduates increased between 2014[108] and 2019 by 5 pps, though the employment rate of recent graduates with a medium-level vocational qualification increased the most. In all countries, except Malta, the employment rates of recent tertiary graduates have increased. However, in Czechia, Austria, France, Luxembourg and Estonia, the employment rates of recent graduates with a medium-level general qualification have declined, while in Latvia, Lithuania and Malta this was the case for recent graduates with a medium-level vocational qualification. Together with the data from the previous analyses, this suggests that medium-level VET systems in Latvia and Lithuania are facing particular challenges and that the situation has further deteriorated in recent years.

Figure 42 – Absolute change in employment rates of recent graduates by level and orientation of education, 2014-2019



Source: Eurostat, LFS, online data code: [edat_lfse_24].

Notes: The indicator of the employment rate of recent graduates measures the employment rates of people aged 20 to 34 who have completed formal education 1-3 years before the survey, with a medium-level qualification diploma (ISCED levels 3 and 4) or a high-level qualification diploma (ISCED levels 5-8), and who are currently not enrolled in any further formal or non-formal education or training among all people in the same age group. The value for PT 'Medium-GEN' is not visible on the chart because it is close to zero. In this analysis, the reference level (set at 0% mark in each country and group of graduates) is the average employment rate in 2014. The change in employment rates is calculated as the difference between employment rate of particular group of graduates in a particular country between 2014 and 2019.

One should remember that the size and composition of learners at the different levels of education, particularly vocational education and training, as well as tertiary education, differ significantly between countries. This probably also has a strong impact on, or relationship to, graduates' employment prospects. In a situation where in one country medium-level VET (ISCED-3) is restricted only to a very narrow set of occupations and targeted primarily at disadvantaged learners compared to another country where medium-level VET prepares learners for a broad range of occupations, attracting well performing learners, this would be reflected in the employment rates of graduates, but may not fully reflect the quality of such programmes when taking into account their purpose, the profile of targeted learners or targeted jobs. It is often the case that in some countries a certain occupation – i.e. nursing – requires a medium level of education, while in others it requires a high level of education. Even though data on which

108 The data differentiating the employment rate of medium-level graduates by the orientation of their qualification is available only as of 2014, after the implementation of the latest ISCED-2011 classification of education in the EU LFS.

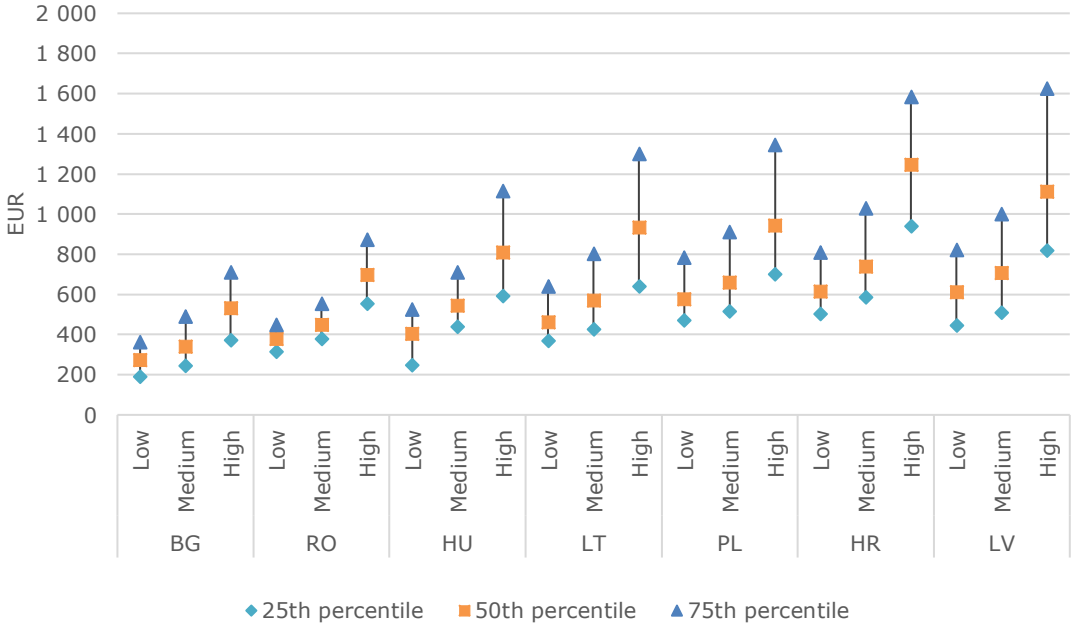
programmes prepare learners for which occupations is very limited, certain trends can be observed when analysing the data on graduates by detailed education level and programme orientation. Two of the countries that stood out in the above analysis in terms of less positive performance by their medium-VET systems (Lithuania and Latvia) indeed have, since 2013, progressively reduced the provision of VET at upper secondary level and increased the provision at higher levels, which suggests that changes in learner composition may partly explain the drop in employment rates.

2.5.2 Young adults' labour income and its distribution

Figure 43 below shows the wage[109] distribution by educational level[110] in several EU Member States in 2018 and provides for three main observations. Firstly, workers with a higher level of education earn more than those with a lower level of education. Secondly, several countries (e.g. Germany, Luxembourg, Austria and the Netherlands) display a larger absolute earnings premium between the highest and lowest education groups. Thirdly, in many countries (e.g. Cyprus, Spain, France, Luxembourg and the Netherlands) there is considerably more wage dispersion among the higher educated than among the low and medium educated.

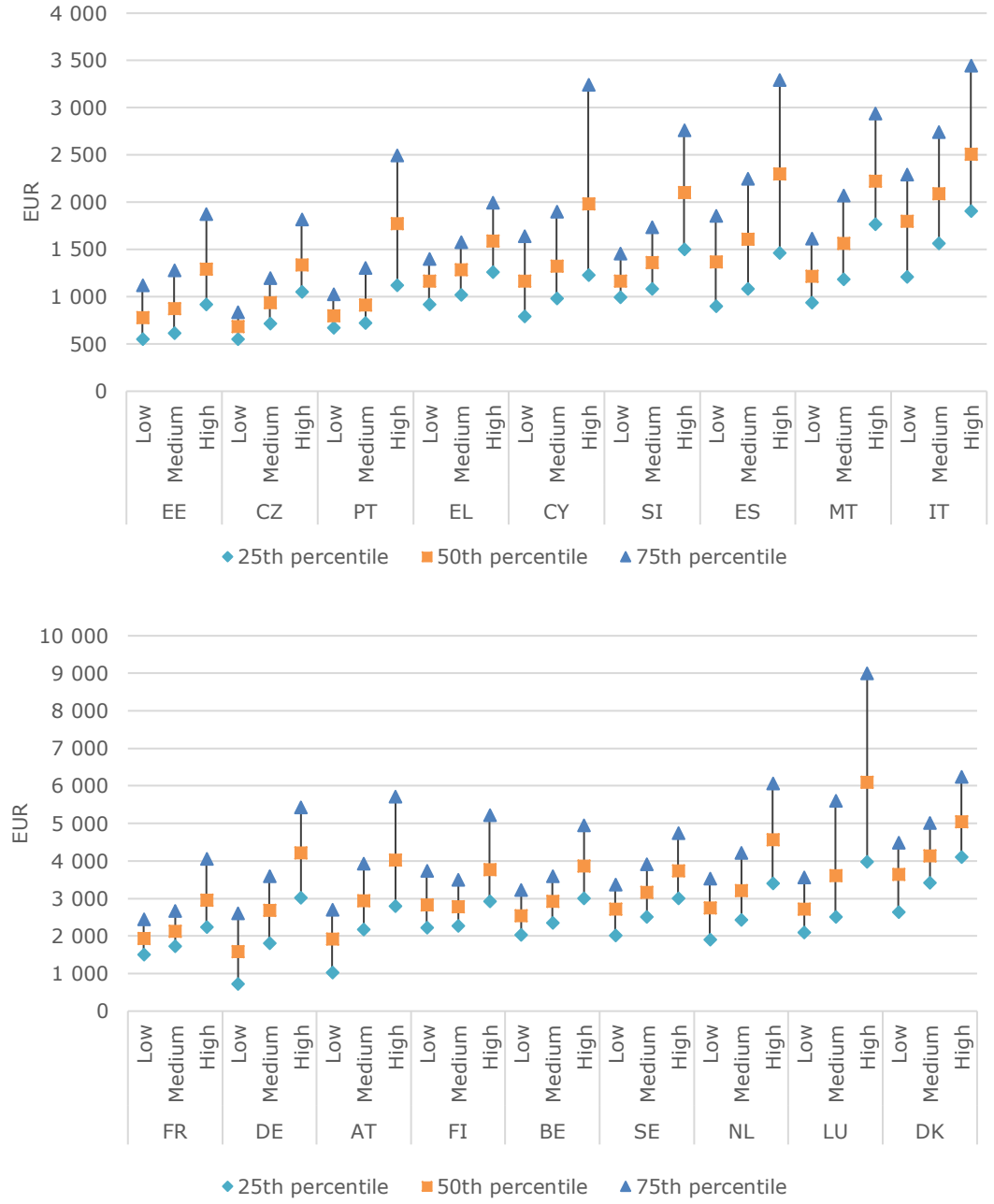
This means the labour market returns for tertiary education may differ between fields of study and that graduating from a prestigious institution may be associated with a larger wage premium. Furthermore, productivity and wages are also affected by individual traits such as non-cognitive skills, resilience, work ethic, unobservable cognitive skills, etc. In a number of countries (e.g. Denmark, Sweden, Austria and Italy), the top-half (in terms of wages) of medium-qualified workers earn more than the bottom-quarter (in terms of wages) of the highly qualified workers.

Figure 43 – Full-time equivalent gross monthly wage by educational attainment (2018) age group 16-34



109 The wages are the 'full-time equivalent gross monthly wages'.

110 Three different level of educational levels are considered: low education (pre-primary education, primary education and lower secondary education), medium education (upper secondary education) and high education (tertiary education).



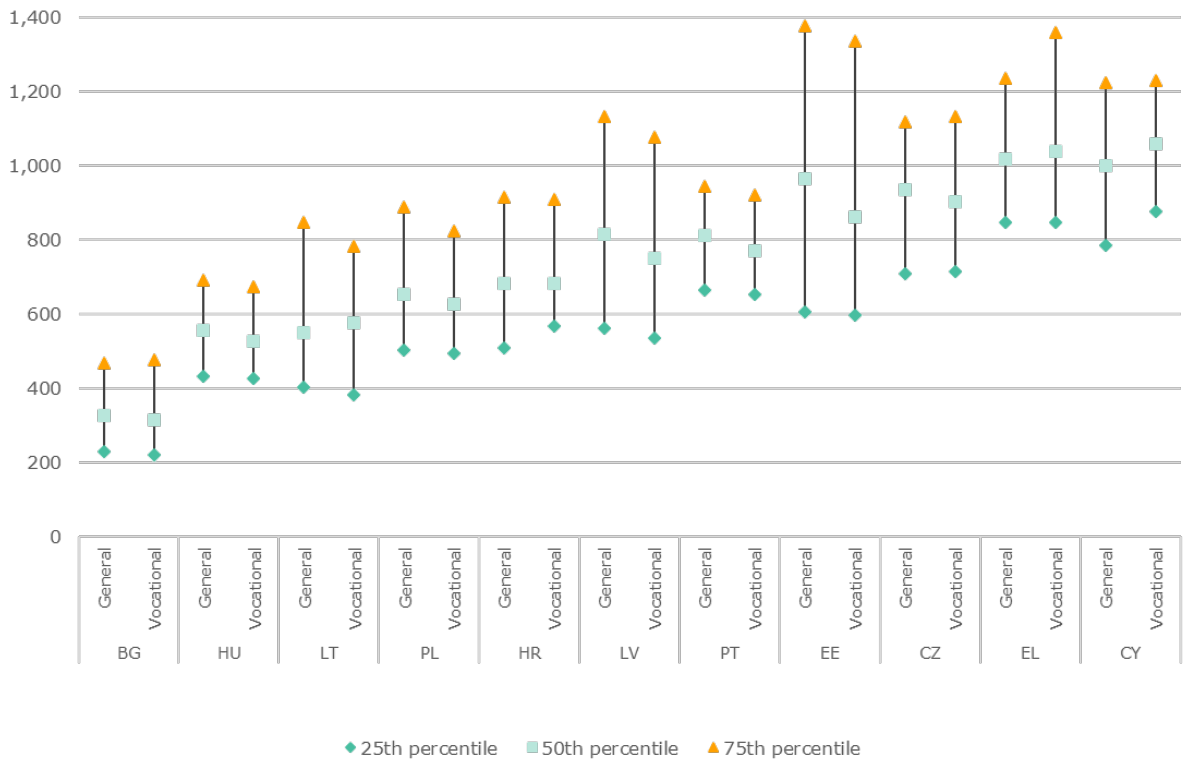
Source: EU-SILC. Special data extraction from Eurostat. Calculations by authors.

In most countries, upper secondary education is split into general and vocational education tracks. While vocational education gives students specific job-related skills, general education provides students with broad knowledge and basic competences that are required for more advanced educational programmes. Austria there is no clear hierarchy between general and vocational education; most VET programmes open pathways to advanced educational programmes. Figure 44 shows the full-time equivalent gross monthly wage distribution by type of upper secondary education[111] in several Member States in 2018[112]. In some countries (including Bulgaria, Hungary

[111] Only individuals aged 16-34 years old are considered. The information on vocational v general secondary education is not available for DE.

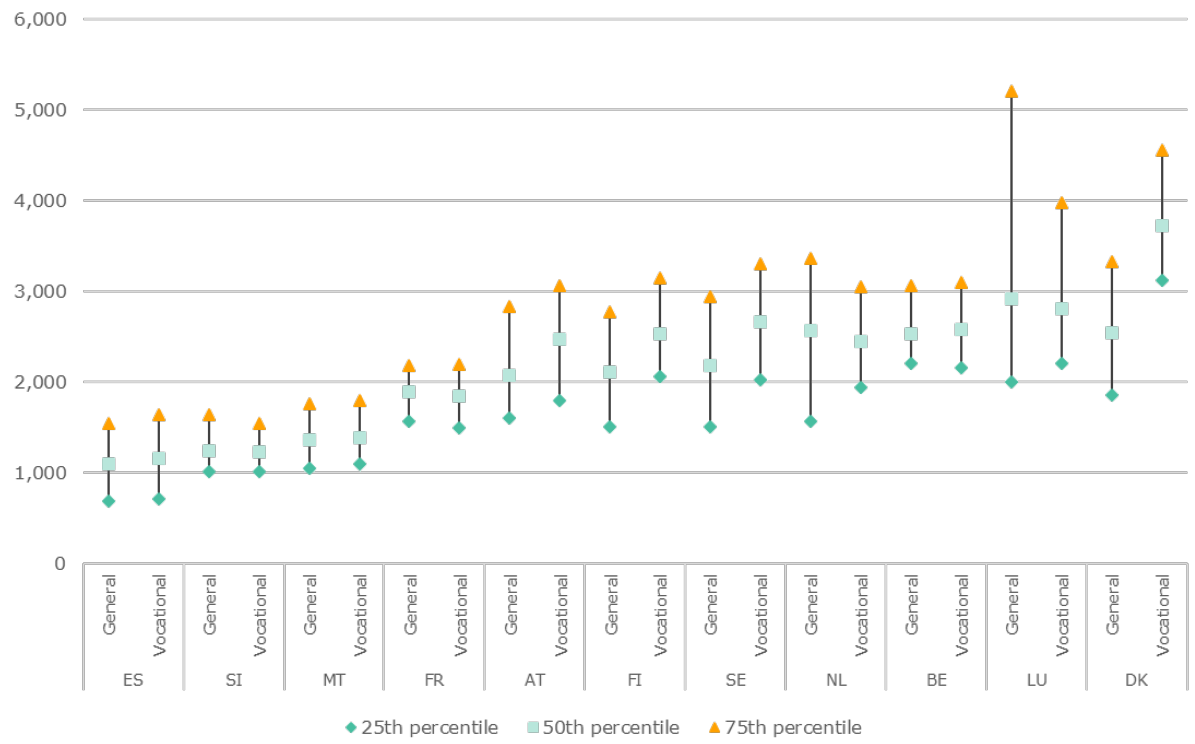
and Czechia), the wages associated with vocational and general education are practically the same in the 25th, 50th and 75th percentiles of the distribution of earnings. In Sweden, Finland, Austria[113] and Denmark, vocational education appears to pay off more than general education, though the size of the wage difference is largest in Denmark. In these countries, vocational learning takes place at school and in the workplace as part of the programme. An advantage of this system is that it helps students acquire especially marketable skills, since firms may exert a direct influence on the content and organisation of vocational training**.** On the other hand, in the Netherlands and Luxembourg workers with general education at the top of the wage distribution are found to earn more than their counterparts with vocational education. Finally, while the above figures focus on young adults, some studies demonstrate that the employment premium, enjoyed by VET graduates compared to general education graduates in a number of countries, becomes less pronounced at a higher age.

Figure 44 – Full-time equivalent gross monthly wage by type of secondary education: vocational v general (2018), age group 16-



112 The values presented in Figure 44 do not take into account the type of secondary education. General and vocational education students may systematically differ in terms of both observable and unobservable characteristics affecting the choice of the type of secondary education and earnings.

113 VET in Austria has apprenticeship-programmes in the dual system as well as school-based VET. There is no marked prevalence of the dual system.



Source: EU-SILC. Special data extraction from Eurostat. Calculations by authors.

2.6 Adult learning

Key findings

The adult learning participation target for 2020 has not been reached and the improvement over the past decade has been slow and uneven. There is scope for better statistical measurement of adult learning. The European Skills Agenda sets out new indicators for adult learning participation based on a 12 months reference period. The current reforms of the European Statistical Systems will improve the measurement of adult learning and allow for a more comprehensive monitoring. The socio-economic characteristics of people participating in adult learning differs substantially across the Member States, calling for more in-depth analysis.

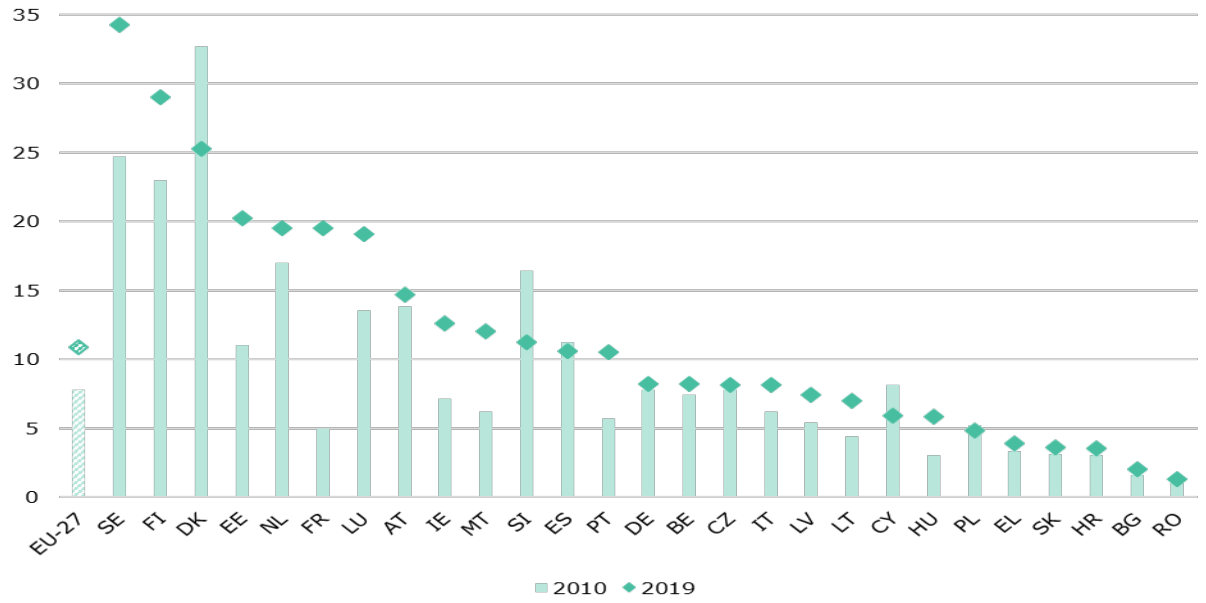
2.6.1 The target on adult learning

Recognising the value of learning not only during early years, but also throughout a person's working and post-working life[114], the EU has sought to increase the frequency and extent to which adults engage in learning. To monitor progress and set a target, the Council in 2009 reinforced the target on adult learning, adopted earlier as part of the Lisbon agenda in 2003. This raised the level of ambition to reach, by 2020, an adult learning participation rate of 15% on average in the EU (up from the earlier 12.5% target).

114 The importance of seniors' learning cannot be overstated It is important that younger seniors have sufficient skills to remain active economically. On the other hand, it is beneficial for older seniors not to be grouped in retirement homes, but to participate in less institutionalised forms of care, which requires new skills of organisers and users of such forms.

However, progress towards that target has been slow and uneven. The participation rate of adults in learning, increased from 7.8% in 2010 to 10.8% in 2019 on average in the EU-27, which is a sizeable relative increase yet still well below the target.

Figure 45 – Adult (aged 25-64) participation in learning, 4-week reference period, 2010 and 2019



Source: Eurostat, LFS, online data code: [trng_lfse_01].

However, there are limitations to the indicators. For example, the way participation in adult learning is currently measured is quite restrictive, as it measures 'the share of population who report having participated in any formal or non-formal learning activity **during the last 4 weeks** prior to being interviewed'. This is problematic in the context of adult learning which is still a rather sporadic activity, often taken-up only once or at most twice a year for a short duration.. Looking at available data on learning activities during the last 12 months, the average duration of a non-formal learning activity (the most prevalent type of learning during adulthood) in 2016 was 75 hours, or around 10 working days[115].

Consequently, due to the low frequency of learning activities, the measurement of adult learning by using a 4-week reference period may not be conducive to monitoring with sufficient precision participation in learning. Also, a recent review by the Joint Research Centre[116] indicates, that while such a measure may indeed be appropriate to indicate the average number of persons who have had a recent exposure to adult learning, it may not be sufficient to represent the average participation rate over a longer time period (such as a calendar year), which is nevertheless how this indicator is most often being defined and interpreted.

