2.2 Low achieving eight graders in digital skills

In a nutshell

Member States have agreed on a new EU-level target on digital skills, aiming to reduce the share of underachieving students in grade 8 to less than 15% by the end of the decade. Over the past two years, the COVID-19 crisis has emphasised the importance of both basic and advanced digital skills for sustaining economies and societies. Notably, digital skills became a prerequisite for participating in learning, working and socialising during the many lockdowns. In future, it is expected that 90% of jobs in all sectors will require some form of digital skills, highlighting the need to develop these skills from an early age in support of the digital transformation.

2.2.1 Assessment of digital skills

The EU-level target is to reduce the share of low-achieving eighth-graders in computer and information literacy to below 15% by 2030. The source of this new target (not covered in previous frameworks) is the indicator used to measure progress towards the digital skills target – the International Computer and Information Literacy Study (ICILS). The study is conducted every five years by the International Association for the Evaluation of Educational Achievement (IEA), and targets students in their eighth year of schooling. ICILS directly measures students' digital skills through computer-based assessments in computer and information literacy and computational thinking[112].

The digital skills indicator is a measure of the share of students in their eighth year of schooling who perform below the level 2 threshold on the ICILS computer and information literacy achievement scale[113]. Low achievement in digital skills means that students are unable to use computers to complete basic and explicit information-gathering and management tasks. Examples of such tasks include locating simple information on a website with multiple pages and entering information in a specified cell in a spreadsheet[114].

Box 11: Digital Education Action Plan in the Flemish Community of Belgium

The plan was adopted in December 2020 to help enhance digital education in schools. The Covid-19 crisis has shown that the Flemish education system was not ready for distance digital teaching. The plan has four objectives: a future-oriented and secure ICT infrastructure in schools; a supportive and efficient ICT school policy; digitally competent teachers and teacher trainers, plus digital resources; and a Knowledge and advice centre (KAAC) for digital school education. The National Recovery and Resilience Plan will support a large share of the €375 m plan. Measures include the use of ICT devices for all students from grade 5 to 12, better ICT infrastructure and connectivity in all schools, strengthening the number and role of ICT-coordinators in schools, an efficient ICT school policy with measures against cyberbullying and promotion of e-inclusion, training to improve the digital teaching skills and the use of ICT in education for teachers and teacher trainers, access for all schools to high-quality and innovative

112 In addition to data on pupil achievement, ICILS collects contextual data on pupils' home and school environments.

113 Level 2 is one of four defined proficiency levels, and performance below this threshold can be defined as low achievement. The proficiency levels describe the nature and the complexity of the tasks pupils are able to solve. At 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. At level 2, pupils use computers to complete basic and explicit information gathering and management tasks. At level 3, pupils demonstrate the capacity to work independently when using computers as information gathering and management tools. At 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.

114 Further examples of tasks associated with each level of the computer and information literacy scale are presented in table 3.2 of the ICILS 2018 international report.

learning resources and platforms and digital forms of evaluation, including through single sign-in. The KAAC will support schools and pedagogical guidance services with digital educational practices and data, and provide input for data-driven education policies.

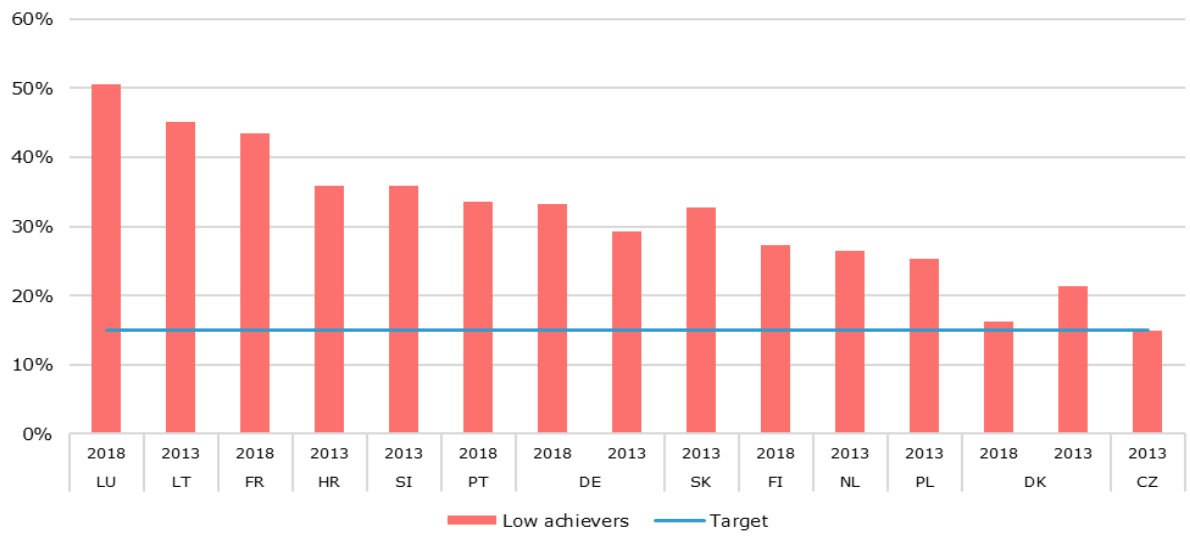
Source: Flemish Ministry for Education, Sport, Animal Welfare and the Flemish Rim (in Dutch).