Therefore, a more comprehensive measure of adult learning has been included in the EU Adult Education Survey (AES), registering participation in learning over a longer – a 12-month reference period and includes a **broader definition of adult learning[117]**, i.e. also covering guided on the job training (for more details on different measures of adult learning, please see earlier editions of the Education and Training Monitor, particularly the 2018 edition[118]). When analysing this more

115 Eurostat online data code [trng_aes_151].

116 Vera-Toscano, E., Urzì Brancati, C. (2020). Towards an improved adult learning monitoring framework.

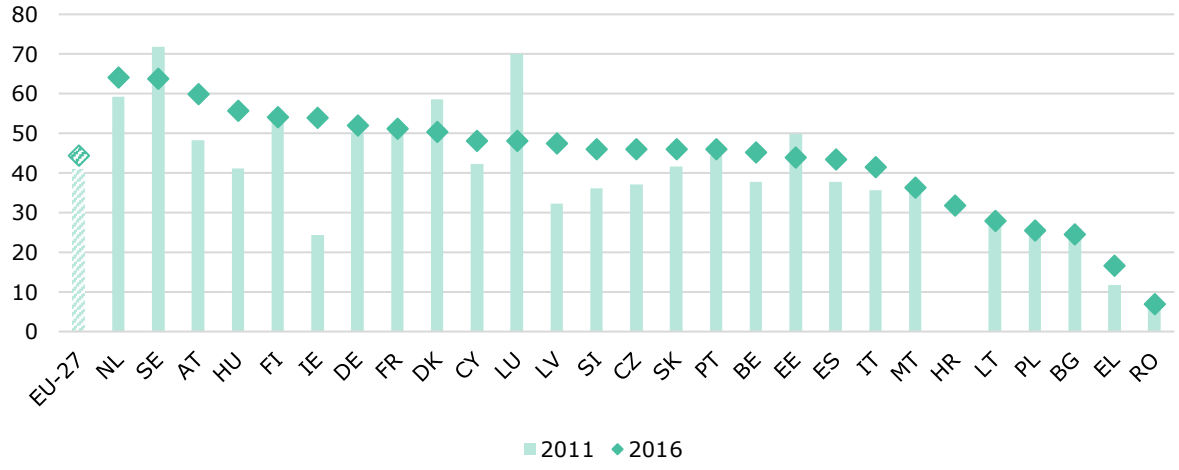
117 European Commission / DG EAC (2019). Achievements under the Renewed European Agenda for Adult Learning, a report of the ET 2020 Working Group on Adult Learning 2018-2020.

118 Education and Training Monitor 2018.

comprehensive measure, a significantly larger proportion of the population is reported to participate in learning. This was also the case when analysed over a shorter period (over 5 years between 2011 and 2016). At the same time, relative differences between Member States are smaller than in the LFS survey; in most cases we are dealing here with differences of at most two and a half times[119]. Still, the low frequency of the EU Adult Education Survey (every 5 years before 2016 and every 6 years since 2016) does not allow for a more regular monitoring of adult learning through this more inclusive indicator.

A broader definition of non-formal education is also included in the EU Continuing Vocational Training Survey (CVTS). As in the AES results, CVTS does not show in general such large differences between countries as are seen in the LFS results (with the exception of some forms of learning at the workplace). This could be another argument for the incomplete identification of non-formal education in the LFS survey. This is especially important because adult participation in education and training depends mainly on participation in non-formal education and training. Participation in formal education is low (a little above 3% in the 4 weeks before the survey) for many years in LFS, and almost 6% (in the 12 months before the survey) in AES 2016, with a downward trend since 2007. Participation in non-formal education and training is significantly higher, and in LFS it is just above 8% in the last few years, and in the AES 2016 it reached 42.6%, showing an upward trend since the AES 2007 (31.6%). Given that the AES and CVTS have a wider coverage of the adult learning forms, these surveys seem to provide a more realistic picture on the learning of adults than LFS survey. It is likely that the LFS results do not identify the entire spectrum of non-formal education in EU, as in many countries the process of this identification is not completed, and in some of them this process has not yet started.[120] Still, the low frequency of the AES (every 5 years before 2016 and every 6 years since 2016) and EU Continuing Vocational Training Survey (every 5 years since 2005) did not allow for regular monitoring of adult learning through this more encompassing indicator.

Figure 46 – Adult (aged 25-64) participation in learning, 12-month reference period, 2011 and 2016



Source: Eurostat, AES, online data code: [trng_aes_100].

Note: No data for HR in 2011.

119 See the report of the ET 2020 Working Group on Adult Learning 2018-2020: Achievements under the Renewed European Agenda for Adult Learning.

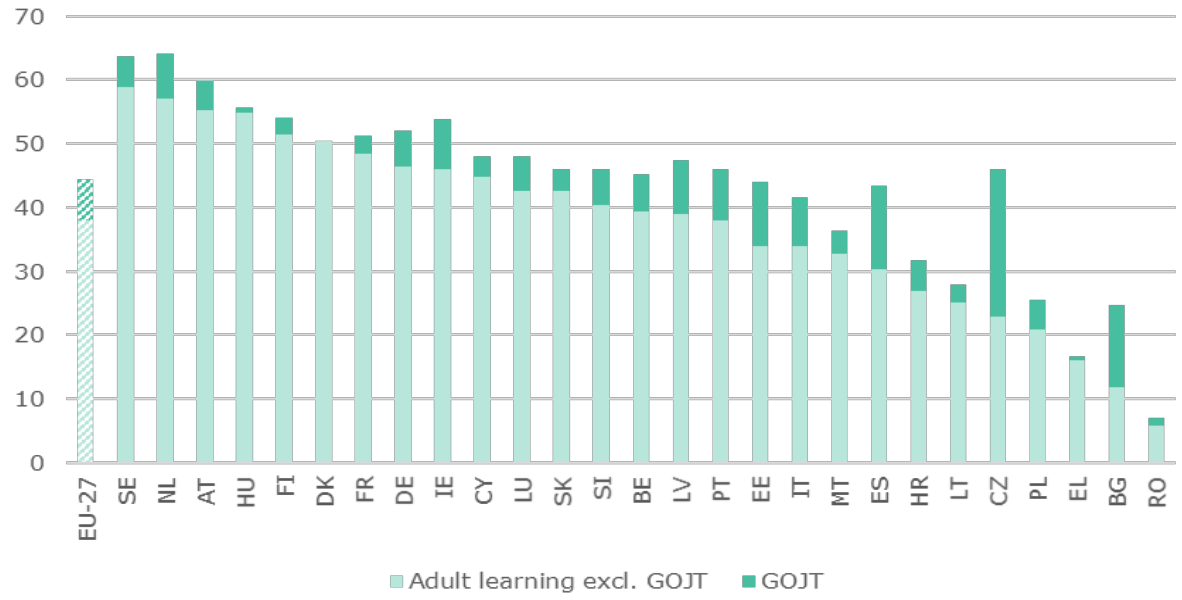
120 According to the Working Group on Adult Learning 2018-2020, the differences in LFS, AES and CVTS results are not only related to the period of participation in education and training (4 weeks vs 12 months). The narrow definition of non-formal education in the LFS survey is also important. In some countries, this restriction may not be limited to guided on the job training.

2.6.2 Improving the measurement of adult learning

The Commission has been working towards better data on adult learning. In particular, in the context of developing an integrated framework for European Social Statistics (IESS)[121], and the revised legal base of the EU Labour Force Survey (LFS)[122], adopted at the end of 2019. The latter provides for a more regular (every two years) collection of data on participation in adult learning with a 12-month reference period, starting in 2022. As of 2023 (the first year of data release), this will allow Member States to report every second year on participation in adult learning.

At the same time, this new data will not be identical to the data collected via the AES. Apart from general differences between the two surveys, the newly collected data via the LFS will exclude one specific form of non-formal adult learning: guided on the job training (GOJT). GOJT is characterised by planned periods of training, instruction or practical experience, using normal tools of work, either in the immediate place of work or in a work situation with the presence of a tutor[123]. It is possible, from the data available in the AES, to estimate the prevalence of GOJT as part of adults' total participation in learning and thus calculate participation rates, which should be more comparable with the forthcoming data from the LFS in 2022.

Figure 47 – Adult (aged 25-64) participation in learning, 12-month reference period, distinguishing guided on the job training (GOJT), 2016



Source: Eurostat, AES, special data extraction for DG EMPL.

Note: Countries are sorted in descending order based on the share of adults participating in learning, excluding GOJT.

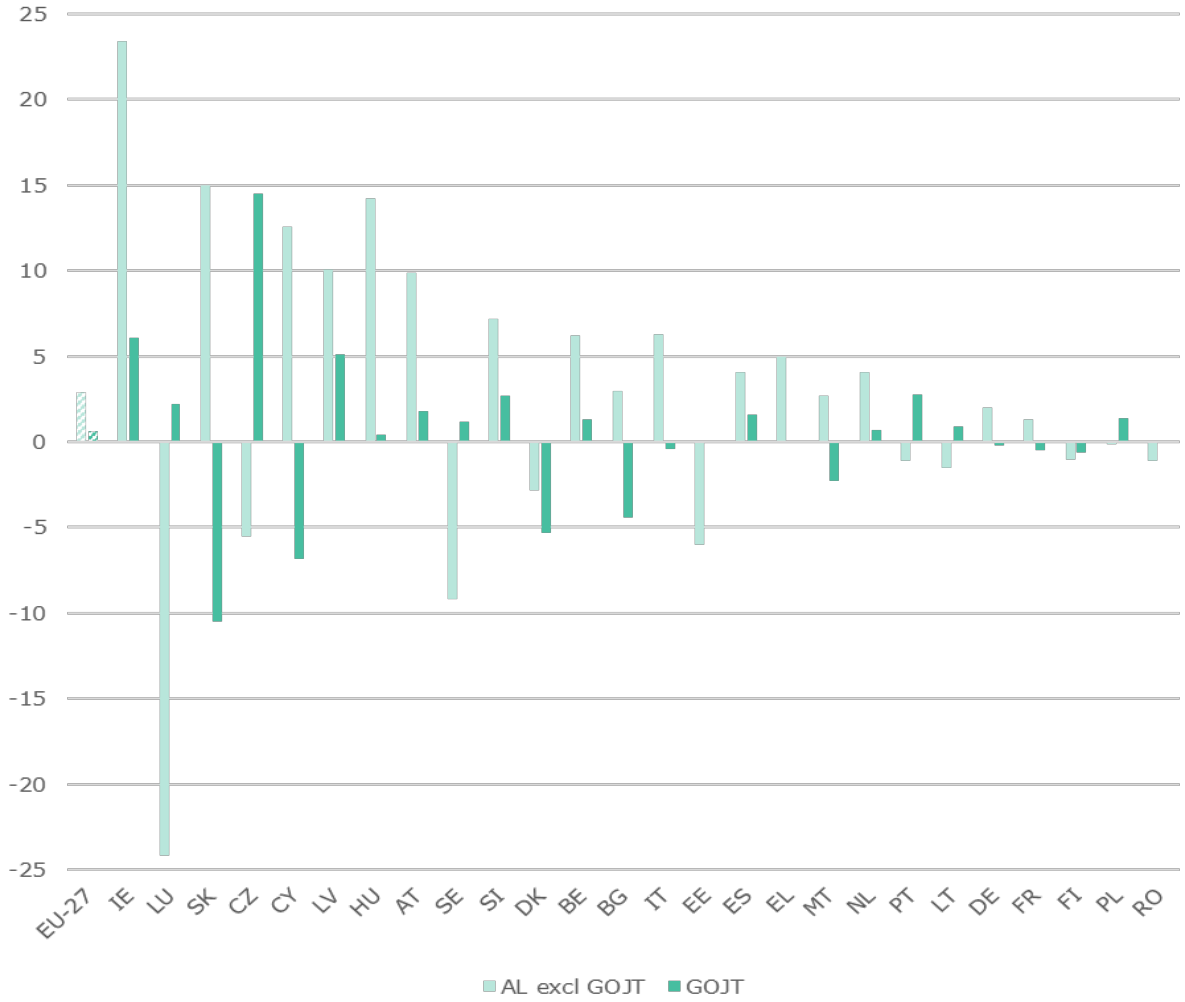
In 2016, in the EU-27, the participation rate of adults in learning, excluding GOJT, was 37.9%, with GOJT representing an additional 6.5% participation rate (i.e. the share of adults who say they have been participating in learning through GOJT but not any other types of learning). The largest share of GOJT was reported in Czechia (23.3%, more than all other types of learning combined), Spain (13%) and Bulgaria (12.8%). In most other countries the participation in GOJT represented a more limited part of total adult learning.

121 Regulation (EU) 2019/1700

122 C/2019/8809 final

123 See Eurostat, Statistics Explained.

Figure 48 – Adult (aged 25-64) participation in learning, 12-month reference period, changes between 2011 and 2016, distinguishing guided on the job training (GOJT)



Source: Eurostat, AES, special data extraction for DG EMPL.

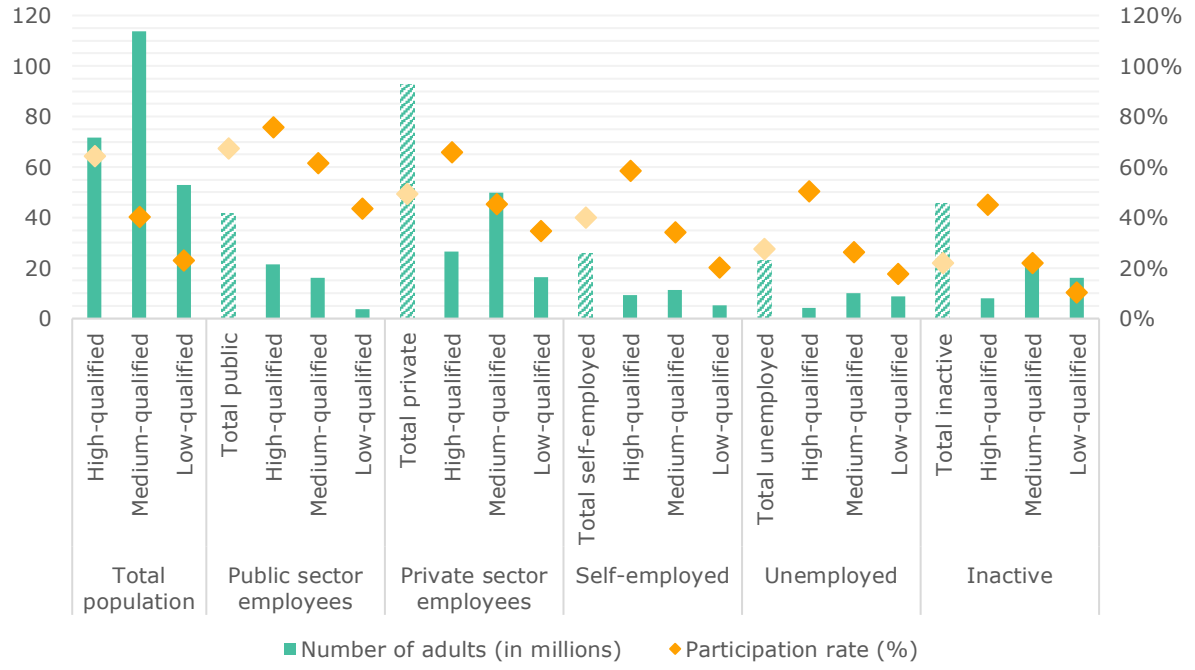
Note: Break in time series for IE, LU and SE. Countries are sorted in descending order based on the total level of changes in participation rates. Changes for HR are not presented as data for the baseline year (2011) is not available.

When analysing changes in the participation rate over time (i.e. during the two latest waves of the AES in 2011 and 2016) and separating GOJT, a rather mixed picture emerges among Member States. On average in the EU-27, the share of individuals participating only in GOJT remained stable, while participation in other forms of non-formal and formal learning increased. Major changes in Ireland and Luxembourg might have been (at least in part) driven by methodological changes. Otherwise, there was a major increase in GOJT in Czechia and a decrease in a number of Member States, including Slovakia, Cyprus, Denmark and Bulgaria. A decline in other forms of learning was also registered in Sweden (also possibly due to methodological changes), Czechia, Estonia and Denmark. In relation to the remarks included in the above-mentioned report of the ET 2020 Working Group on Adult Learning 2018-2020 'Achievements under the Renewed European Agenda for Adult Learning', it is also important to analyse in more detail the differences between EU countries in identifying adult participation in non-formal education in three European surveys: LFS, AES and CVTS (it is also worth considering the Eurofound surveys). These differences are critical to national differences across adult learning and to the achievement of the EU's ambitious adult learning targets. Particularly in-depth analyses should concern **practical forms of learning**, such as learning at the workplace and learning during the implementation of social projects and activities, including those necessary, such as extending the functions of schools children and youth with non-formal education offers for adults in local surroundings and deinstitutionalization of forms of care for older seniors.

2.6.3 The profile and quantification of adult learners and non-learners

The two key socio-demographic factors influencing adult learning are employment status (and sector of employment) and qualification level. From this, it is clear that participation of employees in the private sector, particularly medium-qualified employees, is likely to have the most significant impact on adult learning participation rates, due to their large number and moderate participation rates. The second significant group are inactive adults, which is the second-largest population group as well as the group with the lowest participation rate in the EU. Indeed, these insights are confirmed when the number of non-learners are quantified in each of these socio-demographic groups.

Figure 49 – Adult (aged 25-64) participation in learning by employment status and level of qualification, 12-month reference period, EU-27, 2016



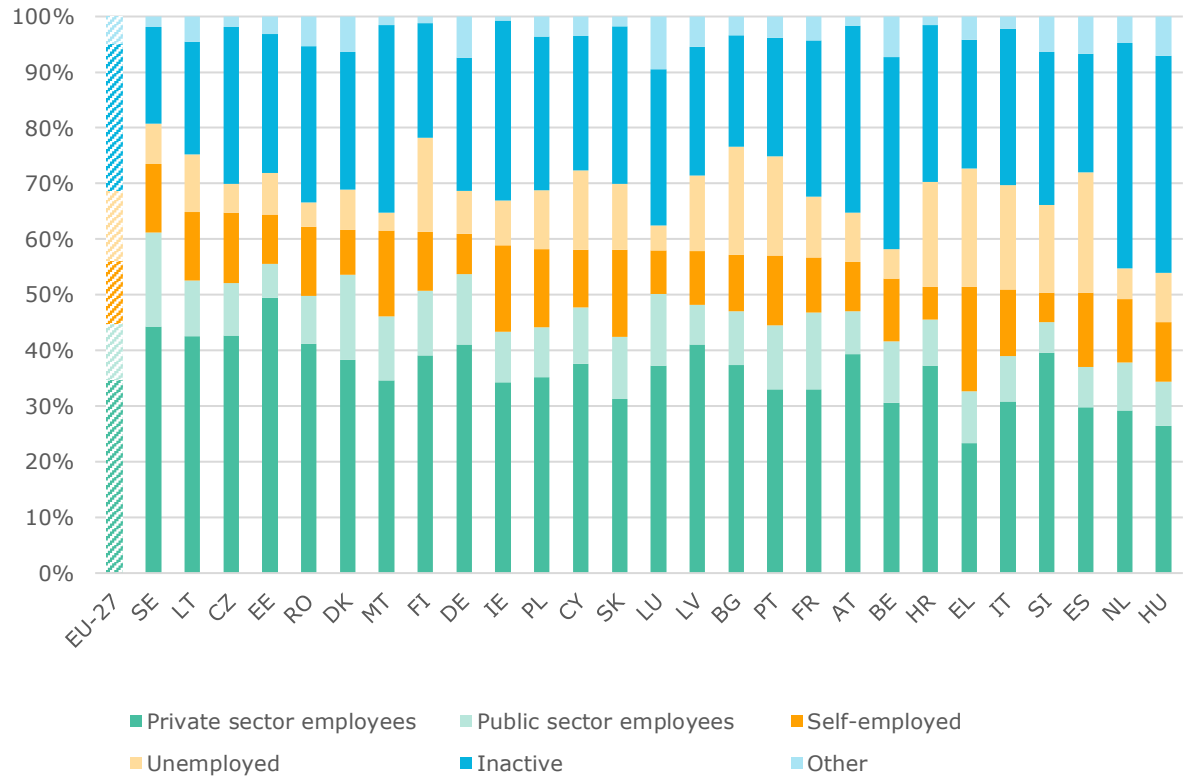
Source: Eurostat, AES, special data extraction for DG EMPL.

Note: A high level of qualification corresponds to qualifications at ISCED level 5 or above; medium level – ISCED levels 3 and 4; low level – ISCED level 2 or below. Public sector employees include employees working for organisations belonging to public administrations, education or the health sector (NACE sectors O, P and Q). Private sector employees include employees working for organisations belonging to the business economy124 (i.e. industry – NACE sections B to E, construction – NACE section F, and services – NACE sections G to N, excluding activities of holding companies – K64.2).

The largest groups of non-participating adults in 2016 were medium-qualified private sector employees (27.1 million), medium-qualified inactive adults (16.6 million), low-qualified inactive adults (14.5 million) and low-qualified private sector employees (10.7 million). These four groups (covering nearly 70 million individuals) together represent more than 50% out of all (nearly 130 million) adults aged 25-64 who did not participate in any formal or non-formal education or training activity that year. Beyond the total EU-27 figures, it is also relevant to look at the distribution of non-learners across EU Member States.