Two ICILS cycles (2013, 2018) have been completed to date[115], albeit with limited participation from EU Member States. The next ICILS cycle will see a substantial increase in coverage, but data collection is not due to start until 2023, with results becoming available in 2024. In total, 14 EU Member States participated in the initial ICILS cycles, nine in 2013[116] and seven in 2018[117]. Denmark and Germany participated in 2013 and 2018, but only Germany has comparable results across cycles[118].

2.2.2 Progress towards the EU-level target

Figure 49 presents the distribution of students performing below the threshold for low achievement in EU Member States participating in ICILS 2013 and ICILS 2018.

Figure 49: Low achievement among 8th-graders in computer and information literacy, 2013 and 2018



Source: IEA, ICILS 2018 and ICILS 2013.

Note: Low achievement 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. For country notes, see Table 3.4 in the respective international reports for ICILS 2013 and ICILS 2018.

115 Low coverage of EU Member States in the two initial cycles limits our ability to generalise for the EU, and does not allow for the calculation of a meaningful weighted EU average at this point. Moreover, the field of digital education is undergoing a rapid development, accelerated by the COVID-19 pandemic. Results from 2013 and 2018 may thus no longer give a representative insight into the current skill level of grade eighth pupils in the participating countries. With these considerations in mind, the data should be interpreted with caution.

116 CZ, DK, DE, HR, LT, NL, PL, SI and SK.

117 DK, DE, FR, IT, LU, PT and FI. Italy participated in ICILS 2018, but the results are not comparable to those of other EU Member States due to the age of the pupils tested.

118 DK did not meet the sample participation rate in 2013.

Considering the two initial cycles of ICILS jointly, the share of low achievers in digital skills only approached the EU level target value in two EU Member States: Czechia in 2013 (15.0%) and Denmark in 2018 (16.2%). In the other participating countries, the share of low achievers ranged from 21.4% in Denmark (2013) to 50.6% in Luxembourg (2018). The data from ICILS 2013 and 2018 suggest that significant effort will be necessary to reduce the share of low achievers in digital skills across all EU Member States, if the EU level target is to be achieved by 2030.

Box 12: Digital sciences are being introduced in secondary education in Luxembourg