124 Eurostat, Statistics Explained.

Figure 50 – The structure of non-learners (aged 25-64) by employment situation and country, 12-month reference period, 2016

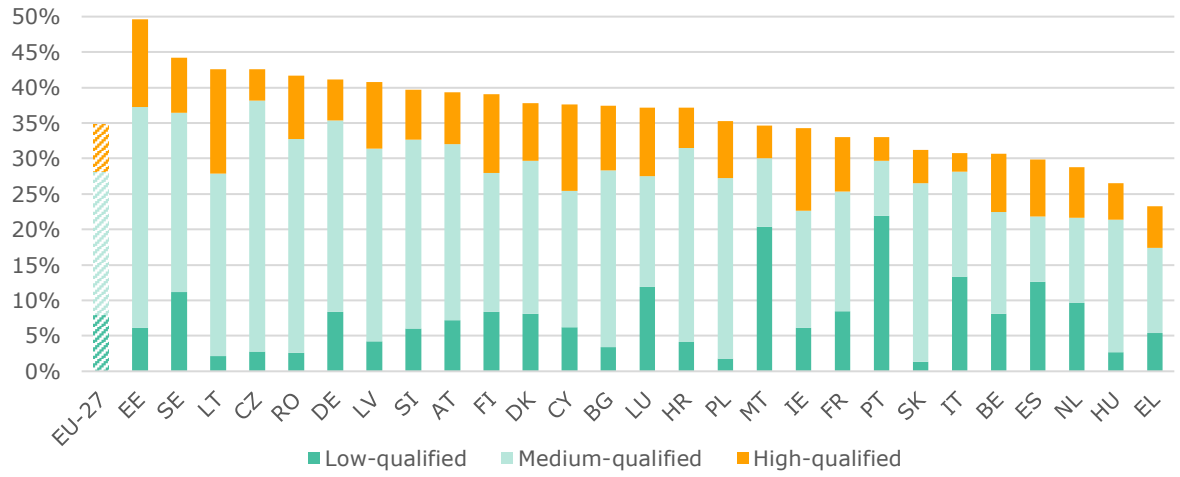


Source: Eurostat, AES, special data extraction for DG EMPL.

Note: The category 'other' includes family workers and people whose employment situation or economy sector is unknown. Countries are sorted in a descending order based on the share of employed non-participants.

In line with the previous analysis, the data indicates that the two largest groups of non-participants on average across the EU are private-sector employees (34.8%) and inactive adults (26.4%). Overall, employed individuals represent more than half (56.2%) of all non-participants. It is also possible to further disaggregate this data, by looking, for example, at the largest group of non-participants (private sector employees) and analysing their composition in terms of educational attainment. Such analysis indicates that, out of all private sector employees in the EU-27 who did not participate in any formal or non-formal learning activity in 2016, the largest proportion were medium-qualified private sector employees (representing 20.2% of all non-learners), followed by low-qualified non-learners (representing 8.0% of all non-learners) and high-qualified non-learners (representing 6.7% of all non-learners). However, some countries stand out as having the majority of their non-learners low-qualified, in particular Portugal and Malta, because of the high share of low-qualified people in the population. Conversely, the largest share of high-qualified private sector employees not participating in learning were in Lithuania (representing 14.7% of all non-learners).

Figure 51 – The percentage non-learners (aged 25-64) who are employed in the private sector, by level of qualification, 12-month reference period, 2016



Source: Eurostat, AES, special data extraction for DG EMPL.

2.6.4 The determinants of participation in adult learning

Beyond a descriptive analysis of who is and who is not participating in adult learning, it is also possible, using regression analysis, to extract which socio-demographic characteristics most influence the likelihood of participation in learning the most. Such determinants can be divided into three categories: (i) personal characteristics (sex, age[125], migrant status, married/cohabiting status and degree of urbanisation of place of residence[126]; (ii) educational attainment (low, medium, and high[127]); and (iii) job-related characteristics (occupation, firm size, work situation[128], professional status[129] and sector). Note that here there is no distinction between formal and non-formal education and training.

These are put together and referred to as 'adult learning activities' (ALA)[130] in the remainder of the analysis. Figure 52 illustrates the relative contribution (in percentages) of the above three categories in accounting for participation in ALA in individual Member States[131]. Although no consistent pattern can be observed across different countries, job-related characteristics seem to

125 The relationship between our dependent variable and age is allowed to vary over the life cycle. In fact, the estimated age profile turns out to be inverse U-shaped, signalling that the probability of being involved in formal or non-formal learning activities first rises and then declines with age.

126 Three options are considered: cities, towns or suburbs, and rural areas.

127 Low education corresponds to ISCED11 levels 0-2, medium education to ISCED11 levels 3-4, and high education to ISCED11 levels 5-8.

128 A distinction is made between full-time and part-time work.

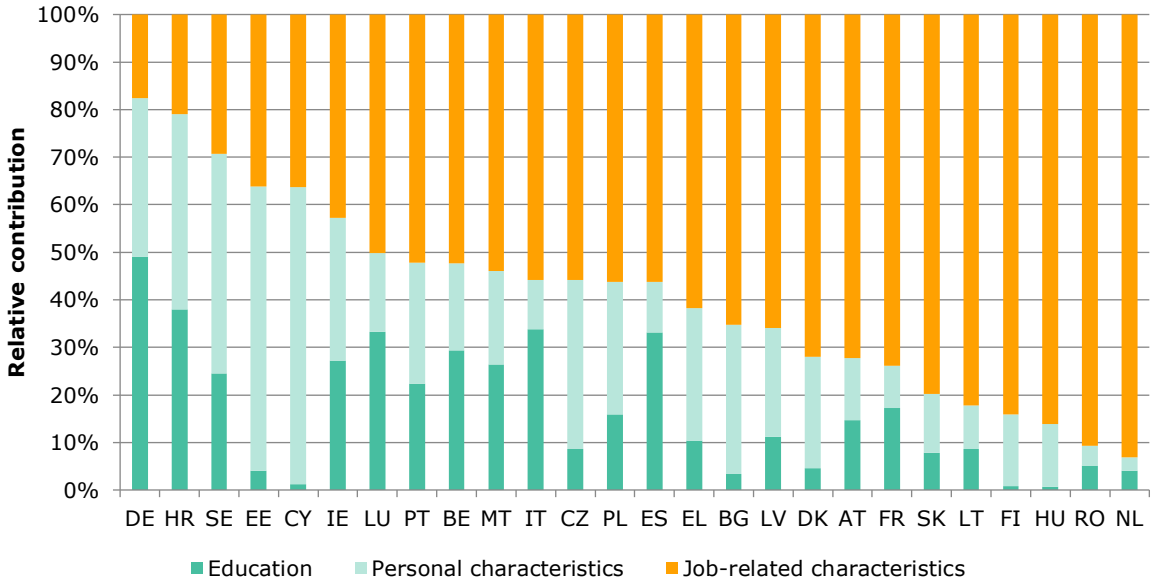
129 There is a distinction between employees with a permanent contract (or a contract of undefined duration), employees with a temporary contract (or contract of limited duration), the self-employed and family workers.

130 The dependent variable 'ALA' takes a value of 1 if the individual has been involved either in formal or non-formal learning or in both; it has a value of 0 otherwise.

131 The data shown in this figure is based on the results of a logistic regression (run for each Member State separately) where the dependent variable captures participation in ALA v non-participation and the independent variables are grouped into the three categories mentioned above: personal characteristics, educational attainment and job-related characteristics. The relative importance of each of these three categories in accounting for participation in ALA is identified by comparing the reduction in deviance attributable to all the independent variables belonging to each category. The relative contribution of each group of determinants could not be presented in terms of the 'proportion of variance explained', because this concept is not well-defined in the context of logistic regression. Logistic regression is suitable for modelling binary dependent variables, such as the participation in ALA (i.e. a variable with only two answer categories such as 0 or 1 / Yes and No), but it does not allow for 'decomposing' the variability of the dependent variable into an explained and unexplained part.

be, overall, the most important determinant of participation in ALA. They play an especially crucial role in the Netherlands, Romania, Hungary, Finland, Lithuania and Slovakia. On the other hand, personal characteristics appear to matter more than job-related characteristics in Cyprus, Estonia, Sweden, Croatia and Germany. In the latter, educational attainment clearly turns out to be the most relevant predictor of participation in ALA. In Germany, as in the majority of EU countries (the exceptions being Bulgaria, Denmark, Estonia, Finland and Hungary), the probability of being involved in ALA increases with the level of education. This could signal an important challenge for those Member States in which upskilling and re-skilling of low-skilled/low-educated workers are especially necessary.

Figure 52 – Relative importance of adult learning determinants across countries: personal v education vs job-related characteristics



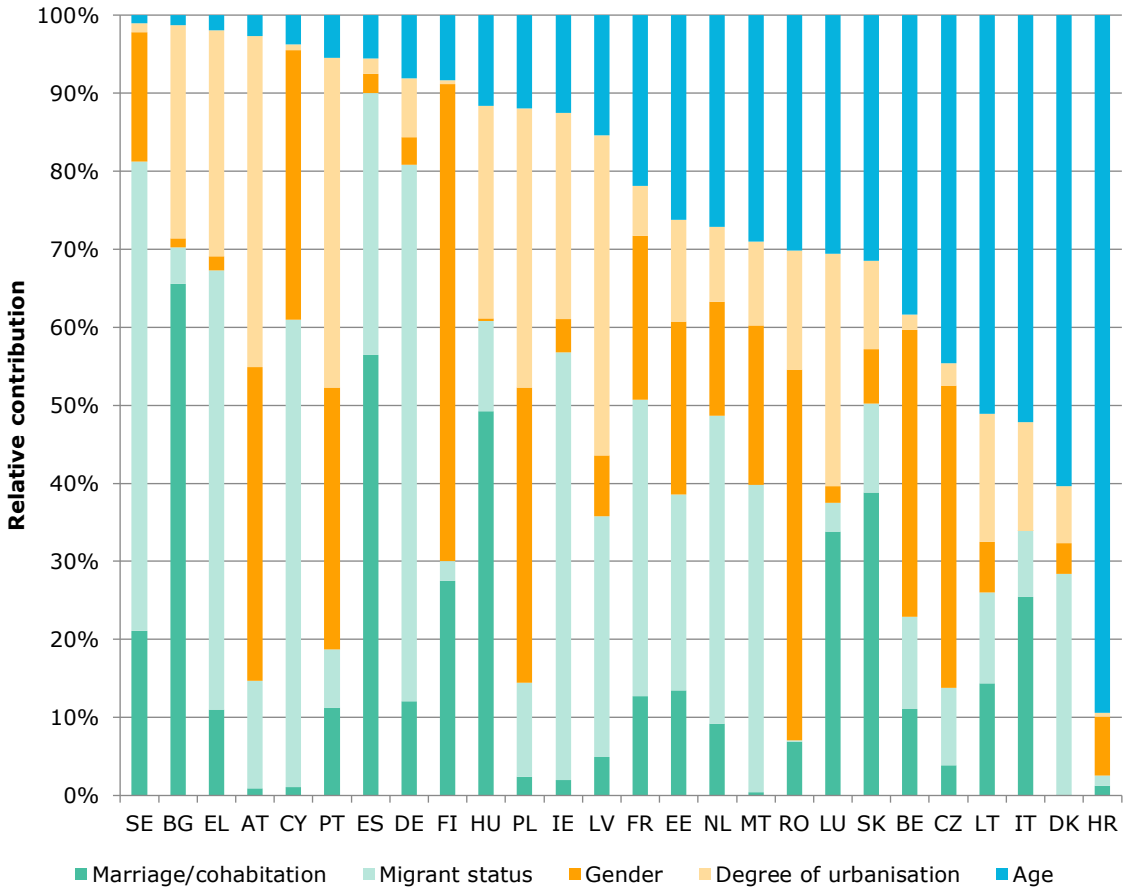
Source: CEDEFOP, AES 2016.

Figures 54 and 55 show the relative importance of the different factors included in the categories of personal and job-related characteristics. For the former, Figure 53 shows that there is a lot of heterogeneity across Member States. Age appears to be the most relevant personal characteristic affecting participation in ALA in Croatia, Denmark, Italy and Lithuania. Migrant status seems to be important in Sweden, Germany, Cyprus, Greece, Ireland, the Netherlands, France and Malta. In all these Member States, except for the Netherlands and Malta[132], migrants are significantly less likely to participate in ALA than natives. Married/cohabiting status turns out to be a significant determinant in Bulgaria, Spain and Hungary. In these countries, apart from Hungary[133], married or cohabiting workers are found to have a lower probability of participating in ALA than single workers. Finally, the degree of urbanisation of one's place of residence is found to be influential in Latvia, Austria, and Portugal.

132 In NL and MT, the difference in participation in ALA between migrants and natives is not statistically significant.

133 In HU, there is no statistically significant difference between married/cohabiting workers and single workers in terms of ALA participation.

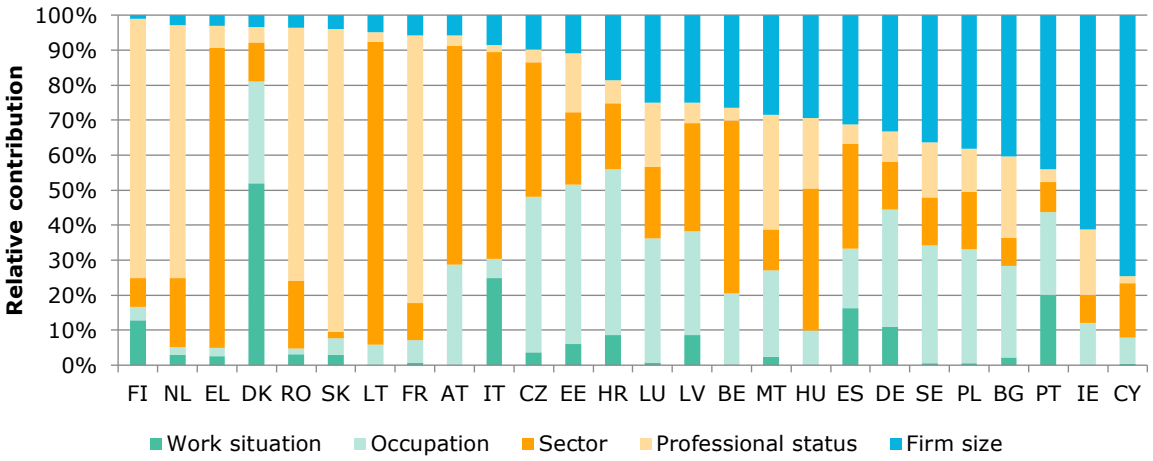
Figure 53 – Relative importance of adult learning determinants across countries: personal characteristics



Source: CEDEFOP, AES 2016.

Moving on to the different job-related characteristics, it is possible to observe large variations between Member States in terms of their relative importance. Firm size is found to be the most important predictor of participation in ALA among job-related characteristics in Cyprus, Ireland, Portugal and Bulgaria, with workers in larger firms are consistently more likely to participate in ALA than those in smaller firms. Sector is important in Lithuania, Greece, Austria, Italy, Belgium and Hungary. Professional status is very relevant in Slovakia, France, Finland, the Netherlands and Romania. Occupation appears to be a meaningful determinant in Czechia, Luxembourg, Estonia and Croatia. In all these countries, in line with expectations, workers with high-level occupations broadly display a higher participation rate in ALA than those with low-level occupations. Overall, work situation is the least important job-related characteristic influencing participation in ALA. However, one exception is Denmark, where it is actually the most important factor.

Figure 54 – Relative importance of adult learning determinants across countries: job-related characteristics



Source: CEDEFOP, AES 2016.

Analysing different determinants of participation in adult learning could allow for a better targeting of policies, in particular by identifying target groups in specific countries based on the most important characteristics. For example, in countries where job-related factors are the most important determinants of adult learning participation, policies could relate to the labour market status/situation of the individuals and aim at increasing the learning participation of the underrepresented groups. In other countries, where personal characteristics (such as age) seem to be the driving force, interventions could be designed that specifically target age criteria. This could allow for policies to be adapted for specific contexts, driven by historic, economic, cultural and other country-specific factors.

2.7 Learning mobility

Key findings

In 2018, 13.5% of higher education graduates in the EU-27 were mobile, meaning that they studied abroad, partly or entirely. Overall in the EU-27, 9.1% of graduates had a temporary experience abroad, known as 'credit mobility', and 4.3% graduated in a country which was not the one where they received their upper secondary school diploma, known as 'degree mobility'. Different EU countries display different combinations of credit mobility and degree mobility, reflecting the availability of different funding schemes, geographical factors or network effects.

Promoting worldwide learning mobility is a key objective of the EU and its Member States. EU Member States adopted a learning mobility target for higher education, which regrettably still cannot be fully calculated due to the unavailability of data from a number of non-EU countries, first and foremost the United States.

Within the EU, Luxembourg, Cyprus, the Netherlands, Germany and Finland (in descending order) have the highest shares of outwardly mobile tertiary graduates. EU mobility programmes account for approximately half of the credit mobility 'stays' in the EU, and at least three quarters of the credit mobility stays in 17 countries.

Inward degree mobility measures the number of graduates who obtained a degree in a country different from the country where they received their upper secondary school diploma. The number of inward degree-mobile graduates can be read as a measure of the attractiveness of the education system. On this indicator, France tops the list in terms of absolute numbers (78 837 inwardly mobile graduates) and Luxembourg in terms of percentage (24.2%).

2.7.1 Progress towards the EU target on learning mobility

In 2011, EU countries agreed on a target that 'by 2020, an EU average of at least 20% of higher education graduates should have had a period of higher education-related study or training (including work placements) abroad, representing a minimum of 15 European Credit Transfer and Accumulation System (ECTS) credits or lasting a minimum of three months'[134]. This target refers to worldwide outward mobility, i.e. mobility from EU countries to both EU and non-EU destinations. It covers two types of mobility: credit mobility and degree mobility[135]. Regrettably, due to the lack or incompleteness of inward degree mobility data for some destination countries, the computation of this target remains underestimated[136].

In 2018, 13.5% of higher education graduates in the EU were mobile, meaning that they studied abroad, partly or entirely (Figure 55). Overall, 9.1% of the graduates had a temporary experience abroad, known as 'credit mobility', and 4.3% graduated in a country which was not the one where they received their upper secondary school diploma[137], known as 'degree mobility'. Luxembourg, Cyprus, the Netherlands, Germany and Finland (in descending order) have the highest shares of outwardly mobile graduates.

Figure 55 highlights the different indices of the two mobility components across Member States. Among the best performers, the prevalence for degree mobility and credit mobility differs. In the Netherlands, Finland and Germany, the percentage of credit-mobile graduates (22.5%, 15.1% and 14.5%, respectively) is higher than the percentage of degree-mobile graduates (2.8%, 4.1% and 5.3%, respectively). In Luxembourg and Cyprus, in contrast, the percentage of degree-mobile graduates (74.1% and 35.2%, respectively) is higher than the percentage of credit-mobile graduates (12.7% and 2.2%, respectively).

134 Council conclusions on a benchmark for learning mobility. OJ C 372, 20.12.2011, p. 31–35.

135 Credit-mobile graduates are those who have had a temporary study period and/or work placement abroad and return to their 'home institution' to complete their degree. Degree-mobile graduates are those whose country of origin (i.e. the country where their upper secondary diploma was obtained) is different from the country in which they graduate. While data on credit mobility is collected in the countries to which students returned after their credit mobility stay, data on degree-mobile graduates is collected at the level of the destination country. Consequently, the calculation of outwardly mobile EU graduates relies on figures provided by all EU and non-EU destination countries. For an overview of the learning mobility target, see Flisi, S. and Sanchez-Barrioluengo, M. (2018). Learning Mobility II: An estimation of the benchmark. A JRC Science for Policy Report JRC113390.

136 For the academic year 2017/2018, information on inward degree mobility is available for 44 destination countries. See note to Figure 55 for an overview of countries with available data. The main outstanding missing destination by far is the US. See Flisi, S. and Sanchez-Barrioluengo, M. (2018). Learning Mobility II: An estimation of the benchmark. A JRC Science for Policy Report JRC113390. This gives an estimation of the effect the missing US data has on the computation of the target.

137 While country of origin would ideally be defined as country of prior education, i.e. country where upper secondary diploma was obtained, there are a number of countries using a different definition in the data collection. For the academic year 2017/2018, definitions of country of origin include country of prior education (ES (ISCED 5), LV and PL (ISCED 8)), country of upper secondary diploma (BE, BG, CZ, DK, DE, EL, HR, CY, LT, LU, MT, NL (ISCED 5-7), AT, PL (ISCED 6-7), PT, RO and FI), country of citizenship (IT, HU and SK), the country of usual residence (EE, IE, ES (ISCED 6-8) and SI) and country estimations (NL (ISCED 8)). In FR country of upper secondary diploma or the country of citizenship is used. In SE, international students are defined as students who have a student residence permit or are either non-residents or have moved to Sweden not more than six months before starting their studies. For students at ISCED 8 the time limit is 24 months. Students with student residence permit are reported by country of citizenship while other students are reported by country of birth. Homecoming nationals are reported as national students.

Figure 55 – Outward degree and credit mobility of graduates, 2018 [%]

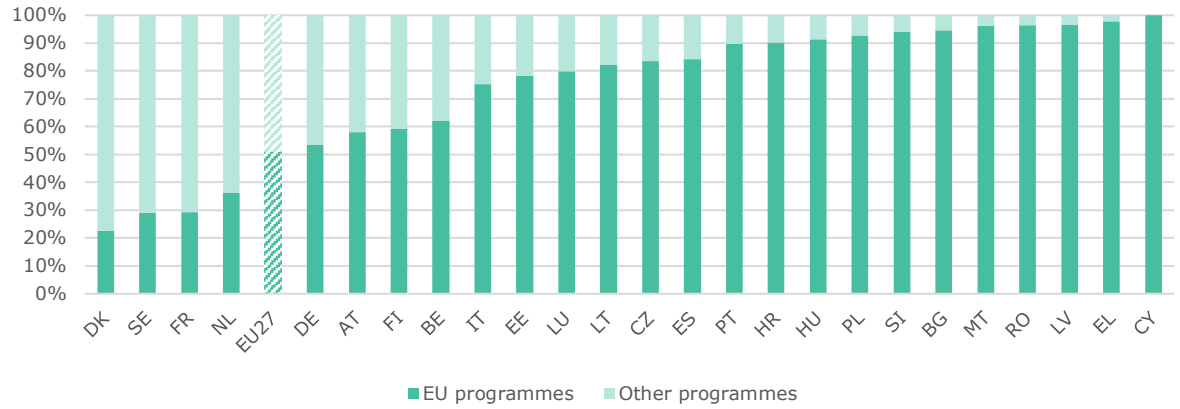
	Total mobility (credit+degree)					Credit mobility					Degree mobility				
	ISCED 5-8	ISCED 5	ISCED 6	ISCED 7	ISCED 8	**ISCED 5-8**	ISCED 5	ISCED 6	ISCED 7	ISCED 8	**ISCED 5-8**	ISCED 5	ISCED 6	ISCED 7	ISCED 8
EU-27	13.5	5.1	11.7	18.4	19.8	9.1	2.7	8.3	12.6	6.5	4.3	2.4	3.4	5.8	13.2
BE	10.6	:	10.1	11.7	:	6.7	:	7.6	5.9	:	3.9	5.5	2.5	5.8	13.2
BG	10.2	n.a.	10.7	8.0	14.5	1.4	n.a	1.6	1.1	2.6	8.8	n.a.	9.1	6.9	11.8
CZ[2]	14.0	51.0	9.9	17.6	23.5	9.0	0.0	5.7	12.8	16.6	5.0	51.0	4.2	4.8	7.0
DK	11.1	3.7	11.0	13.0	33.1	9.3	3.1	9.9	9.8	24.0	1.8	0.6	1.1	3.2	9.1
DE[1]	19.9	77.2	17.0	25.3	:	14.5	0.0[4]	13.5	17.9	:	5.3	77.2	3.5	7.3	10.7
EE	15.6	n.a.	13.8	16.0	:	5.5	n.a.	5.8	5.7	:	10.1	n.a.	8.1	10.3	19.7
IE[3]	:	:	:	:	:	:	:	:	:	:	5.8	2.9	3.5	11.3	25.6
EL	12.2	n.a.	5.1	22.4	:	0.0	n.a.	0.0	0.0	:	12.2	n.a.	5.1	22.4	35.8
ES	9.9	1.8	16.3	9.5	:	7.7	1.4	14.6	5.3	:	2.2	0.4	1.7	4.2	5.6
FR	18.1	5.9	14.5	31.6	20.5	14.6	4.4	10.1	27.7	8.2	3.5	1.5	4.4	3.9	12.3
HR[2]	7.0	90.5	4.5	8.5	28.3	3.6	0.0	2.2	5.1	8.8	3.5	90.5	2.4	3.4	19.6
IT[2]	13.7	n.a.	8.8	17.1	64.0	8.9	n.a.	6.2	11.1	37.6	4.8	23.3	2.6	6.0	26.4
CY	37.4	15.5	55.8	23.0	62.3	2.2	0.9	4.4	0.4	2.2	35.2	14.6	51.4	22.7	60.1
LV	13.3	4.2	16.3	14.5	29.7	5.2	0.8	7.7	4.1	1.9	8.1	3.4	8.6	10.3	27.7
LT	16.4	n.a.	15.3	15.1	34.7	7.0	n.a.	7.7	5.0	10.9	9.5	n.a.	7.6	10.1	23.8
LU	86.7	12.3	96.8	84.5	80.5	12.7	0.0	22.5	0.4	0.0	74.1	12.3	74.3	84.1	80.5
HU[2]	8.4	7.3	6.2	12.7	14.7	3.7	0.3	2.8	6.4	1.3	4.7	7.0	3.5	6.3	13.4
MT	14.6	7.0	11.4	19.6	52.3	5.3	2.9	8.7	0.3	1.1	9.4	4.1	2.7	19.3	51.1
NL	25.3	11.4	24.9	26.6	33.2	22.5	4.7	23.9	20.4	16.8	2.8	6.7	0.9	6.2	16.4
AT	14.8	0.2	20.8	23.4	30.7	9.1	0.0[4]	13.3	14.3	15.0	5.8	0.2	7.5	9.1	15.7
PL	2.4	90.8	1.6	3.4	15.4	1.2	0.0	0.9	1.9	2.6	1.2	90.8	0.8	1.5	12.8
PT	11.2	6.0	10.0	13.6	20.9	7.0	0.2	7.7	7.3	0.5	4.2	5.8	2.3	6.3	20.5
RO	7.7	n.a.	7.4	6.8	19.0	1.7	n.a.	1.9	1.5	1.1	6.0	n.a.	5.5	5.3	17.9
SI	4.0	1.5	2.3	6.6	14.7	0.0	0.0	0.0	0.0	0.0	4.0	1.5	2.3	6.6	14.7
SK[3]	:	:	:	:	:	:	:	:	:	:	15.7	31.4	16.4	14.2	16.9
FI	19.2	n.a.	17.2	24.0	8.6	15.1	n.a.	14.1	18.4	2.1	4.1	n.a.	3.1	5.5	6.4
SE	15.0	2.6	14.4	20.6	15.6	10.5	0.2	10.5	14.8	5.3	4.5	2.3	3.9	5.8	10.2

Source: Eurostat, UOE, and OECD. Online data codes: [educ_uoe_grad01], [educ_uoe_mobg02] and [educ_uoe_mobc01] for graduates, degree-mobile graduates and credit-mobile graduates in the EU, EFTA, EEA and candidate countries. Special extraction from the OECD of international graduate data for degree-mobile graduates of EU origin who graduated in non-European countries (Australia, Canada, Chile, Colombia, Israel, Japan, Korea, New Zealand, Brazil and Russia). Eurostat, UOE, data extracted on 5 June 2020 and OECD data on 11 May 2020.

Note: The total outward mobility rate for country X is calculated as ((outward degree-mobile graduates from country X + outward credit-mobile graduates who were not degree-mobile from country X) / graduates originating in country X). The number of graduates originating in country X is calculated as (total graduates in country X – inward mobile graduates from any other country to country X + outwardly mobile graduates from country X to any other country). Credit and degree mobility are calculated considering only one component as the numerator. Outward mobility rates for the EU are calculated as ((outward degree-mobile graduates from the EU + outward credit-mobile graduates who were not degree mobile from the EU) / graduates originating in the EU). The number of graduates originating in the EU is calculated as (number of graduates in the EU – inward mobile graduates from non-EU countries to the EU + outwardly mobile graduates from the EU to non-EU countries). Note that inward degree mobility data is not available for SI disaggregated by country of origin, and no inward degree mobility data is available for ES (ISCED 8). This implies a potential underestimation of outward degree-mobile graduates from other Member States. Furthermore, limited availability of information on the number of outwardly mobile graduates of EU origin from destination countries outside of Europe affects the reliability of the estimates. (n.a.) not applicable; (:) not available; (1) data does not cover graduates that are simultaneously credit and degree mobile; (2) data on graduates with credit mobility who were not degree-mobile is missing, and total graduates with credit mobility is used instead; (3) no information on outward credit-mobile graduates is available; (4) no well-developed credit transfer system is in place for vocational ISCED level 5 programmes.

About half of the credit-mobile graduates in the EU had their stay abroad funded by the Erasmus or other EU programmes (Figure 56). In six countries (Cyprus, Greece, Latvia, Romania, Malta and Bulgaria), this share is 95% or higher. Credit mobility through EU programmes accounts for more than half the credit mobility in 15 additional countries where data is available. Only four countries have a higher frequency of credit mobility through non-EU programmes (the Netherlands, France, Sweden and Denmark), with shares of credit mobility through non-EU programmes ranging from 64% to 77%.

Figure 56 – Outward credit mobility by type of mobility scheme, ISCED 5-8, 2018



Source: Eurostat, UOE. Online data code: [educ_uoe_mobc01]. Data extracted on 5 June 2020.

Note: 'Other programmes' includes the categories 'international/national programmes' and 'other programmes', as reported by Eurostat. Values are the sum of the ISCED levels available for each country. The EU value is the sum of the available EU countries. No data is available for IE and SK. Data for BG NL and SI (ISCED 5) are estimates, and the definition differs for Belgium DE and EE (see Eurostat metadata). Countries are ordered by increasing prevalence of EU programmes These data by type of mobility scheme refer to all credit-mobile graduates, not only those who were not degree mobile. Therefore, they do not correspond to the credit mobility component used in the estimation of the target.

2.7.2 Inward mobility

In 2018, the highest rates of inward degree-mobile graduates were recorded in Luxembourg (24.2%), the Netherlands (18.8%), Austria (16.0%) and Denmark (15.1%) (Figure 57). Values between 10% and 15% were present in Ireland (14.6%), Belgium (12.7%), Czechia (12.4%), Estonia (11.7%), France (10.6%) and Sweden (10.3%). The rate of inward degree-mobile graduates is below 10% in the remaining Member States, with rates of 5% or lower recorded in nine countries (Figure 57).

At the EU level, the rate of inward degree-mobile graduates increases with the level of educational attainment: short-cycle (ISCED 5) has a rate of 2.4%[138]; bachelor's level (ISCED 6) has a rate of 5.0%; master's level (ISCED 7) has a rate of 12.9%; and PhD level (ISCED 8) has a rate of 20.8%. In 17 countries, the highest inward degree mobility rate is at ISCED level 8[139], while seven countries have the highest rate at ISCED level 7[140]. Only one country has the highest inward degree mobility rate at ISCED level 6, Greece, while two countries have the highest rate at ISCED level 5, Cyprus and Malta. At ISCED level 8, Luxembourg is in an atypical situation where the inward degree mobility is higher than 100%. This is due to the peculiarity of the country, which attracts more inward degree-mobile PhD students than the number of PhD graduates with origin in the country.

138 This level is not applicable for BG, EE, EL, LT, PL, RO and FI.

139 BE, BG, CZ, DK, DE, IE, FR, HR, IT, LU, NL, AT, PT, SI, SK, FI and SE. The inward degree mobility rate for ISCED level 8 is unavailable for ES.

140 EE, ES, LV, LT, HU, PL and RO.

European Commission

Figure 57 – Inward degree mobility rates for tertiary education graduates by level of education and origin, 2018

	Inward degree mobility rate					Inward mobile graduates	
	ISCED 5-8	ISCED 5	ISCED 6	ISCED 7	ISCED 8	ISCED 5-8	ISCED 5-8 (from EU)
	%	%	%	%	%	N	%
EU27	7.8	2.4	5.0	12.9	20.8	301 661	30.3
BE	12.7	0.0	7.5	20.5	71.2	13 659	42.5
BG	3.2	n.a.	2.2	4.4	6.7	1 842(e)	35.4
CZ	12.4	2.0	11.3	13.6	19.1	8 805	64.6
DK	15.1	19.2	8.0	25.1	55.4	10 891	66.9
DE	9.0	0.0	4.5	14.6	21.0	48 990	25.6
EE[1]	11.7	n.a.	6.3	21.7	15.7	1 041	36.9
IE[1]	14.6	4.0	12.1	26.2	27.9	11 285(d)	15.1
EL	1.6	n.a.	2.3	0.5	0.9	1 273	55.3
ES	4.6	1.2	1.3[1]	13.7[1]	:[1]	20 754	26.5
FR[4]	10.6	2.7	8.1	18.0	52.6	78 837	14.0
HR	2.4	0.0	1.8	2.7	9.4	824	14.1
IT[2]	5.2	5.4	4.6	5.6	10.6	20 591	19.9
CY	9.0	17.3	9.2	7.5	4.0	1 115	61.0
LV	5.7	0.7	4.7	11.7	7.1	892	28.9
LT	3.7	n.a.	2.2	8.0	2.9	1 028	15.0
LU	24.2	31.1	6.6	42.8	135.6	847	71.9
HU[2]	7.4	0.9	4.5	14.6	11.0	4 680	36.1
MT	8.9	15.2	4.6	14.4	11.4	371	24.3
NL	18.8	0.0	11.2	36.0	59.8[3]	25 822	56.9
AT	16.0	0.3	19.5	27.8	38.6	12 206	74.2
PL	2.3	n.a.	1.9	3.1	1.8	10 713(e)	14.1
PT	6.1	2.0	2.8	11.4	28.1	4 744	21.0
RO	4.1	n.a.	2.5	6.4	5.9	5 271	22.5
SI[1]	3.3	1.1	2.3	5.4	7.9	560	:
SK[2]	5.0	0.4	4.9	5.2	7.0	2 495	65.7
FI	8.6	n.a.	5.5	12.9	38.3	4 744	17.5
SE[5]	10.3	0.1	2.3	21.8	53.3	7 381	33.3

Source: Eurostat, UOE, and OECD. Online data codes: [educ_uoe_grad01] and [educ_uoe_mobg02] and [educ_uoe_mobc01] for graduates and degree-mobile graduates in the EU, EFTA, EEA and candidate countries. Special extraction from the OECD of international graduate data for degree-mobile graduates of EU origin who graduated in non-European countries (Australia, Canada, Chile, Colombia, Israel, Japan, Korea, New Zealand, Brazil and Russia). Eurostat, UOE, data extracted on 5 June 2020 and OECD data on 11 May 2020.

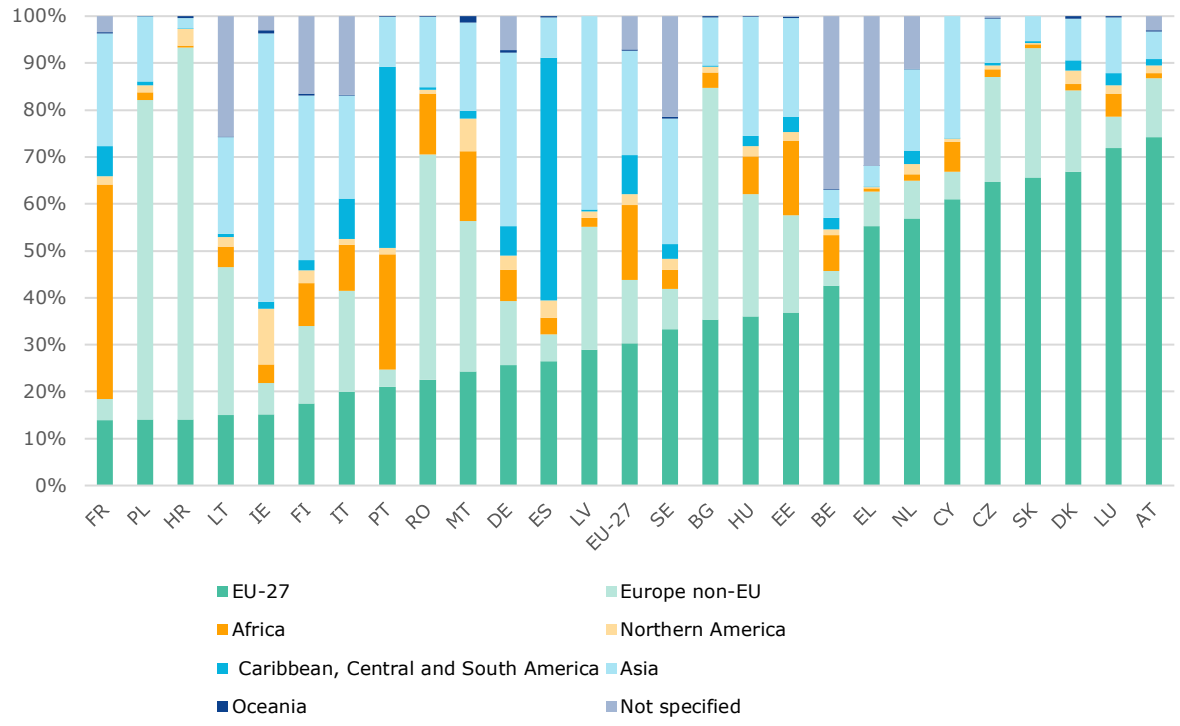
Note: The inward degree mobility rate in country X is calculated as (inward degree-mobile graduates in country X / graduates originating in country X). Graduates originating in country X is calculated as (total graduates in country X – inward mobile graduates from any other country to country X + outward mobile graduates from country X to any other country). The inward mobility rate for the EU is calculated as (inward degree-mobile graduates in the EU / graduates originating in the EU). The number of graduates originating in the EU is calculated as (number of graduates in the EU – inward degree-mobile graduates from non-EU countries to the EU + outward degree-mobile graduates from the EU to non-EU countries). No information is available for ES (ISCED 8). Country of origin is defined as country of prior education or upper secondary diploma. Inward-degree mobility data is not available for SI disaggregated by country of origin. (1) country of origin identified by country of usual residence; (2) country of origin identified by country of citizenship; (3) country estimations; (4) country of upper secondary diploma or country of citizenship; (5) international students are defined as students who have a student residence permit or are either non-residents or have moved to Sweden not more than six months before starting their studies. For students at ISCED 8 the time limit is 24 months. Students with student residence permit are reported by country of citizenship while other students are reported by country of birth. Homecoming nationals are reported as national students. e: estimated. d: definition differs, see Eurostat metadata.

Figure 58 presents inward degree-mobile graduates across the EU by area of origin, distinguishing between the EU and the main macro-areas outside the EU. Overall, 30.3% of inward degree-mobile graduates to the EU originate in the EU, followed by graduates originating in Asia (22.2%), Africa (15.9%) and non-EU European countries (13.5%). Intra-EU degree mobility accounts for less than

50% of the inward degree mobility in 18 countries[141]. In France (14.0%), Poland (14.1%) and Croatia (14.1%), less than 15% of the inward degree-mobile graduates originate in another Member State. This is in contrast to Austria (74.2%), Luxembourg (71.9%) and Denmark (66.9%), where two out of three inward degree-mobile graduates originate in the EU.

Historical ties are important for explaining mobility patterns between countries. This is clear in the case of Spain and Portugal, where, respectively, 51.7% and 38.5% of the inward degree-mobile graduates come from the Caribbean, Central America and South America (Figure 58). Geographical proximity and common language are two other important factors. In Belgium, 19.8% of the degree-mobile graduates come from France, and, similarly, 43.6% of the graduates in Austria come from Germany. In Czechia, 57.6% of the inward degree-mobile graduates originate in Slovakia, while 47.2% of the inward degree-mobile graduates in Slovakia originate in Czechia. High mobility from non-EU countries may also be driven by geographical proximity, as in Poland, where 53.0% of the inward degree-mobile graduates come from Ukraine, and in Croatia, where 70.6% of the inward degree-mobile graduates come from Bosnia and Herzegovina.

Figure 58 – Inward degree-mobile graduates (ISCED 5-8) by area of origin, 2018



Source: Source: Eurostat, UOE. Online data code: [educ_uoe_mobg02]. Data extracted on 5 June 2020.

Note: Country of origin is defined as country of prior education or upper secondary diploma. Exceptions include EE, IE, ES (ISCED 6-8) and SI (country of origin identified by country of usual residence); IT, HU and SK (country of origin identified by country of citizenship); and NL (ISCED 8) (country estimations). In FR country of upper secondary diploma or the country of citizenship is used. In SE, international students are defined as students who have a student residence permit or are either non-residents or have moved to Sweden not more than six months before starting their studies. For students at ISCED 8 the time limit is 24 months. Students with student residence permit are reported by country of citizenship while other students are reported by country of birth. Homecoming nationals are reported as national students. Inward-degree mobility data is not available for SI disaggregated by country of origin. The shares are calculated based on the available ISCED levels for ES (missing ISCED 8). Data for BG and NL are estimates, and the definition differs for IE (see Eurostat metadata). The EU shares are calculated based on the available countries. Countries are ordered by increasing shares of EU mobile graduates in the total number of mobile graduates in the country.

141 BE, BG, DE, EE, IE, ES, FR, HR, IT, LV, LT, HU, MT, PL, PT, RO, FI and SE.

2.7.3 Recent policy responses

Although mobility in higher education is being increasingly recognised, obstacles hindering the free movement of students are still present in the form of economic, administrative and linguistic barriers. In a 2011 Council Recommendation promoting learning mobility, Member States were encouraged to implement structural reforms to create a positive learning environment for all students[142]. The Recommendation also provides a framework for Member States to monitor progress in this area and for the European Commission and the Eurydice network to gather national data and compile it into a 'mobility scoreboard'.[143].

Limited access to funding is one of the main obstacles to mobility, and consequently the portability of domestic support (grants and/or loans) can be a major factor in a student's decision to study abroad. Portability can be differentiated between portability for credit mobility and portability for degree mobility. Degree portability is the extent to which students can take domestic support to pursue a full degree abroad, whereas credit portability is the extent to which students can take domestic support to pursue study visits abroad that lead to credits in the framework of a home country programme[144].

In 2018/2019, portability of public support measures for the first and second cycle was more widespread for credit mobility than degree mobility. Within the EU, 14 education systems (the Flemish and German communities of Belgium, Denmark, Germany, Ireland, France, Cyprus, Luxembourg, Malta, the Netherlands, Austria, Slovenia, Finland and Sweden) guarantee portability for both credit and degree mobility within the European Higher Education Area (EHEA)[145]. An additional 12 education systems (Czechia, Estonia, Spain, Croatia, Italy, Latvia, Lithuania, Hungary, Poland, Portugal, Romania and Slovakia) provide portability of public support for credit mobility only[146]. Most Member States apply some restrictions, whether geographical (e.g. Germany limits degree portability to the EU and Switzerland) or scheme-based (e.g. Greece, Spain, Latvia, Lithuania and Portugal only allow portability of grants to programme exchanges with recognised schemes such as Erasmus+ for example. In Lithuania, this is also the case for loans).

Availability of public support for learning mobility has a particular impact on students from disadvantaged socio-economic backgrounds and students with disabilities, who have been identified as less likely to participate in such activities[147]. All Member States but one (Bulgaria) provide targeted mobility grants, needs-based portable grants or universal portable grants to disadvantaged learners[148]. Since the release of the previous mobility scoreboard background report in 2016[149], several countries have introduced new measures. Romania introduced new legislation in 2017 making the portability of need-based grants possible for credit mobility. Additional need-based grants have been introduced on top of Erasmus+ grants in Latvia and Slovenia.

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142 Council Recommendation of 28 June 2011 on 'Youth on the move' – promoting the learning mobility of young people, OJ C199, 7.7.2011, C199/4.

143 The data on policy measures in this section is mainly taken from European Commission/EACEA/Eurydice (2020). Mobility Scoreboard: Higher Education Background Report 2018/19.

144 European Commission/EACEA/Eurydice (2020). Mobility Scoreboard: Higher Education Background Report 2018/19.

145 The European Higher Education Area (EHEA) is an international collaboration on higher education, encompassing 48 countries and the European Commission.

146 Estonia, Latvia, Hungary and Slovakia provide publicly subsidised loans that are portable for both credit and degree mobility. In addition, Estonia allows portability for both credit mobility and degree mobility for two grant schemes: needs-based study allowance and scholarships for students with special needs.

147 Hauschildt, K., Vögtle, E.M. and Gwosć, C., (2018). Social and Economic Conditions of Student Life in Europe. Eurostudent VI 2016-2018: Synopsis of Indicators. Edited by DZHW (German Centre for Higher Education Research and Science Studies. Bielefeld: W. Bertelsmann Verlag; European Commission, 2019. Studying abroad - benefits and unequal uptake. Science for Policy Briefs, Joint Research Centre.