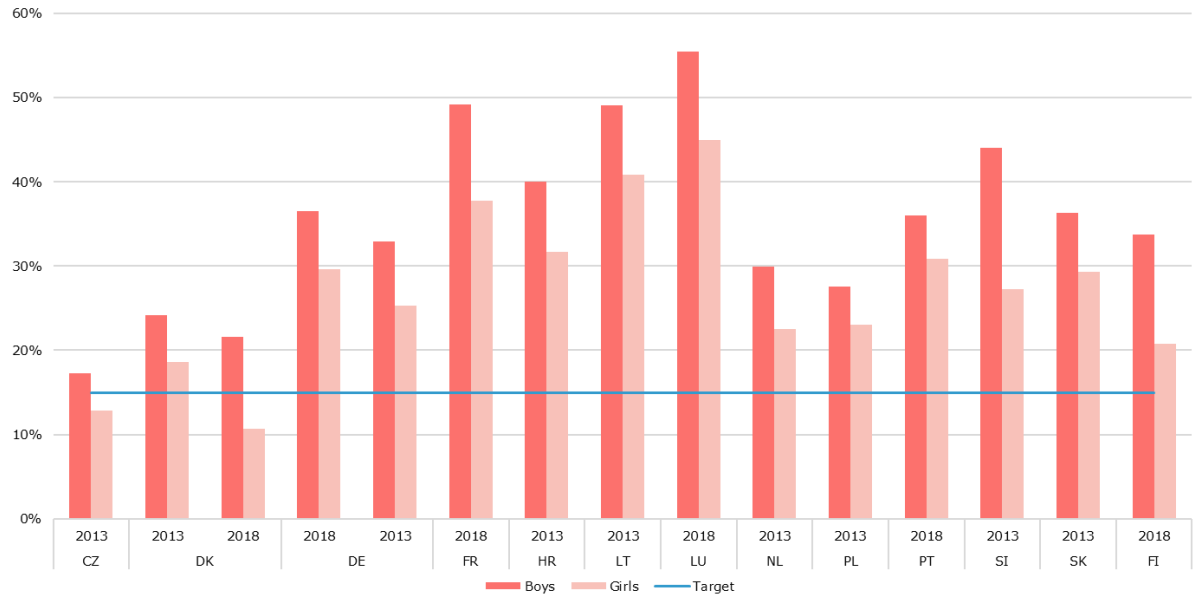
Since the school year 2020-21, coding has been embedded in maths classes in cycle 4 (age 10-11) and starting in 2021-22 it is being taught across all subjects in cycles 1 to 3 (age 4-9). In secondary education, computer science is a new subject in 2021-22, including coding and computational thinking. As of 2021-22, some 18 secondary schools – about half of all secondary schools – are participating in a pilot, introducing digital sciences as of grade 7 through the three years of lower-secondary education. This is to be extended to all secondary schools as of 2022-23. As part of the strategy for improving digital education, new continuing professional development courses are offered to both primary and secondary school teachers by the National Teacher Training Institute Source: IFEN – Luxembourgish Training Institute for National Education).

There is evidence of a gender gap in digital skills in the data from ICILS 2013 and ICILS 2018. On average in the participating Member States, boys perform worse than girls[119]. Figure 50 shows the share of low achievers in digital skills by sex. We see that the difference ranges from 4.5 pps in Czechia (2013) to 16.9 pps in Slovenia (2013).

Although girls on average perform better than boys do, there were only two countries, Czechia (2013) and Denmark (2018), where the share of low achievers among girls was lower than the new EU level target of 15%. The share of low achievers among boys was not below the overall target value in any of the Member States participating in the initial two ICILS cycles.

[119] An interesting observation from the ICILS results is that the difference between the shares of boys and girls performing at the higher end of the ICILS achievement scale is substantially lower than it is below the level 2 threshold (not shown in the figure). In nine countries (2018: DK, FR, DE, LU, PT; 2013: DE, HR, LT, SI), this difference between the share of boys and girls performing at level 4 was below 1 pp.

Figure 50: Low achievers in digital skills by sex [%]



Source: IEA, ICILS 2018 & ICILS 2013.

Note: Low achievement 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. For country notes, cf. Table 3.4 in the respective international reports for ICILS 2013 and ICILS 2018.

2.2.3 Spotlight on socio-economic status

Similar to the digital divide between girls and boys, ICILS data suggests that there is a digital divide associated with the socio-economic status of students[120]. That is, students from more advantaged backgrounds perform better in computer and information literacy than their peers from less advantaged backgrounds. This pattern is consistent across the 14 Member States participating in ICILS.[121]

Lower socio-economic status is associated with poorer labour market prospects, partly due to the low level of skills, including digital skills. Moreover, higher levels of digital skills tend to correlate positively with more favourable labour market positions. Basic digital skills are found to enhance employability, while advanced ICT skills lead to higher wages[122]. With over 90% of jobs in all sectors expected in future to require some form of digital skills, developing basic digital skills at an early age is key.

120 Socioeconomic background can be captured using a variety of proxies. In ICILS, responses from the student questionnaire on parental education, their occupational status and the number of books at home is sourced to derive three socioeconomic background variables.

121 Pupils in the from more affluent socioeconomic backgrounds performed statistically significantly higher than pupils from less advantaged backgrounds across the three proxies used to measure socioeconomic background in both ICILS 2013 and ICILS 2018.