148 The definition of what constitutes a disadvantaged learner has been expanded to include both students from low socio-economic backgrounds and students with disabilities for the 2020 edition of the mobility scoreboard. This is the same as the approach taken in the Bologna Process Implementation Report.

149 European Commission/EACEA/Eurydice (2016). Mobility Scoreboard: Higher Education Background Report.

To provide the right support for disadvantaged students, information on the extent to which different groups participate in learning mobility is key. Although all countries participating in the Erasmus+ programme are required to monitor participation for this specific programme, there are some countries that go beyond this obligation. Six education systems already had comprehensive monitoring practices across all major mobility programmes in 2015/2016 (French and Flemish communities of Belgium, France, Germany, Austria and Italy).

Additional policy measures supporting learning mobility include foreign language education and automatic recognition of qualifications and the outcomes of learning periods abroad. Foreign language preparation is considered in Chapter 3.1 of this report. Automatic mutual recognition is the right for: (i) the holder of a qualification of a certain level issued by one country to be considered for entry to a higher education programme at the next level in another country, without having to go through a separate recognition procedure; or (ii) a person who has completed a mobility period abroad to have their learning outcomes recognised without having to go through a separate recognition procedure. The automatic recognition of qualifications and the outcomes of learning periods abroad is particularly important, as it is a necessary precondition for large-scale mobility. At present, eight Member States (Denmark, Germany, France, Italy, Malta, Poland, Finland and Sweden) report that they operate on the basis of automatic recognition of degrees issued in all other EHEA countries. A further 15 education systems in Member States report that they have automatic recognition for some of these countries[150].

2.8 How has BREXIT changed the EU performance on the ET2020 indicators?

United Kingdom's departure from the EU has changed the aggregate EU performance on the six Europe 2020 and ET2020 benchmarks only slightly. Below is a summary table of these changes. The column 'EU-28' shows a score with the United Kingdom. The numbers in bold show a better result. For example, in tertiary educational attainment, the EU-27 has only 40.3% of tertiary diploma holders which means a 1.3 percentage point decrease compared to the EU-28 with the United Kingdom. Yet overall, Brexit has not substantially affected the evaluation of EU's performance over the past decade.

Figure 59 – Comparison of EU performance on the ET2020 targets before and after BREXIT

	EU27	EU28
Early school leavers (2019)	**10.2**	10.3
Tertiary education (2019)	40.3	**41.6**
Early childhood education (2018)	**94.8**	95.3
Underachievers – reading (2018)	22.5	**21.7**
Underachievers – maths (2018)	22.9	**22.4**
Underachievers – science (2018)	**22.3**	21.6
Employment rate of recent graduates (2019)	80.9	**81.5**
Adult education (2019)	10.8	**11.3**

Source: Eurostat, online data codes: [sdg_04_10], [sdg_04_20], [sdg_04_30], [sdg_04_40] [sdg_04_50] and [sdg_04_60].

Note: Numbers in bold denote better performance.

150 BE (fl), BE (fr), BE (de), CZ, EE, LV, LT, LU, HU, NL, PT, RO and SK.

Part 3

Thematic chapters on current policy issues

3 Thematic chapters on current policy issues

3.1 Multilingualism and education in Europe

Key findings

Linguistic diversity is a defining feature of European culture and should be protected and cherished. Being able to understand and use several languages is essential for cross-border communication, creating a European identity, intra-EU mobility and – in broader terms – opening up opportunities for ourselves in a globalised world. The EU faces the challenge of integrating newly arrived migrants and refugees. Supporting their acquisition of the host country's language(s) is an essential part of the integration process. Currently no common test of foreign language skills exists at European or international level. It is therefore not possible to assess the current state of knowledge of foreign languages among EU pupils or the general population.

Europe is home to many languages, and upholding linguistic diversity is one of the EU's core principles. 66 languages have an official status in national systems[151], and the European linguistic landscape includes many more languages that matter in societies and communities. Language learning is indispensable in facilitating mutual understanding, respect and dialogue both within and beyond Europe. Multilingualism is complex, and the challenge lies in finding appropriate responses to multilingual situations in education. National, regional or minority and migrant languages all contribute to shaping societal multilingualism, and all students should be provided with opportunities to succeed academically, develop language skills, and sustain their cultural and linguistic heritage. To that end, the Council has adopted a comprehensive approach to teaching and learning languages[152] with a vision to develop a trilingual language profile that helps strengthen awareness of European cultural and linguistic heritage and diversity[153]. According to this Council Recommendation, students should be fluent in their first school language, as well as another European language, and be confident in a third language by the end of upper secondary school. This can be achieved through a relevant mix of promoting the language of the school in question, teaching foreign languages and helping students maintain their native language(s). While mainstream school systems have been heavily influenced by monolingual views and ways of implementing language learning programmes, attention has more recently turned to introducing inclusive, innovative multilingual approaches to language education[154]. This involves: (i) valuing and mobilising students' linguistic repertoires in the learning process; (ii) taking individual needs into account by truly engaging with multilingual learners (including minority and migrant students); and (iii) fostering metalinguistic awareness is fostered by building on learners' 'plurilingual' repertoires[155].

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151 European Commission/EACEA/Eurydice (2017). Key Data on Teaching Languages at School in Europe – 2017 Edition. An Eurydice report.

152 Council Recommendation of 22 May 2019 on a comprehensive approach to the teaching and learning of languages, OJ C 189, 5.6.2019.

153 European Council Conclusions of 14 December 2017.

154 May, S. (2014). The multilingual turn: Implications for SLA, TESOL and bilingual education. New York, London: Routledge.

Busch, B. (2011). Trends and innovative practices in multilingual education in Europe: An overview. International Review of Education, 57, 541-549.

Meierkord, A. & Day, L. (2017). Rethinking language education and linguistic diversity in schools. A report for the European Commission.

155 Cenoz, J., and D. Gorter 2013. Towards a Plurilingual Approach in English Language Teaching: Softening the Boundaries Between Languages. Tesol Quarterly, 47(3), 591-599.

In schools, multilingual teaching methods can take varied forms such as language awareness, mutual comprehension, linguistically-responsible teaching, language portfolios, content and language integrated learning (CLIL), and 'translanguaging'[156]. The European Commission proposes to transversally apply the concepts of literacy and language awareness to all subjects. Language awareness in this context means consciously teaching the language of schooling and supporting literacy across the whole curriculum, while supporting the maintenance of ethnic-minority languages, and several other languages that the student population brings to school[157]. Using an inclusive multilingual framework, schools are recommended to actively support multilingualism[158] to achieve the goals of: (i) succeeding in the language of schooling; (ii) be confident in three languages; and (iii) sustaining and respecting the linguistic and cultural diversity that shapes Europe.

3.1.1 Teaching foreign languages at school

Learning foreign languages is a common practice in European schools. According to Eurydice[159], an average of 83.7% students studied at least one foreign language in primary school. Although in most countries more than half of the students studied at least one foreign language in primary school, learning a second foreign language was much less prominent, except for Luxembourg.

In 2016, the year of the latest available data, 80.7% of primary students were learning English as their first foreign language while only 3.3% were learning French, 3.1% German and 0.5% Spanish. Among lower secondary students, as many as 96.3% were learning English, 26.9% French, 16.8% German and 12.7% Spanish. Yet these numbers decrease among the upper secondary students (general and vocational combined): 86.5% for English, 15.7% for French, 15.1% for German (higher for Spanish: 14.2%).

Despite the fact that teaching a foreign language usually starts in primary school in Europe, and that many countries also introduce a second foreign language, in the 2011 European Survey on Language Competence[160] only 42% of students reached independent user (B1 + B2) level in their first foreign language. Even less (25%) attained the same in their second foreign language. Even though changes have been introduced in language education systems in some countries since 2011, these results indicate the need to continue to find motivating, engaging and effective language learning methods for all students.

156 Meier, G. (2014). Our Mother Tongue is Plurilingualism: A Framework of Orientations for Integrated Multilingual Curricula. In J. Conteh, & G. Meier (Eds.) The Multilingual Turn in Languages Education (132-157) Bristol: Multilingual Matters.

Herzog-Punzenberger, B., Le Pichon-Vorstman, E., Siarova, H. (2017). Multilingual Education in the Light of Diversity: Lessons Learned, A NESET II report.

157 European Commission (2018). Accompanying document to the Proposal for a Council Recommendation on a comprehensive approach to the teaching and learning of languages.

158 Herzog-Punzenberger, B., Le Pichon-Vorstman, E., Siarova, H. (2017). Multilingual Education in the Light of Diversity: Lessons Learned, A NESET II report prepared for DG EAC.

159 European Commission/EACEA/Eurydice (2017). Key Data on Teaching Languages at School in Europe – 2017 Edition. A Eurydice Report.

160 European Commission (2011). First European Survey on Language Competence. Executive Summary.

Box 16 – Accelerative integrated method of foreign language teaching[161]

The accelerative integrated method (AIM) was originally developed by Maxwell (2011) in Canada, and empirically validated for teaching French as a foreign language in Canada and in the Netherlands. It is a fun way to teach foreign languages authentically and combines storytelling with gestures, active collaboration and repetition. The method is used for primary aged children, and has so far been used to teach English, French, Spanish and Mandarin. The programme starts with introducing a short story, a fairy tale or narrative about a topic children can relate to. Then the following steps are taken (extract):

- Step 1: The teacher asks short questions, the children repeat the answers and rehearse the accompanying gestures at a fast pace, very actively and playfully.
- Step 2: The teacher continues telling the story with visuals and gestures. Segments of the story are used to practice vocabulary and learn meaning in a playful way.
- Step 3: Students work in small groups to practice the meaning and gestures associated with the segment. Activities can include word puzzles or 'fill in the gap' exercises, singing and dancing, playing vocabulary bingo and so on. For the first 6 months, students listen to the story in segments and practice the accompanying gestures until they know the whole piece by heart and they are ready to perform. After 6 months, the teacher also introduces writing activities with the story.

3.1.2 Regional or minority languages in the light of multilingualism

Regional or minority languages are part of Europe's linguistic diversity. These are languages that have historically been used in a defined territory within a state by nationals who form a smaller group than the rest of the state[162]. Examples include Frisian in the Netherlands, Sami in Finland, Sorbian in Germany and Mirandes in Portugal, but there are many more. There are also non-territorial languages – languages that at some point in history may have been associated with a region, but that can no longer be directly linked to any particular region[163]. The European Charter of Regional or Minority Languages legally protects and promotes minority or regional languages in Europe, and promotes the right of pupils to study regional or minority languages. Educational policy documents across Europe refer to more than 60 regional or minority languages[164]. The provision of education opportunities for these languages differs across the Member States. Some teach these languages as separate subjects - for example Frisian in the Netherlands. Other countries teach some or all subjects in the regional or minority language - for example in Danish and Sorbian schools in Germany. Other initiatives in schools are related to promote regional or minority languages in society in general. In regions where minority or regional languages are spoken, they usually interact not only with other (dominant) national languages, but also with global foreign languages. To enable an integrated multilingual environment where all languages are equally valued, some regions have developed a trilingual model - for example, the Basque region or Catalonia in Spain.

161 Malpat, A. R. & Verspoor, M. in Le Pichon-Vorstman, Siarova, H., and Szonyi, E. (2019). The future of language education in Europe: case studies of innovative practices.

162 Council of Europe (1992). The European Charter for Regional or Minority Languages (ECRML). European Treaty Series – No. 148.

163 Ibid.

164 European Commission/EACEA/Eurydice (2019). The Teaching of Regional or Minority Languages in Schools in Europe. An Eurydice Report.

Box 17 – Trilingual language portfolio KAJPATAJ and KLEPETO (Austria)[165]

The trilingual language portfolios KAJPATAJ in Carinthia and KLEPETO in Burgenland were developed in Austria. KAJPATAJ and KLEPETO combine the importance of maintaining minority languages Slovene, Hungarian and Burgenland Croatian, by focusing on bilingualism. In Carinthia the language repertoire has been extended by Italian, which is also important given the proximity of the bordering country. KAJPATAJ and KLEPETO are designed for primary and lower secondary students, enabling them to monitor and register their language development in German, Slovene and Italian as well as in German, Hungarian and Burgenland Croatian over the course of 8 years.

3.1.3 Migration and multilingualism

The vulnerabilities of migrant students usually arise due to marginalisation in school life, barriers in accessing the school curriculum. Migrant languages are also insufficiently valued in school and society. However, the principles of inclusive multilingualism recognises all languages as valuable sources of knowledge and learning, even if they are not formally part of national legislation or school curricula. Keeping these values in mind, coupled with the Council recommendation to be proficient in the language of schooling and two other languages, European schools are challenged to develop means and opportunities for all to be meaningfully included in curricula and school life, leading to school success. In PISA 2018[166], migrant students perform significantly worse than their non-migrant peers (except for in Croatia, Latvia, Malta and Cyprus). This raises questions for education systems on how to best support migrant students in learning the language of schooling. Across Europe, teaching the language of schooling is organised in several different ways: in separate preparatory classes; in additional classes alongside mainstream classes; through language support in mainstream classes; or a combination of these[167]. Effective integration of migrant students starts with an initial reception period where students' language skills are mapped, and the right decisions are made according to what kind of instruction students will receive (which class and learning path they will be placed in with what kind of support measures)[168]. If students are admitted to preparatory classes (a frequent practice in about half of European countries), it is important to restrict it to a certain time period and combine it with extra support so that students can move to mainstream classes as soon as possible. Being integrated in mainstream classes does not mean that language support should stop. Providing in-class support for developing academic subject-specific knowledge is crucial, and can be achieved by implementing a range of multilingual teaching methods, as well as utilising digital tools. At the same time, it is important to maintain students' home languages by providing them with instruction in their home language, and allowing them to speak it at school. Although most Member States have policies to support the development of the language of schooling, this is not the case for the teaching of home languages, with some exceptions[169].

165 Austrian Federal Ministry of Education, Science and Research.

166 European Commission (2019). PISA 2018 and the EU: Striving for social fairness through education.

167 European Commission/EACEA/Eurydice (2019). Integrating Students from Migrant Backgrounds into Schools in Europe: National Policies and Measures. An Eurydice Report.

168 Staring, F., and Meierkord, A. (2018). Migrants in European schools: learning and maintaining languages. A report for the European Commission.

169 Ibid.

Box 18 – Integration of recently-arrived migrant children in Greece

To better integrate recently-arrived migrant children into education, Greece has created the role of refugee education coordinators. The coordinators are permanent teachers seconded to refugee accommodation centres, towns and cities to oversee and ensure children's access to education. They help the children and their families navigate everyday school life and bring various actors together. Their tasks include (i) informing parents about enrolment in public school and its importance; (ii) registering children living in refugee accommodation centres or urban accommodation including all necessary documents for their enrolment; (iii) coordinating and ensuring safe transport of children; (iv) cooperating with multiple actors, including school directors, directors of education, school advisors, association of parents, NGOs, local authorities, refugee accommodation centre managers; (v) mediating between schools and parents to solve issues regarding the schooling of students. Since the 2016/2017 school year, the Ministry of Education and Religious Affairs has implemented an emergency action plan for the education of refugee children. Its main objective is to ensure the psychosocial support and integration of all refugee children into the Greek educational system, following a preparatory, transitional period.

Source: Refugee Education Project-Scientific Committee of the Ministry of Education, Research and Religious Affairs (2017), Assessment Report on the Integration Project of Refugee Children in Education.

3.1.4 Teachers and multilingualism

Teachers are important actors in supporting student learning and promoting multilingual education. In some countries such as Austria, Belgium, Bulgaria, Finland, Portugal and Sweden, teachers increasingly work in schools where more than 10% of students have a different first language than the language of schooling.[170] In many large cities this proportion can far exceed 50%. However, countries such as Slovakia, Slovenia or Spain show the opposite trend[171]. Regardless of how proficient students are in the language of schooling, all teachers can be regarded as language teachers and need effective support to feel comfortable and satisfied in their profession also when it comes to multilingualism. According to a European Commission report[172], teachers believe that teacher education should help them to better support students who are not proficient in the language of schooling in the classroom. Teachers also feel strongly that initial teacher education should include and upgrade this element of training for contemporary multilingual classrooms. Establishing networks, informal learning and continuous professional development in specialised centres is also considered beneficial. Yet, preservice teachers often still feel unprepared to teach in multilingual environments, and practicing teachers also express concerns of feeling alone in coming up with pedagogical solutions. Sound training on multilingual pedagogies, more collaboration with local communities and speakers of languages, as well as a whole-school approach for teacher learning and supportive leadership could help to navigate these dilemmas[173].

170 OECD TALIS 2008 and 2018. (I.3.29) Online Tables.

171 OECD (2019). TALIS 2018 Results. Teachers and School Leaders as Lifelong Leaders. OECD Publishing: Paris.

172 European Commission (2015). Language teaching and learning in multilingual classrooms.

173 Herzog-Punzenberger, B., Le Pichon-Vorstman, E., Siarova, H. (2017). Multilingual Education in the Light of Diversity: Lessons Learned, A NESET II report.

Box 19 – DivEd, a language awareness project[174] (Finland)

DivEd is a project in Finland, funded by the Finnish Ministry of Culture. It is a response to the 2004 curricular reform in Finland that introduce language awareness and cultural responsiveness. The project brings together the Universities of Turku, Tampere, Oulu, Lapland and Åbo Akademi (Swedish), as well as two Universities of Applied Science – DIAK in Helsinki and HAMK in Hämeenlinna. The main aims is to better prepare teachers to work in linguistically - and culturally - diverse classrooms by: (i) developing and strengthening culturally - and linguistically - responsive pedagogy across Finland; (ii) increasing awareness among teacher educators; (iii) being at the forefront of transforming teacher education curricula; and (iv) providing specific training to in-service teachers.

Technology can also support teachers' work to promote multilingualism and students' to develop plurilingual competence. Computer assisted language learning (CALL) can greatly benefit all learners. The European Commission recommends[175] using digital resources to get students familiarised with the ways languages are used in real life (for example, videos, pod-casts, web-casts, flash-animations, etc.), to interact with speakers of other languages on digital platforms (computer-mediated communication, social media, video/voice conferencing), to learn phonetics, pronunciation, vocabulary and so on by using digital language learning tools, to sign up for virtual learning environments and telecommunication platforms, and play digital games. Technology can be a useful promoter of language learning for all students, either for learning the language of schooling, foreign languages, translating services or providing language support in home languages.

Box 20 – E-Validiv, taking advantage of language diversity (Belgium)

This computer-based learning environment was created in Belgium as part of the Valorising Linguistic Diversity in Multiple Contexts of Primary Education project. It aims to teach a wide range of subject content within science education. It is accessible in two languages: Dutch (the language of schooling in Flanders) and a choice between English, French, Italian, Polish, Spanish and Turkish.

3.2 Investment in education

Key findings

In 2015-2018, public spending on education in EU Member States measured as the share of total public expenditure was fairly steady at around 9.9%. However, the share of public spending on education varied considerably between countries.

When broken down by education level, spending in EU countries also varies considerably in how much each country spends at different education levels. This reflects different political priorities but also the organisational or institutional setup in individual countries. One factor that can affect this is the growing size of the private education sector and the trend of increasing public subsidies for private schools. This is particularly evident in some countries.

In 2015-2018, spending for the pre-primary and primary level increased in almost all EU countries. Countries also saw a slight increase in spending at the secondary and post-secondary (non-

174 Source: http://dived.fi/

175 European Commission (2018). Accompanying document to the Proposal for a Council Recommendation on a comprehensive approach to the teaching and learning of languages.

tertiary) levels. At the tertiary level, spending has actually decreased slightly. Variations between countries in spending on tertiary education can partly be explained by the amount of private funding which varies considerably between EU countries.

Most EU countries saw an increase in the number of students in 2013-2018. The increase primarily affected the pre-primary and primary levels, whereas most countries did not witness an increase at the secondary/post-secondary and tertiary levels. The change in student numbers at different education levels is somewhat correlated with changes in spending at these education levels. Shifting population patterns of ageing and migration may explain some of the variation in the number of students in different countries in 2013-2018.

Investing in education contributes to economic growth and social inclusion. Quality investment in education improves productivity and competitiveness, boosts employability and strengthens innovation capacity. A well-educated population tends to be healthier and to adopt more environmentally-friendly behaviours. Education is important for fighting economic inequality and the transmission of inequality across generations. Literature on education and economic growth shows that the quality of schooling in a country is a powerful predictor of the wealth produced by that country will produce in the long run[176].

The recent school closures in most EU-countries due to COVID-19 therefore represent an economic and social loss due to lost learning, which impacts both the individual and society as a whole[177]. Studies based on previous cases of learning losses indicates that the consequences of these 'learning gaps' may be detected throughout the entire lifetime of the students affected[178]. There is also concern that an economic recession following COVID-19 will lead to cuts in public spending, including in the education sector, intensifying the negative consequences of COVID-19 on students' education.

This chapter looks at trends in education expenditure in the EU, covering spending for different education levels and the associated drivers, such as teachers' salaries and demographic changes. It is important to acknowledge that increasing public spending in education does not automatically lead to better education outcomes. At comparable levels of spending, some Member States achieve better results than others. This demonstrates the critical importance of increasing efficiency and effectiveness of public spending in education.

3.2.1 Overview of spending in education

This chapter will analyse public spending on education using different indicators that measure if from the following perspectives:

- **Public expenditure on education as a percentage of GDP** is the absolute public investment in education relative to a country's entire production.
- **Public expenditure on education as a percentage of total public expenditure** measures the funding to education compared to other areas of public spending.
- **The real change in year-on-year expenditure** shows by what percentage overall spending has changed compared to the previous year, adjusted for inflation.
- **Expenditure per student** is calculated by dividing total expenditure at each education level by the number of (full-time equivalent) students enrolled in the corresponding level of education.

176 OECD (2015). Universal Basic Skills: What Countries Stand to Gain.

177 https://www.brookings.edu/blog/education-plus-development/2020/04/29/the-covid-19-cost-of-school-closures/

178 https://uh.edu/~adkugler/Ichino%26Winter-Ebmer.pdf

EU Member States invested 4.6% of total GDP on education in 2018. That is a small drop compared to 2015 when the proportion was 4.8% (see Figure 60). Note that in the same period, GDP grew by between 2.1 and 2.7%.

As a share of total public expenditure, average public spending on education in the EU was fairly steady at around 9.9% between 2015 and 2018. However, the proportion varied considerably between countries (between 8.2% and 15.8% in 2018). In 2015-2018, 14 out of 27 Member States increased their share of public spending on education. Historically however, spending on education varies with economic cycles and general government spending. For example, in 2009-2011 education spending decreased in many countries worldwide decreased as a result of the economic crisis back then[179].

Figure 60 – Public expenditure on education, 2015-2018

	Year-on-year real change (%)				Share of total public expenditure (%)				Share of GDP (%)			
	2015	2016	2017	2018	2015	2016	2017	2018	2015	2016	2017	2018
EU27	0.7	0.5	1.4	1.8	9.9	10.0	9.9	9.9	4.8	4.7	4.6	4.6
BE	2.0	-0.2	2.7	1.2	11.7	11.7	12.0	11.9	6.3	6.2	6.2	6.2
BG	0.4	-10.1	7.3	2.7	9.8	9.8	10.1	9.7	3.9	3.4	3.5	3.5
CZ	2.4	-6.3	-1.2	19.1	11.8	11.3	10.6	11.4	4.9	4.5	4.1	4.6
DK	0.6	0.3	-2.6	1.3	12.9	12.9	12.6	12.6	7.0	6.8	6.5	6.4
DE	-1.2	1.2	1.6	3.0	9.5	9.4	9.3	9.4	4.2	4.1	4.1	4.2
EE	9.1	-1.0	6.2	13.8	15.0	14.4	14.5	15.8	5.9	5.7	5.7	6.2
IE	-4.7	4.9	4.4	7.4	11.4	12.0	12.3	12.6	3.3	3.3	3.2	3.2
EL	-4.4	-4.7	-1.8	4.0	7.7	8.0	8.0	8.3	4.1	3.9	3.8	3.9
ES	3.8	1.8	1.1	P	9.4	9.6	9.7	P	4.1	4.1	4.0	P
FR	0.3	0.4	P	P	9.6	9.6	P	P	5.4	5.4	P	P
HR	P	P	P	P	P	P	P	P	P	P	P	P
IT	-0.3	-1.2	1.5	2.4	7.9	8.0	8.0	8.2	4.0	3.9	3.9	4.0
CY	4.2	4.0	1.0	2.5	13.9	14.6	14.4	12.0	5.6	5.5	5.3	5.2
LV	3.4	-5.9	10.2	4.9	15.6	14.8	15.3	15.1	5.9	5.5	5.8	5.8
LT	2.8	-3.5	-0.9	4.2	14.5	14.0	13.7	13.4	5.1	4.8	4.5	4.6
LU	3.1	0.3	3.9	4.2	11.2	11.0	10.9	11.0	4.6	4.5	4.5	4.6
HU	3.6	-2.6	7.5	1.9	10.3	10.6	10.9	11.0	5.2	5.0	5.1	5.1
MT	6.2	4.5	0.8	13.2	13.3	14.3	13.8	14.2	5.3	5.2	4.9	5.2
NL	0.6	1.8	1.1	2.0	11.7	12.0	12.1	12.1	5.2	5.2	5.1	5.1
AT	0.9	1.5	1.2	1.2	9.6	9.8	9.8	9.8	4.9	4.9	4.8	4.8
PL	4.3	-6.9	6.1	7.4	12.7	12.1	11.9	12.0	5.3	5.0	4.9	5.0
PT	-2.6	-4.2	-0.6	1.6	10.5	10.7	10.1	10.5	5.1	4.8	4.6	4.5
RO	6.3	11.9	-9.4	14.0	8.5	9.6	8.5	9.1	3.1	3.3	2.8	3.2
SI	-4.7	2.7	2.4	3.6	11.5	12.0	12.3	12.4	5.6	5.6	5.4	5.4
SK	8.4	-5.6	4.0	5.8	9.1	9.0	9.4	9.5	4.2	3.9	3.9	4.0
FI	-1.8	0.3	-3.5	-1.0	11.0	10.9	10.5	10.4	6.2	6.0	5.7	5.5
SE	0.2	4.1	1.9	-1.4	13.0	13.3	13.6	13.8	6.4	6.6	6.7	6.9

Source: Eurostat, General Government Expenditure by Function (COFOG), online data base: [gov_10a_exp].

Note: The 'real change' is a change that is adjusted for inflation. Provisional data (*P*) on education expenditure has been omitted for some countries in certain years. Education expenditure for 2015-2018 is estimated for PT. There is a break in education expenditure time series for FI in 2015.

Year-on-year real change in the EU (Figure 60) increased slightly from 0.7% (2014-2015) to 1.8% (2017-2018). Although these changes were modest at EU level, there was wide variation between country, with some experiencing changes of more than 10% in only a few years. Policy choices and general cuts to public spending can explain some of these differences between countries.

3.2.2 Public spending in education sectors and categories

In 2018, EU Member States spent on average 34% of total public spending on education on pre-primary and primary education, 37% on secondary education and 16% on tertiary education[180]. As mentioned in the 2019 edition of the Education and Training Monitor[181], there is a general trend toward shifting educational resources away from secondary education, and towards pre-primary/primary and tertiary education.

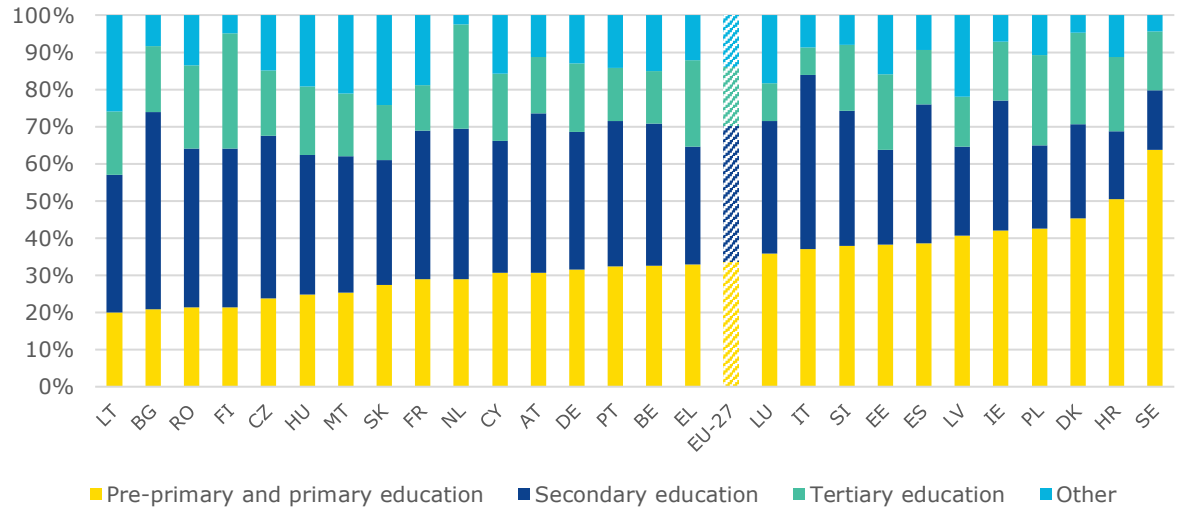
179 OECD (2014) Education at a Glance 2014, pp. 204

180 14% of Member States' total education spending fell outside the three main education levels, i.e. pre-primary/primary, secondary and tertiary education.

181 European Commission (2019). Education and Training Monitor 2019, Page 105.

The differences in public education spending at the different education levels varies considerably between countries as shown in Figure 61. In 2018, some countries spent around 20% of their public education resources on pre-primary and primary education while other countries spent more than 40%. For secondary education the range was similarly large with spending varying from 16% to 53% of available educational resources.

Figure 61 – Public expenditure on education by level, 2018



Source: Eurostat, COFOG, online data base: [gov_10a_exp].

Note: One important limitation of the current COFOG register is that pre-primary and primary education are reported together in a single category of spending. Some countries treat pre-primary education as 'social protection' spending rather than education. This accounting issue limits comparability between countries. The category 'other' contains: 'not definable by level', 'subsidiary services to education', 'R&D education' and 'not elsewhere categorised'. Another point is postsecondary is included in the secondary education expenditure category. Some Member States categorise expenditure differently. e.g. Croatia merges primary and lower secondary levels. Non-availability of the post-secondary data for Bulgaria yielded it to be counted as zero in calculations.

These variations between EU Member States, in spending per educational level can be explained by a number of different things. They can of course reflect underlying political priorities in educational spending in different countries. They can also be because countries differ in the services that their education systems and schools provide. For instance, in some countries schools provide meals and transport to and from school, while in other countries they do not. Sweden, Finland and Estonia for example provide free school meals as part of the compulsory education.

Education spending in EU Member States is mainly funded by public budgets, which is the focus of this chapter using indicators for public education expenditure. EU Member States have a private education sector which varies in size between countries (as do public subsidies for the private education sector which have been growing over recent years[182]). The organisation of the public education systems varies significantly between countries and so does the organisation and funding systems of private and semi-independent schools. Private religious schools in Belgium and grant-aided independent schools in Sweden (see box below) are such examples.

182 OECD (2017) School Resources Review, pp 14.

Box 21 – Grant-aided independent schools (Sweden)

Sweden has a system of grant-aided independent schools existing alongside municipal schools. This is the case for pre-school, compulsory school and upper secondary school. Both municipal and independent schools at the compulsory level are grant-aided and free of charge. 17% of the Swedish compulsory schools were grant-aided independent schools in the 2016/2017 academic year.

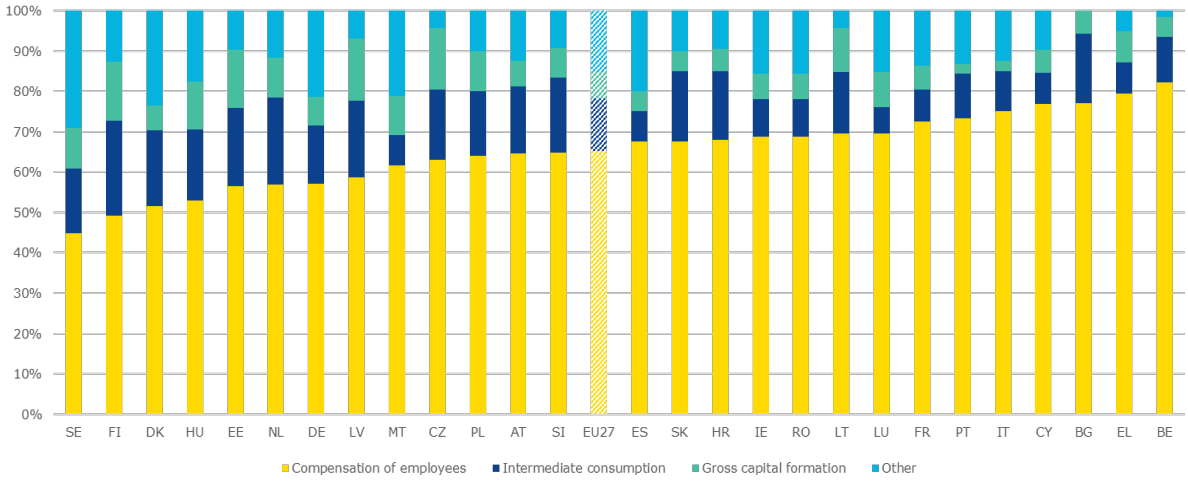
Some grant-aided independent schools have a specific orientation, including special teaching methods (Montessori or Waldorf/Steiner), a linguistic orientation, or are schools with a certain religious denomination, or are run by parents/guardians organisations or private companies. Grant-aided independent schools have to be approved by the Swedish Schools Inspectorate[183].

Public spending on education consists of funding for educational institutions like schools and universities, funding for bodies delivering education-related services (ministries, agencies, municipalities etc.) and funding/subsidies for services related to education (but not normally considered part of core education) such as transportation, meals, etc.

Figure 62 shows educational spending in EU-countries across four major categories:

- **Compensation of employees** (gross salaries and social contributions for staff)
- **Intermediate consumption** (purchase of non-durable goods (e.g. teaching materials) and services needed to provide education (e.g. electricity, cleaning and maintenance)
- **Gross capital formation** (investment in fixed assets and durable goods (e.g. computers) and buildings)
- **'Other'** (remaining transactions including subsidies in the form of transfers to households and payments to private schools).

Figure 62 – Public expenditure on education by category of expenditure, 2018



Source: Eurostat, General Government Expenditure by Function (COFOG), online data base: [gov_10a_exp].

183 European Commission/EACEA/Eurydice (2018). Swedish national education system: organisation of private education, (last updated 07/08/2018).

Salaries account for the vast majority of public education expenditure in EU Member States. The EU-average is 65% but there are wide variations between countries (45% to 82%[184]). This variation can be explained by a number of different policy choices in countries in terms of class sizes, teachers' salaries, teachers' working hours and instruction time, other teacher working conditions, and other factors.

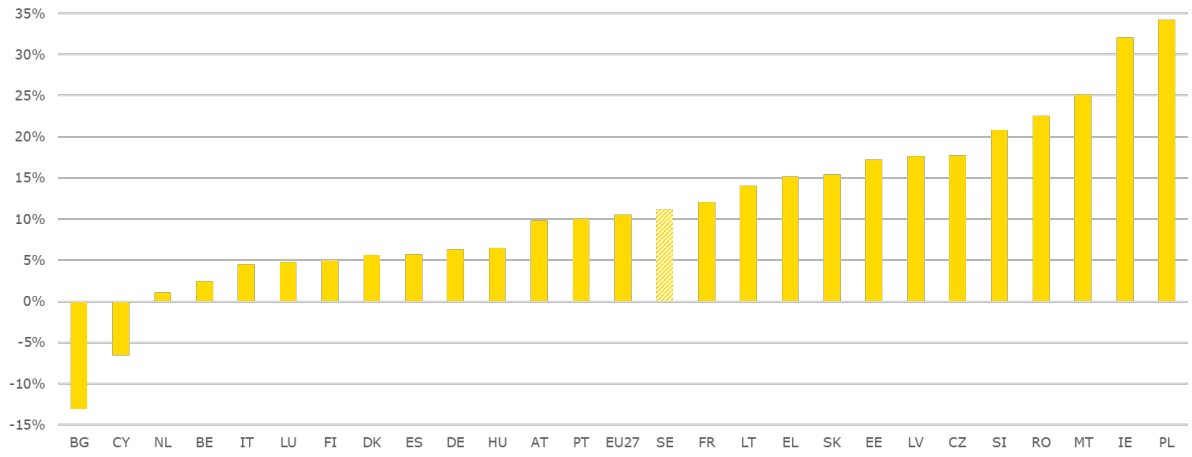
Caution should be taken when comparing categories between countries. For example, compensation of employees is not always uniform across countries, as some countries include non-teaching staff, such as guidance counsellors, school nurses, janitors in this category, and others do not[185].

3.2.3 Change in public education spending over time

Public spending on education has remained relatively constant overall in the EU-27 in the past 5 years, although there are differences between educational levels.

In 2015-2018, real expenditure rose by more than 10% at the primary and pre-primary level in the EU as a whole (see Figure 63). That is also the case in most EU countries as expenditure rose in real terms in 24 out of the 27 Member States. In some countries, the rise was very steep. For example Ireland and Poland have both seen rises of more than 30% between 2015 and 2018. Only in Bulgaria, Croatia and Cyprus did real public expenditure in primary and pre-primary fall during this period.

Figure 63 – Change in real expenditure in pre-primary and primary level, 2015-2018



Source: Eurostat, COFOG, online data base: [gov_10a_exp].

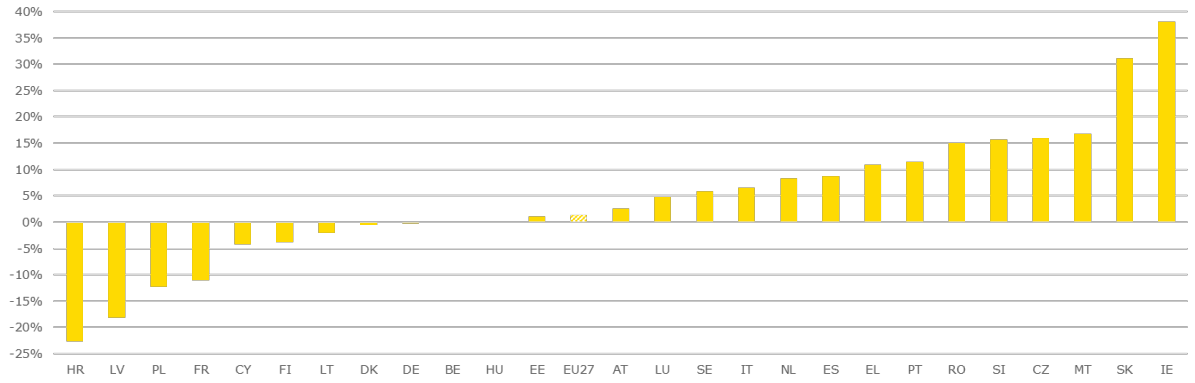
Note: Data for HR not shown due to break in time series. Change in the chart is real change that is adjusted for inflation.

At secondary and post-secondary (non-tertiary) level, the EU as a whole has seen a slight increase of 1.3% in real funding in 2015-2018, with wide variations between countries. Spending in Ireland and Slovakia, for example, rose by 38% and 31% respectively in the same period.

184 The numbers should be interpreted with caution as they also reflect differences in definitions of staff categories across countries, OECD (2019) OECD Reviews of School Resources Working and Learning Together, pp 51.

185 OECD Education at a Glance database`1.

Figure 64 – Change in real expenditure in secondary and post-secondary (non-tertiary) level, 2015-2018



Source: Eurostat, COFOG, online data base: [gov_10a_exp].

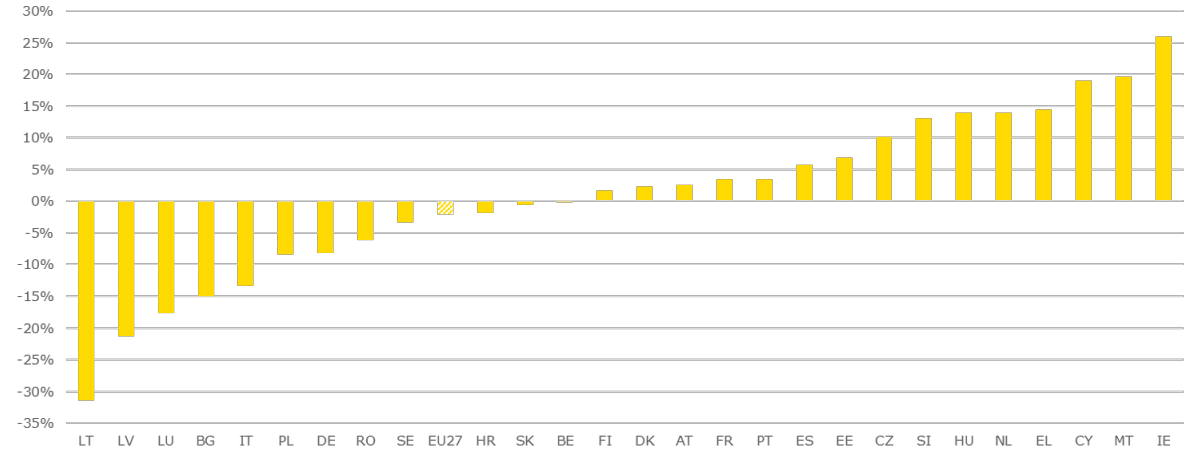
Note: Change in the chart is real change that is adjusted for inflation. BG is not included in the chart due to missing data.

For tertiary level spending, the EU as a whole has seen a decrease of 2.1% in 2015-2018, with wide variations between countries ranging from a large decreases of 31.4% in Latvia to an increase of almost 26% in Ireland. As with the other education levels, differences in public spending at the tertiary level can reflect educational policy choices in terms of teaching and teachers' working conditions/salaries but can also be explained by the delivery of education/teaching by public or private sources.

At the tertiary level, educational institutions in OECD countries are mainly publicly funded, although there are substantial and growing levels of private funding. Also, the contribution to the costs of education by private bodies is increasingly considered an effective way to ensure that funding is available to students, in some cases regardless of the students' economic background and situation.

In the EU, the share of private funding at the tertiary level, varies considerably between Member States. In Finland, only 3.4% of funding comes from private sources, whereas in Hungary the share is 37%[186].

Figure 65 – Change in real expenditure over time at tertiary level, 2015-2018



Source: Eurostat, COFOG, online data base: [gov_10a_exp]

Note: Change in the chart is real change that is adjusted for inflation.

186 OECD Education at a Glance database.

Variation in public spending at different education levels is partially a reflection of differences in the size of the administrative systems that support the provisioning of education services, i.e. number of employees or services provided by the administrative systems. For example, the cost of facilities and equipment are higher at the tertiary level than at other education levels[187].

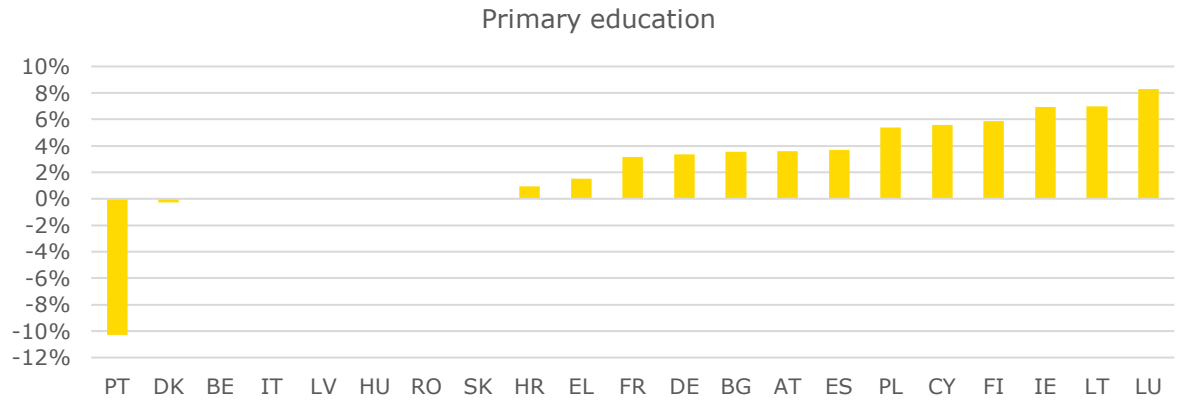
3.2.4 Demographic changes and expenditure

In the previous sections, the focus has been on the delivery of education services and the effect on public expenditures. However, the single most important demand factor in education comes from the number of students as this in turn affects the number of teachers and the provision of educational services in general. For compulsory education levels (usually primary and lower secondary levels), the number of students is predictable years in advance since all children are required to participate in these types of education. This should make it easier to adjust education supply to demographic trends. When it comes to non-compulsory education levels/programmes, many other factors play a role, such as student choices or policy priorities, making adjustment somewhat less predictable.