122 Karpiński, Z., Biagi, F. and Di Pietro, G. (2021). Computational thinking, socioeconomic gaps, and policy implications. IEA Compass: Briefs in Education No. 12.

Box 13: Socio-economic gaps and labour market disadvantage

A recent IEA Compass Briefs in Education prepared by the Joint Research Centre identified significant different levels of ICT skills among students depending on their family background in the data from ICILS 2018[123]. Key to their findings is that the socio-economic gap in computational thinking[124] test scores is consistently larger than the corresponding gap in computer and information literacy test scores. This suggests that the labour market disadvantage associated with lower levels of ICT skills among individuals from a lower socio-economic status may be larger than previously thought, highlighting the importance of collecting evidence on multiple dimensions of ICT competence. Although even simple and routine jobs require individuals to be able to use ICT at some level, more and more occupations in future will be based on advanced problem-solving abilities. The results suggest that students with a lower socio-economic status are likely to experience unequal opportunities in the labour market by facing a higher risk of being excluded from the best jobs. This may potentially lead to larger social inequality, income and job polarisation, and higher poverty rates.

Addressing socio-economic differences at an early age will be a contributory factor to achieving the EU-level target on digital skills among eighth graders. Reducing the share of underachieving students can also be a factor in meeting the newly proposed EU level target of at least 80% of those aged 16-74 having basic or above-basic digital skills by 2030[125]. Considering data from the EU survey on the ICT usage in households and by individuals[126], we see a similar pattern to that identified by ICILS – namely that the level of digital skills in the population is associated with socio-economic status.

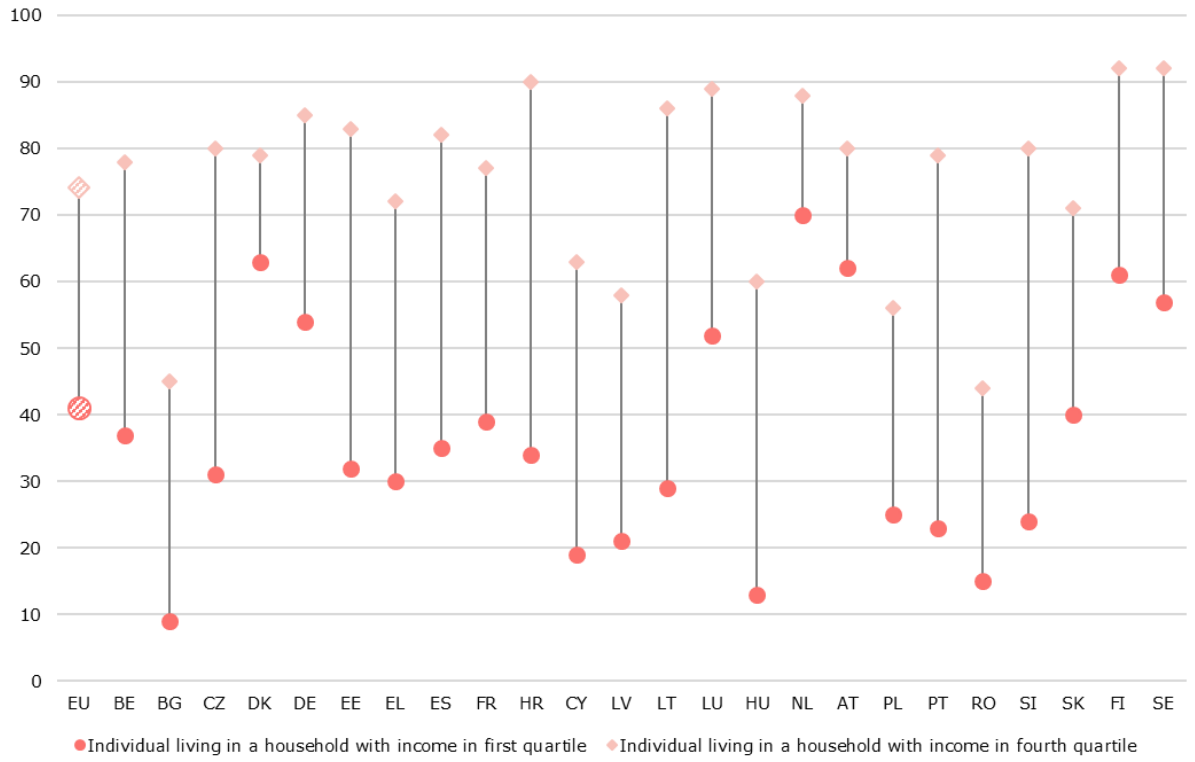
123 Ibid.