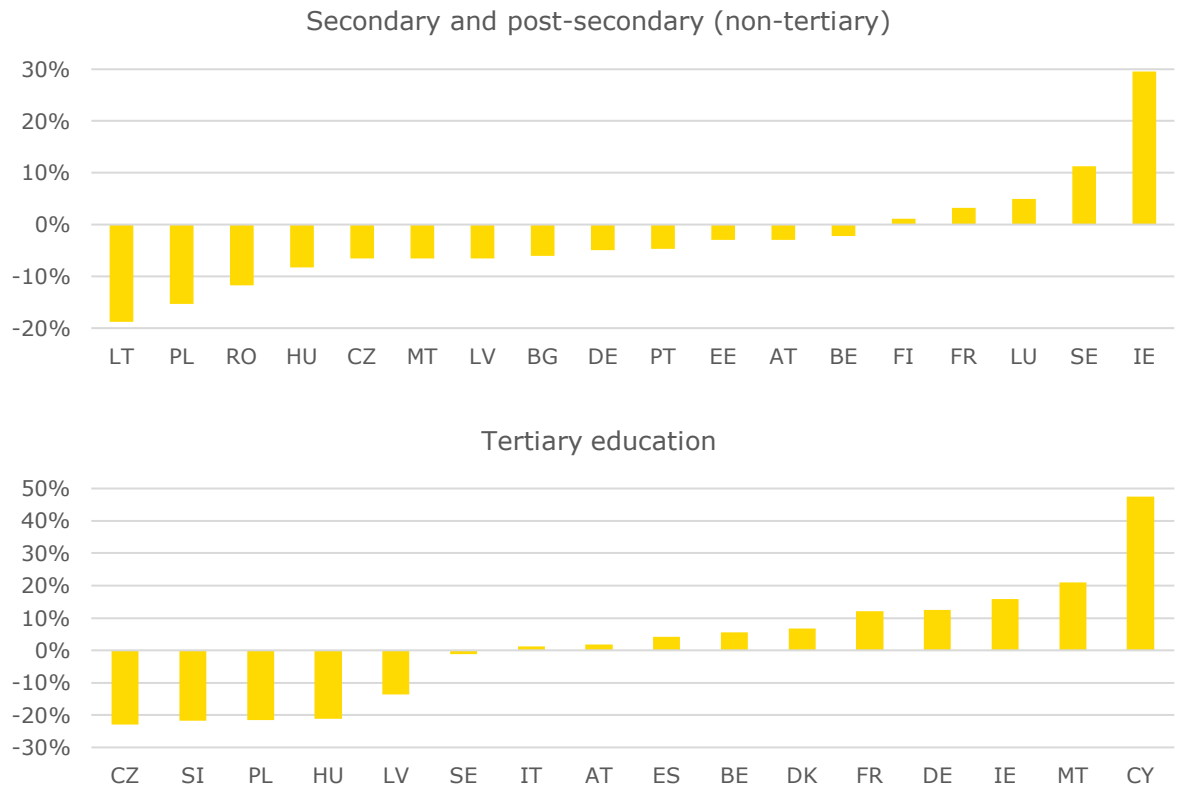
Planning public provision of education is therefore an exercise that to a large extent, and depending on the education level, is predictable years in advance as it depends on the number of children/students in a country (and at non-mandatory levels the choices of students). But changing the supply of education services to match demand takes time, and sudden changes often comes with adverse effects. If a country wishes to expand the supply, it needs to acquire buildings and hire and educate teachers, which in most countries takes 3-5 years (not even taking into account that enough suitable candidates need to apply for and enter teacher training, which is a problem in many countries).

Changes in public education spending do not only related to changes in student numbers, however. The need to replace of physical infrastructure, which is sometimes uncorrelated with changes in student numbers, is one example. Also, the school closures following COVID-19 have shown an increased need to invest in digital infrastructure for distant and digital learning, which is likely to continue in the coming years.

Figure 66 – Change in number of pupils and students at various education levels, 2013-2018



187 OECD Education at Glance 2017.



Source: European Commission, based on Eurostat data and UOE. Online data codes: [educ_uoe_enra01].

Note: Change in the chart is real change that is adjusted for inflation. EU-averages not calculated as data is missing for certain education levels for some countries.

Figure 66 shows the change in students at the pre-primary/primary, secondary/post-secondary and tertiary levels in EU Member States in 2013-2018. When looking at the pre-primary and primary level, most countries have seen an increase in the number of student during this period, while a few countries have seen a decrease.

At the secondary and post-secondary levels, the picture is somewhat different. Most countries have experienced a decrease in the number of students in 2013-2018, while only a handful have seen an increase.

Finally, for tertiary education the situation is slightly more balanced: Most countries have seen changes in student numbers of up to just over 20% while Cyprus has seen an increase of student numbers of 48%[188].

Several factors can explain the relatively large variations in some Member States, for example ageing and population decline affect some countries in particular. While the EU-27 population as a whole has continued to grow in recent years, population has declined in certain Member States, notably Central European countries and certain South European countries[189]. Both differences in birth rates and migration patterns (both inside the EU and with outside countries) can explain differences in population trends between EU countries. Birth rates are generally lower in Central and Southern Europe and adding to this, there has been a net migration from some countries in Central Europe to countries in Western and Northern Europe. These shifting population patterns may explain some of the variation in the number of students in different countries in 2013-2018.

188 It should be taken into account, that Cyprus is a small country which can explain why small changes and variations in real numbers can be large in relative terms.

189 Eurostat, Statistics Explained.

3.3 The future of education in the EU? Trends in education in the EU?

One of the most important challenges for our society today and in the future is how we view and organise learning and education in the light of building a sustainable, prosperous and robust society. However, numerous social, economic and technological developments keep changing the environment within which policy decisions on shaping the future of education are made. There is therefore an interest in analysing trends, anticipating developments and taking a coherent policy approach to the future of education. Societal mega trends, such as the changing conditions of globalisation, democracy and citizenship, security, ageing and modern cultures, pose new questions for education[190]. To be prepared for challenges in the new era, it is crucial that individuals are equipped with the skills, knowledge and qualities necessary to feel confident, be successful and spark societal, economic and environmental advances in Europe. High-quality learning must therefore be rethought to meet the economic and societal needs of the future, and education must adapt to the 'fourth industrial revolution' by transforming into 'Education 4.0'[191].There are some clearly emerging long-term trends in education that push education systems to respond appropriately. These include[192]:

- A tendency towards starting education early due to the connection between early childhood education and better life prospects.
- Lifelong learning and the need to know how to learn and train oneself even after graduation.
- Digital skills as part of core literacy, and therefore, digital education being crucial for getting into the job market.
- Human competition with intelligent devices and technological advances. This means that in the new era, human roles have to be redefined and education should focus on skills such as creativity, problem solving, negotiation, adaptability, critical thinking, cooperation, empathy and emotions, and communication.
- The move towards individualised, digitally-enabled learning instead of standardised mass education.
- The need for interdisciplinary work processes.
- The diversification of education and training providers with ever more paths and opportunities to learn and receive qualifications.
- Non-linear connections between formal education and employment, and youth in Europe experiencing interruptions and unemployment in their professional lives.
- The importance of media literacy and critical thinking for democracy.
- Global competition in the university sector, with the need of further specialisation as a game changer.

The COVID-19 outbreak has accelerated some of those trends and slowed down or halted others. Most notably, remote learning has triggered an unprecedented push towards digital transformation in education. Digitisation has also facilitated other trends, such as individualised learning and paced education because it provides the necessary ICT tools. However, the switch from offline to online

190 OECD (2019). Trends Shaping Education 2019.

191 World Economic Forum/ Platform for Shaping the Future of the New Economy and Society (2020). Schools of the Future: Defining New Models of Education for the Fourth Industrial Revolution.

192 European Political Strategy Centre (2017). 10 Trends Transforming Education as We Know It.

learning is also expected to exacerbate existing educational inequalities. Students from less advantaged backgrounds are especially likely to fall behind during remote schooling periods, as their access to digital learning resources and to a suitable learning environment tends to be limited. Additionally, in more affluent families, parents are more likely to be able to work from home and are also more likely to be able to afford private online tuition.

Responding to these trends effectively would mean promoting transformation in education, namely moving towards lifelong learning, digitally-equipped environments, new forms of literacy, interactive and participatory modes of learning, coaching and mentoring instead of lecturing, individualised learning, competency-, multidisciplinary and project-based learning, the diversification of education and training providers, and recruitment based on skills and talents[193].

This transformation also implies four overarching shifts in learning content and in learning experiences[194]. Regarding learning content, children must be equipped with global citizenship, innovation and creativity, technology and interpersonal skills. In terms of learning experiences, learning is envisioned to become personalised and self-paced, accessible and inclusive, problem-based and collaborative, as well as lifelong and student-driven. Schools of the future that follow this 'Education 4.0' framework, have the potential for scaling up, approaching design and implementation from a multi-stakeholder perspective, and demonstrating improved student outcomes as well as access to learning.

However, in the midst of multiple trends, education systems have to make sure that everyone is equally included in societal change. Digital and climate transformations are two key examples for contemporary Europe. In the case of technological developments, while there is clearly a need to catch up with the digital transformation, it is also clear that not all students, regions and countries have equal opportunities to do so[195, 196]. This illustrates the importance of developing future-oriented policies that appropriately anticipate several alternative scenarios for the future, thereby enabling education systems to respond effectively to the expected challenges. Based on some foresight studies, this chapter presents perspectives on future education in four different areas of education.

3.3.1 Assessment in primary and secondary education[197]

A re-evaluation of primary and secondary schools' assessment practices is considered to be a necessary step to appropriately monitor teaching and learning in changing conditions. The following major trends are likely to play a part in determining the way in which assessment will evolve in the next decade:

- A shift towards a competence-oriented curriculum will require a broader perspective in assessment that encompasses knowledge, skills and attitudes such as problem solving, critical thinking, digital literacy and socio-emotional competence.
- A spread of individualised assessment to support personalised learning with the help of computer-adaptive assessments and data analytics. Technological innovation and digitalisation, such as computer-adaptive assessments or data analytics, will be the main catalysts for customising assessment.

193 Ibid.

194 World Economic Forum (2020). Schools of the Future: Defining New Models of Education for the Fourth Industrial Revolution.

195 See the previous chapter 'Teaching and learning in a digital age' as well as European Commission (2019). The 2018 International Computer and Information Literacy Study (ICILS): Main findings and implications for education policies in Europe.

196 European Commission/DG CNECT (2019). 2nd Survey of Schools: ICT in Education. Objective 1: Benchmark process in ICT in schools.

197 PPMI (2020). Prospective Report on the Future of Assessment in Primary and Secondary Education.

- An increasing integration of digital innovation in the assessment process, using for example artificial intelligence, augmented reality and gamification. In the future, digitalised assessment is also expected to provide education stakeholders with precise data to enable evidence-based decision-making.
- The role of students in assessment will become more prominent with peer and self-assessment being increasingly integrated into assessment practices. Digital assessment will also aim to evaluate peer interaction trends, group performance and pupils' teamwork.
- To provide a more equitable education, assessments will take social and cultural differences that affect pupils' performance into consideration.
- The assessment will focus on enhancing students' learning, as well as on improving school and classroom practices.

Such shifts would ensure that education systems better support the individual learner, which would in turn foster inclusive and high quality education.

3.3.2 Non-formal and informal learning[198]

Non-formal and informal learning will also be shaped differently in the future. Ambiguous borders between formal, non-formal and informal learning call for clear strategies and practices to cope with the increasing demand to provide transversal skills. In addition, the lack of acknowledgement of learning outcomes of non-formal and informal learning requires a change of practice for assessing non-traditional learning outcomes. Five key trends will probably play a role:

- The borders between formal, non-formal and informal learning will lose their rigidity and clarity. The fast-growing non-formal learning sector is expected to push the formal sector to develop clear strategies and practices to incorporate soft, transversal and meta-skills in educational credentials and integrate today not yet verified expertise into formal learning and teaching processes.
- Companies and private education providers are particularly well-positioned to provide alternative learning paths that are flexible and personalised. Private actors will also be quick to respond to new assessment, validation and certification needs.
- The opening of public education institutions to other education providers, different communities and society will play an important role in increasing collaboration and participation. This will allow new links and synergies to be created between formal, non-formal and informal learning. Collaboration between education providers, employers, trade unions, civil society organisations and other stakeholders in the validation process will increase the acceptance of informally and non-formally acquired skills.
- Digitalisation will be increasingly important in enabling and enhancing non-formal and informal learning for all sectors of the population. The main role of digitalisation will be to facilitate access to education and training content in order to fulfil the learning needs - both professional and private – of everyone in society.
- Adult education and training will be boosted with the increasing recognition of non-formal and informal learning. Work and career-oriented learning, upskilling and re-skilling, for both job-related and non-job-related reasons will become widespread thanks to the proliferation of informal and non-formal education.

198 AIT/DUK (2020). Prospective Report on the Future of Non-Formal and Informal Learning: Towards Lifelong and Life-wide Learning Ecosystems.

Thanks to these trends, lifelong learning will become the norm by the end of the decade, enabling people to maintain and acquire the skills they need to fully participate in society and to successfully navigate transitions in the labour market.

3.3.3 Transnational collaboration in higher education[199]

Cross-border collaboration between universities is expected to further intensify in the mid-term, motivated by international competition and facilitated by technological development. Several trends are expected to support the European Universities initiative and other strategic alliances and models of collaboration.

- Both digital technologies and open science will increase opportunities for universities to cooperate across national borders. Because distance is less and less relevant thanks to technology, higher education institutions can also be more strategically selective in the partnerships they maintain with other institutions. The motivations for partnerships will continue to be diverse, ranging from trying to boost the quality of education and research to offering a wider choice and more convenient learning options to students.

- More and more students will gather their credits and credentials through a cross-organisational learning pathway. Individualised learning paths will urge universities to collaborate with each other to offer more flexibility to learners, for example by splitting their programmes into harmonised building blocks and offering more and more modularised and disaggregated degrees based on standardised micro-credentials. Exchange and mobility will also be renewed by digital technologies, and international collaboration will boost online access to courses abroad.

- In addition, widespread learning mobility will encourage national education systems to expedite the Bologna process and the European Higher Education Area by promoting the internationalisation of the curriculum and developing comprehensive guidelines for uniformly recognised assessment and certification of learning achievements in tertiary education.

- Higher education institutions are expected to further specialise in the course of the next decade. At the same time, addressing major challenges of our societies require interdisciplinary approaches. As a response, universities will provide training that combines different disciplines, by creating multidisciplinary competency hubs together with partners.

- Digital technologies will reduce the transaction costs of transnational research collaboration between universities and allow more opportunities for sharing data and research results across borders. In addition, to promote their R&D activities, higher education institutions will cooperate significantly with business, industry and the service sector in public-private partnerships.

- Universities will increasingly respond to the labour market's call to play a key role in providing formal education for upskilling and re-skilling beyond graduation. To introduce programmes that will eventually make lifelong learning the norm for everyone, universities will collaborate among themselves and with employers, linking their resources to achieve a critical mass in supply.

These emerging trends will give universities more opportunities to cooperate both within and across nations so that they can contribute to the achievement of the European Education Area by bringing cross-border cooperation to the next level of ambition, where alliances of higher education institutions, sharing the same vision and values, will develop bottom-up, long-term institutional strategies for education and research..

199 CHEGG/CHEPS (2020). Prospective Report on the Future of Transnational Collaboration in European Higher Education.

3.3.4 Social innovation[200]

Numerous social, economic and technological developments are bringing 'disruptive' changes to our societies, i.e. changes that challenge knowledge, skills and values. Rather than taking place over generations, these changes require that we adapt and adjust constantly and at an unprecedented pace throughout our lives. Social innovation tries to address rapidly emerging social challenges in a 'non-traditional' manner and the education sector has a major responsibility in promoting social innovation to enable citizens to cope with the challenges of fast developing societies. The following key trends are likely to shape social innovation in education in the next 10 years.

- In recent years, social innovation education has gone from small specific courses to being rolled out across universities, and is slowly being introduced at earlier stages of education. The growing focus on interdisciplinary learning and the promotion of key competences such as entrepreneurship, creativity and sense of initiative as well as 'learning to learn', will further encourage social innovation in education.
- Technology, in particular social media, will keep playing a crucial role in providing publicity for unmet social needs and offering possibilities for potential actors, such as schools or universities, to engage in social innovation. Access to big data and artificial intelligence through collaboration with tech firms will help to analyse and better understand social challenges and to propose creative solutions.
- Social media will also increase competition between different proposals to tackle social issues generated by current global trends, such as ageing, migration, inequality, environmental degradation and resource scarcity. Global comparison will motivate pupils and students to vie with each other for the most innovative solutions and for potential funding.
- Digital games and virtual reality are expected to be increasingly used for teaching and to reinforce professional skills, such as collaboration, problem solving and communication. Serious gaming provides a relatively low-cost access to experimental learning in the field of social innovation, e.g. by simulating social dynamics or modelling the impact of innovative solutions.

These trends suggest that education institutions will gradually increase their social engagement in the coming years. However, to allow citizens to fully contribute to positive social developments, it is crucial to release social innovation from its shadow existence and introduce it into mainstream education.

200 AIT/IHS (2020). Prospective Report on the Future of Social Innovation.

Part 4

Annex

4 Annex

Figure 67 – ECEC summary table 1: Legal framework, 2019/20

	Starting age of		
	Universal legal entitlement to ECEC	Compulsory ECEC	Compulsory primary education
BE (fr)	2y 6m	5 from 2020 Sep	6
BE (de)	3	5 from 2020 Sep	6
BE (fl)	2y 6m	5 from 2020 Sep	6
BG		5	7
CZ	3	5	6
DK	6m		6
DE	1		6
EE	1y 6m		7
IE			6
EL		4	6
ES	3		6
FR		3	6
HR		6	7
IT			6
CY		4y 8m	5y 10m
LV	1y 6m	5	7
LT		6	7
LU	3	4	6
HU		3	6
MT			5
NL		5	6
AT		5	6
PL	3	6	7
PT	4		6
RO			6
SI	11 m		6
SK			6
FI	9 m	6	7
SE	1	6	7

Source: European Commission/EACEA/Eurydice (forthcoming). Structural Indicators for Monitoring Education and Training Systems in Europe – 2020.

Note: 'y' = years, 'm' = months.

European Commission

Figure 68 – ECEC summary table 2: Selected quality aspects, 2019/20

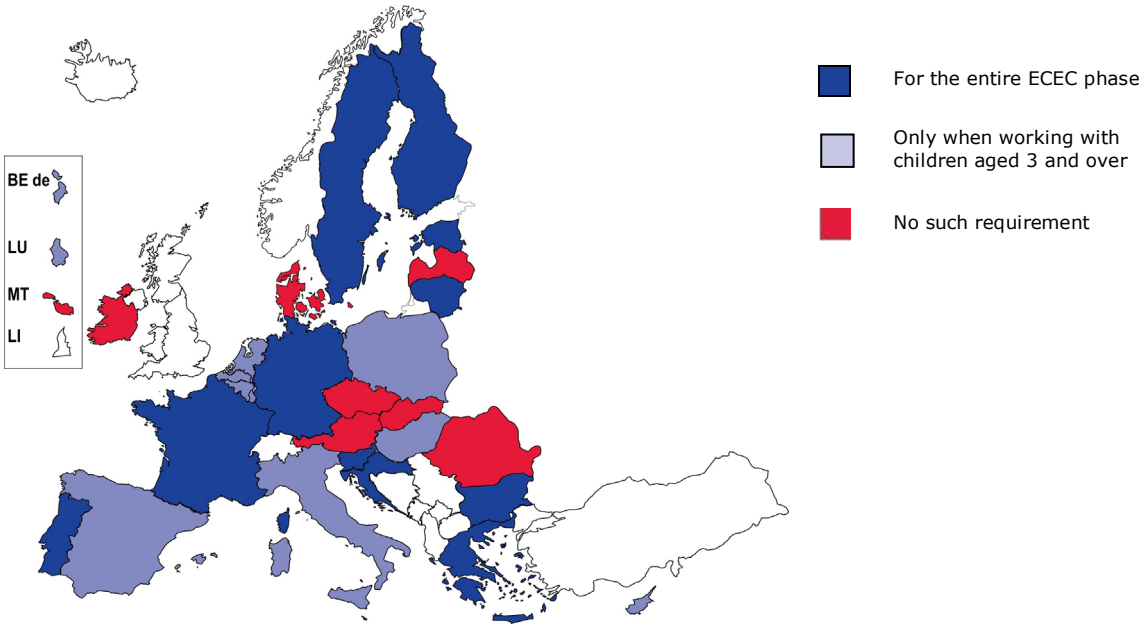
	1.2. Staff		1.3. Curriculum or educational guidelines	1.4. Language programmes as targeted support measure	1.5. Support for parents	
	1.2.1. At least one staff member with a tertiary qualification in education sciences	1.2.2. CPD as a professional duty or necessary for promotion			1.5.1. Home-learning guidance	1.5.2. Parenting programmes
BE (fr)	■	●	●	■		■
BE (de)	■	■	■	■		●
BE (fl)	■	●	●	■		
BG	●	■	■	■		■
CZ		■	■	■		
DK			●	●		
DE	●		●	●	●	●
EE	●	●	●	●		●
IE			●		●	
EL	●	■	■	■		
ES	■	■	●	●		●
FR	●	●	●	■	●	●
HR	●	●	●	●		●
IT	■	■	■	■		
CY	■	■	■			■
LV	●	●	●	●		
LT	●	●	●	●	●	●
LU	■	●	●	●		
HU	■	●	●	■		For under 3s
MT		■	●	■	●	●
NL	■		■	●		
AT		●	●	●	■	●
PL	■	■	■	■	●	
PT	●	■	■	●		
RO		●	●	■		●
SI	●	●	●	●	●	●
SK		■	■	■		
FI	●	●	●	●		
SE	●		●	●		

Source: European Commission/EACEA/Eurydice (forthcoming). Structural Indicators for Monitoring Education and Training Systems in Europe – 2020.

Notes: ■ = children aged 3 years or more ([201]); ● = the entire ECEC phase (from birth to the start of compulsory education). Tertiary qualification in education = minimum 3 years ISCED 6. CPD refers to continuing professional development.

[201] ■ refers to children aged 2 years or more in France, 2.5 years or more In Belgium (French and Flemish communities) and to children aged 4 years or more in Greece, the Netherlands and Liechtenstein.

Figure 69 – Staff with a minimum of a Bachelor's level qualification (ISCED 6), 2019/2020



Source: European Commission/EACEA/Eurydice.

Note: The Figure shows whether at least one staff member per group of children in centre-based ECEC must have a Bachelor's level (ISCED 6) qualification or higher related to ECEC (or education) according to top-level regulations. ECEC staff only refers to those professionals who have daily, direct contact with children and whose duties involve education and/or care. It does not include heads of ECEC settings.

European Commission

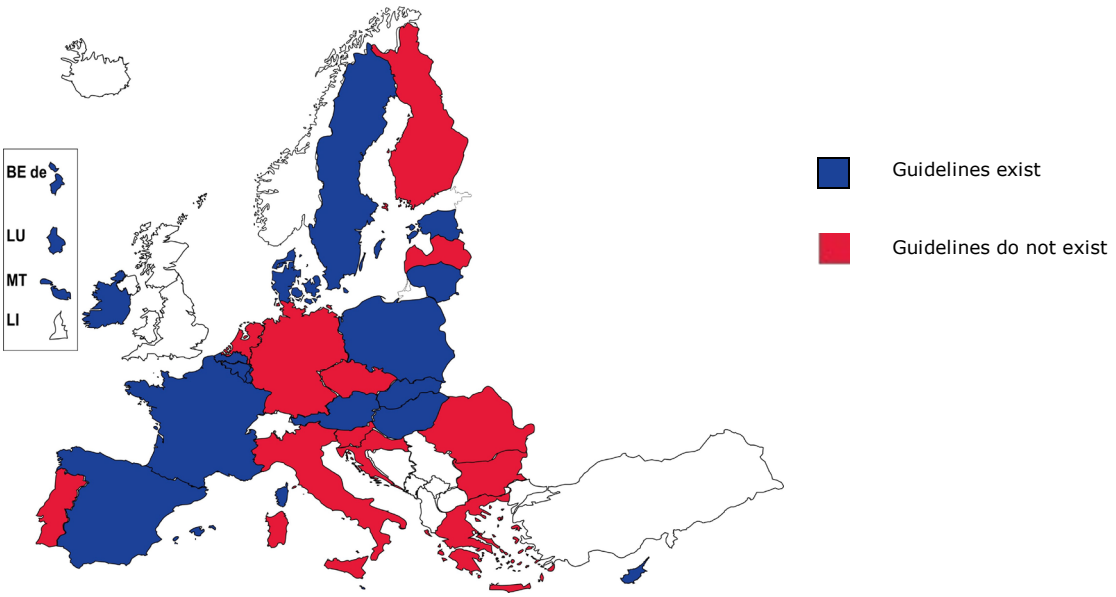
Figure 70 – Summary table on achievement in basic skills, 2019/2020

	1. National tests in compulsory education			2. Recent national reports on achievement			3. Use of performance data in school evaluation	4. Guidelines on underachievement [2]as a topic in ITE			5. Additional resources provided by top-level authorities to schools with disadvantaged students
BE (fr)	R	M	S	R	M	S	●	R	M	S	●
BE (de)				R	M	S	●	R	M	S	●
BE (fl)				R	M	S	●	R	M	S	●
BG	R	M	S	R	M	S	●				●
CZ		M		R	M	S	●				●
DK	R	M	S	R	M	S	●	R	M	S	
DE	R	M	S	R	M	S	●	R			●
EE	R	M	S	R	M	S	●	R	M	S	●
IE	R	M	S	R	M	S	●	R	M		●
EL				R	M	S					●
ES	R	M	S	R	M	S	●	R	M	S	●
FR	R	M	S	R	M	S	●	R	M	S	●
HR				R	M	S					
IT	R	M		R	M		●				●
CY	R	M		R	M	S		R	M	S	●
LV	R	M	S	R	M		●				●
LT	R	M	S	R	M	S	●	R	M	S	●
LU	R	M		R	M		●	R	M	S	●
HU	R	M		R	M		●	R	M	S	
MT	R	M	S	R	M	S	●	R	M	S	●
NL	R	M	S	R	M	S	●				●
AT	R	M		R	M		●	R	M	S	●
PL	R	M		R	M	S	●	R	M	S	●
PT	R	M	S	R	M	S	●				●
RO	R	M	S	R	M	S	●				
SI	R	M	S	R	M	S					●
SK	R	M		R	M			R	M	S	●
FI	R	M		R	M						●
SE	R	M	S	R	M	S	●	R	M	S	●

Source: European Commission/EACEA/Eurydice (forthcoming). Structural Indicators for Monitoring Education and Training Systems in Europe – 2020.

Note: 'R' = reading; 'M' = mathematics; 'S' = science.

Figure 71 – Top-level guidelines on underachievement as a topic in ITE, 2019/2020



Source: European Commission/EACEA/Eurydice.

Note: This indicator examines the existence of top-level regulations, recommendations or guidelines on addressing student underachievement in ITE programmes.

European Commission

Figure 72 – ELET Summary table 1, 2019/2020

	1. National data collection on ELET based on a student register	2. Policies for increasing the flexibility and permeability of education pathways:			3. Policies for language support for pupils with a different mother tongue
		2.1.Providing alternative education & training pathways	2.2. Facilitating transitions within education & training systems	2.3.Recognising skills and/or qualifications	
BE (fr)	●	●	●	●	●
BE (de)			●	●	●
BE (fl)	●	●	●	●	●
BG	●	●		●	●
CZ	●	●	●	●	●
DK	●	●	●		●
DE		●	●		●
EE	●	●	●	●	●
IE	●	●			●
EL	●	●	●	●	●
ES		●	●	●	●
FR	●	●	●	●	●
HR	●		●	●	●
IT	●	●	●	●	●
CY	●	●	●		●
LV	●	●	●	●	●
LT	●	●	●	●	●
LU	●	●	●	●	●
HU	●	●			
MT	●	●	●	●	●
NL	●	●	●		●
AT	●	●	●		●
PL	●	●		●	●
PT	●	●	●	●	●
RO		●	●	●	●
SI		●	●	●	●
SK		●	●		●
FI	●	●	●	●	●
SE	●	●	●	●	●

Source: European Commission/EACEA/Eurydice (forthcoming). Structural Indicators for Monitoring Education and Training Systems in Europe – 2020.

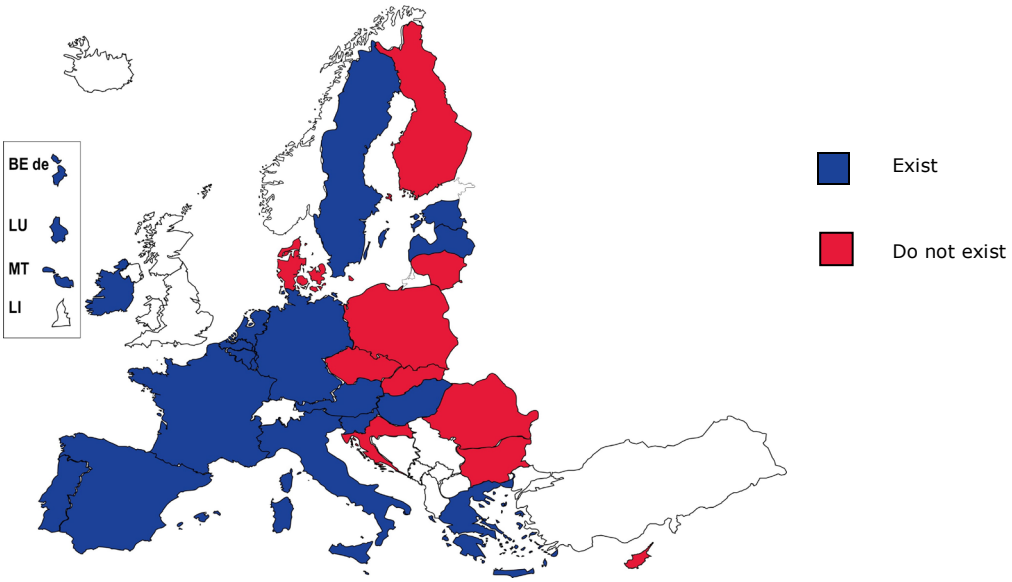
Figure 73 – ELET Summary table 2, 2019/2020

	4. Policies encouraging the inclusion of ELET in ITE and/or CPD	5. Education and career guidance in schools, ISCED 2 and 3*	6. Policies to support early leavers re-enter the education & training system:		
			6.1.Second chance education	6.2. Education and career guidance	6.3. Youth guarantee
BE (fr)	●	●	●	●	●
BE (de)	●	●	●		
BE (fl)	●	●	●	●	●
BG		●	●	●	●
CZ		●	●	●	●
DK				●	
DE	●	●	●	●	●
EE	●	●	●	●	●
IE	●	●	●	●	●
EL	●	●	●	●	●
ES	●	●	●	●	●
FR	●	●	●	●	●
HR			●	●	●
IT	●	●	●		●
CY		●	●	●	●
LV	●	●	●	●	●
LT		●	●	●	●
LU	●		●	●	●
HU	●	●	●		●
MT	●	●	●	●	●
NL	●		●	●	●
AT	●	●	●	●	●
PL		●	●	●	●
PT	●	●	●	●	●
RO		●	●	●	●
SI	●	●	●	●	●
SK		●	●		
FI		●	●	●	●
SE	●	●	●	●	●

Source: European Commission/EACEA/Eurydice (forthcoming). Structural Indicators for Monitoring Education and Training Systems in Europe – 2020.

Note: * Education and career guidance provided both as a compulsory part of the curriculum **and** by school guidance services in lower and upper secondary education.

Figure 74 – Policies/measures encouraging the inclusion of ELET in ITE and/or CPD, 2019/2020



Source: European Commission/EACEA/Eurydice.

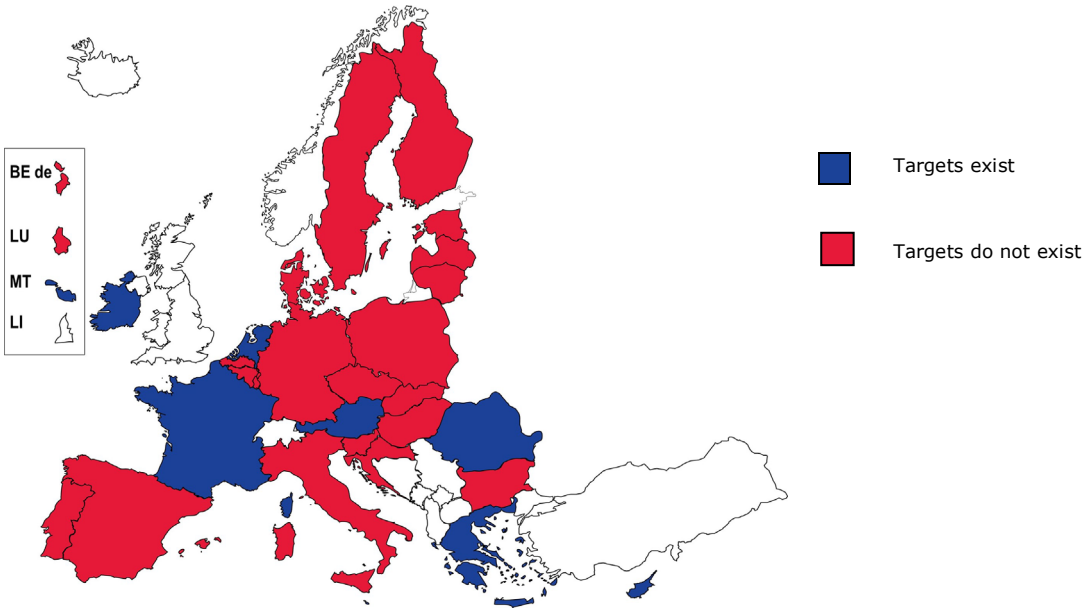
Note: This indicator examines the existence of policies and measures for improving teachers' understanding of the challenge of ELET through ITE and/or CPD.

Figure 75 – Summary table on higher education, 2019/2020

	1.Quantitative targets for widening participation and/or attainment of under-represented groups	2. Monitoring of socioeconomic background of students	3. Recognition of informal or non-formal learning in entry to higher education	4. Completion rates as a required criterion in external QA	5. Performance-based funding mechanisms with a social dimension focus
BE (fr)		●	●	●	
BE (de)				●	
BE (fl)		●	●		●
BG		●		●	
CZ					
DK		●	●		
DE		●	●	●	
EE			●	●	
IE	●	●	●	●	●
EL	●				
ES		●	●	●	●
FR	●	●	●	●	●
HR		●		●	●
IT		●	●	●	●
CY	●				
LV					
LT		●	●	●	
LU			●		
HU		●	●	●	
MT	●	●	●	●	
NL	●	●			
AT	●	●			●
PL		●	●	●	●
PT			●	●	●
RO	●	●		●	●
SI				●	
SK					
FI		●	●		
SE		●	●		

Source: European Commission/EACEA/Eurydice (forthcoming). Structural Indicators for Monitoring Education and Training Systems in Europe – 2020.

Figure 76 – Quantitative targets for widening participation and/or attainment of under-represented groups



Source: European Commission/EACEA/Eurydice.

Figure 77 – Summary table on graduate employability, 2019/2020

	1. Labour market forecasting used systematically	2. Required involvement of employers in external QA	3. Requirements OR incentives for work placements for all students	4. Career guidance for all students in HEIs	5. Graduate surveys used systematically
BE (fr)	●	●		●	●
BE (de)		●	●		
BE (fl)		●		●	●
BG	●	●	●	●	●
CZ		●		●	
DK		●		●	●
DE		●		●	●
EE	●	●	●	●	●
IE	●			●	●
EL	●	●		●	
ES		●	●	●	
FR	●	●	●	●	●
HR		●	●		●
IT	●	●	●	●	●
CY				●	
LV	●	●			●
LT	●	●	●	●	
LU				●	
HU		●		●	●
MT		●	●	●	
NL	●	●		●	●
AT		●		●	●
PL	●	●		●	●
PT		●		●	
RO		●	●	●	●
SI		●		●	
SK				●	●
FI	●			●	
SE	●	●		●	●

Source: European Commission/EACEA/Eurydice (forthcoming). Structural Indicators for Monitoring Education and Training Systems in Europe – 2020.

European Commission

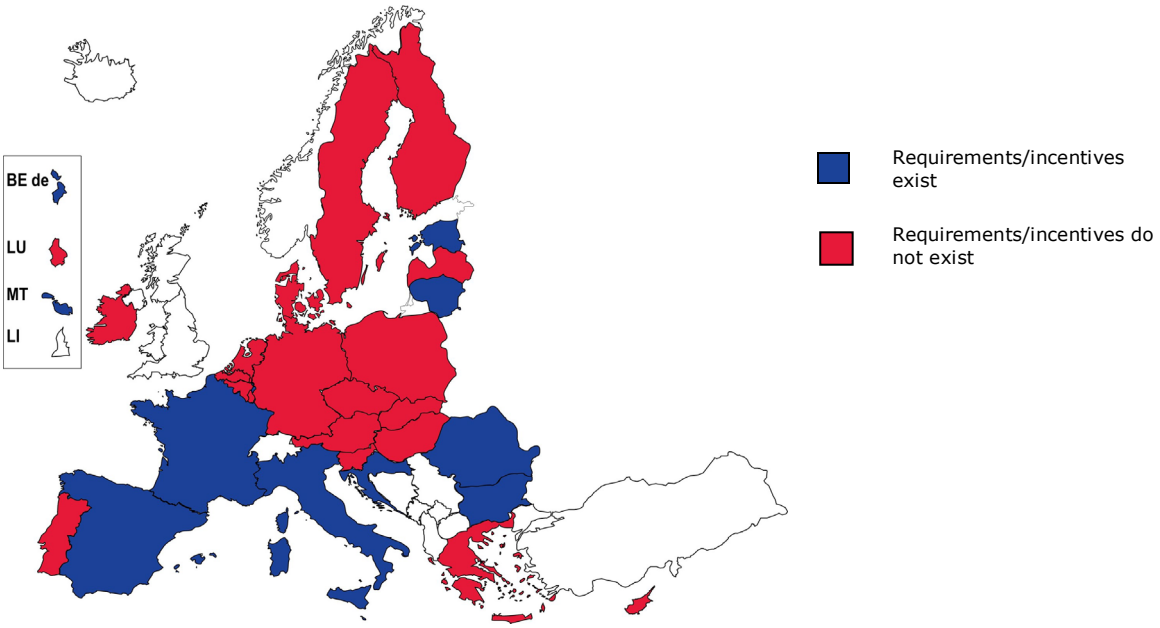
Figure 78 – Summary table on learning mobility, 2018/2019

	Portability of grants and/or loans			Percentage of higher education institutions using ECTS	Automatic recognition of qualifications		
	Full	Partial	No		Yes	Partial	No
BE (fr)			●	100%		●	
BE (de)	●[a]			100%		●	
BE (fl)	●[a]			100%		●	
BG			●	100%			●
CZ		●[c]		100%		●	
DK	●[b]			100%	●		
DE	●[b]			100%	●		
EE		●[c]		100%		●	
IE	●[b]			75%-99%			●
EL			●	100%			●
ES		●[d]		100%			●
FR	●[b]			100%	●		
HR		●[c]		100%			●
IT		●[c]		100%	●		
CY	●[a]			75%-99%			●
LV		●[d]		National system, ECTS compatible		●	
LT		●[d]		100%		●	
LU	●[a]			100%		●	
HU		●[c]		100%		●	
MT	●[a]			100%	●		
NL	●[a]			100%		●	
AT	●[b]			100%			●
PL		●[c]		100%	●		
PT		●[d]		100%		●	
RO		●[d]		100%		●	
SI	●[a]			100%			●
SK		●[c]		100%		●	
FI	●[a]			100%	●		
SE	●[a]			National system, ECTS compatible	●		

Source: European Commission/EACEA/Eurydice (forthcoming). Structural Indicators for Monitoring Education and Training Systems in Europe – 2020.

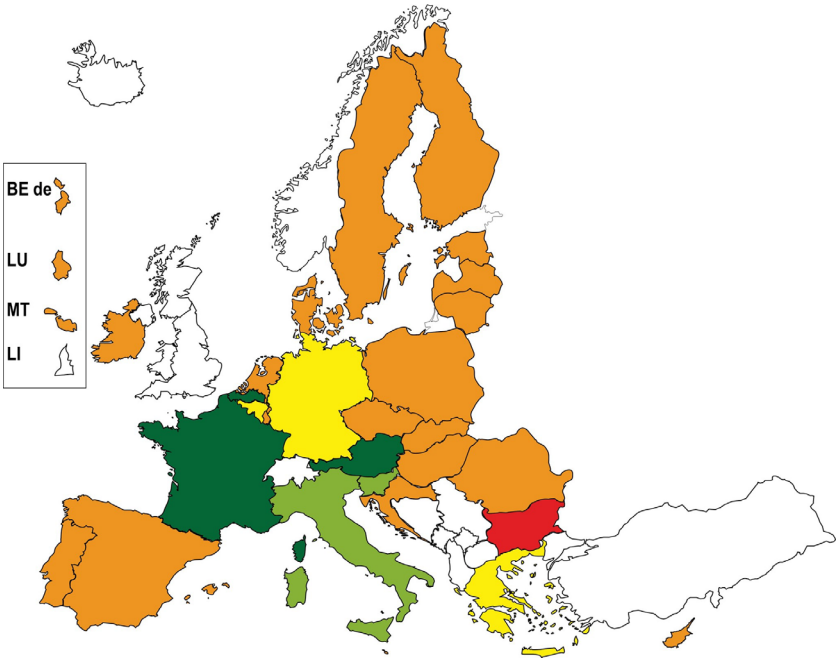
	Portability of student grants and/or loans
Yes	a) Full portability or b) portability of domestic student support measures – grants and/or loans – for credit and degree mobility, but with some restrictions.
Partial	Credit portability c) without restrictions and d) with restrictions related to geography (country limitations), and/or types of programme, and/or field of study or time. No degree portability or not all major support measures with degree portability.
No	No portability: public grants and/or loans are only provided if students study in the home country or are portable only in exceptional cases (no equivalent programme is available in the home country).
	Automatic recognition of qualifications
Yes	All higher education qualifications issued in other EHEA countries are recognised on an equal level with qualifications in the home country.
Partial	Automatic recognition takes place between a subset of European countries; for other countries specific recognition procedures are in place.
No	There is no automatic recognition at system level.

Figure 79 – Requirements or incentives for work placements for ALL students



Source: European Commission/EACEA/Eurydice.

Figure 80 – Measures to support the participation of disadvantaged learners in learning mobility, EU-27 countries, 2018/2019



Source: European Commission/EACEA/Eurydice.
Note: Scoreboard indicator categories:

	The following measures are undertaken to increase the participation of disadvantaged learners in learning mobility: • Long-term quantitative objectives on the participation of disadvantaged learners; • Comprehensive monitoring of the participation of disadvantaged learners in mobility programmes; • Financial support in the form of: o Targeted specific mobility grants **OR** o Portable need-based grants **OR** o Mainstream portable grants provided to more than 50% of students; • Top-level recommendations/incentives to HEIs to implement targeted measures supporting the participation of disadvantaged students in mobility programmes.
	Three of the four types of measure are undertaken.
	Two of the four types of measure are undertaken.
	One of the four types of measure is undertaken.
	None of the four types of measure are undertaken.