124 Computational thinking encompasses an individual's ability to recognise aspects of real-world problem, which are appropriate for computational formulation and to evaluate and develop algorithmic solutions to those problems so that the solution could be operationalised by a computer.

125 Put forward in the European Pillar of Social Rights Action Plan.

126 The digital skills indicator based on the Community Survey on ICT usage in households and by individuals is proxy of the digital competences and skills of individuals. It is a composite indicator based on selected activities performed by individuals aged 16-74 on the internet in four specific areas (information, communication, problem solving and content creation). It is assumed that individuals having performed certain activities have the corresponding skills.

Figure 51: Individuals with basic or above-basic digital skills by income quartile, 2019 [%]



Source: Eurostat (ESS: Community survey on ICT usage in households and by individuals) Online data code: [isoc_sk_dskl_i].

Note: Data not available by income quartile for IE, IT and MT. Break in time series for CZ, LV and LU. Data for SE has low reliability.

Figure 51 compares individuals living in households with incomes in the bottom and the top income quartiles. There is a difference of more than 30 pps in the share of individuals with basic or above basic digital skills between the top and the bottom income quartiles in 20 Member States[127]. In the top income quartile, more than 80% of individuals have basic or above-basic digital skills in 10 Member States. This is in contrast to the bottom income quartile, where the share of individuals with basic or above-basic digital skills is below 40% in 16 Member States.

2.2.4 Policy takeaways

Digital skills are becoming crucial for all citizens to participate in an increasingly digital world. Over the past two years, the COVID-19 crisis has further emphasised the importance of both basic and advanced digital skills for sustaining our economies and societies. Particularly during the widespread lockdowns, basic digital skills became a prerequisite for activities such as learning, working and socialising, thereby accelerating the digital transformation. More than 95% of the respondents contributing to the open public consultation on the digital education action plan consider the COVID-19 crisis to be a "turning point" for how technology is used in education and training.[128]

[127] Data by income quartiles is available for 25 EU Member States.

[128] Digital Education Action Plan 2021-2027.

The 2030 Digital Compass points to digital skills as essential to reinforce our collective resilience as a society, noting that access to education allowing the acquisition of basic digital skills should be a right for all EU citizens[129]. The European Pillar of Social Rights action plan sets out that at least 80% of those aged 16-74 should have at least basic digital skills by the end of the decade[130]. In 2019, this number stood at 56% according to the Digital Economy and Society Index[131].

In the area of education, COVID-19 brought on a rapid and widespread shift to distance, online and blended learning and teaching. This shows the importance of providing teachers, students with adequate digital infrastructure and skills. Evidence suggests that the pandemic aggravated pre-existing inequalities in the school system, in particular affecting students from lower socio-economic backgrounds. Going forward, it will be important to enrich data collections and develop policy responses to reach those at risk of being left behind.

2.3 Participation in early childhood education and care

In a nutshell

Member States have agreed on a new EU-level target for participation in early childhood education and care (ECEC) at EU level: 96% of children between 3 years old and the starting age for compulsory primary education to participate in ECEC. The latest available data from 2019 puts that share at 92.8%, for the EU as a whole, with increases during the preceding five years observed in most countries. The EU-level target should be seen in conjunction with policy guidance on the quality of ECEC provision. Member States are working both on increasing the accessibility of ECEC and improving the quality of staff and curricula. At EU level, a Working Group on ECEC supports the development of high quality ECEC through peer learning, monitoring and evaluation.

2.3.1 Progress towards the EU-level target

During the last decade, considerable steps have been taken to improve the participation of children in early childhood education and care all over Europe[132]. To keep the momentum, Member States have agreed on a new, ambitious EU-level target for this, ensuring that the early years in a child's education are kept in the spotlight.

The EU-level target states that, by 2030, at least 96% of children between 3 years old and the starting age for compulsory primary education should participate in ECEC[133]. Setting the target high should also help vulnerable children to benefit from the policy measures taken.

The latest (2019) EU average for the new ECEC target stands at 92.8%[134] (Figure 52). This is an increase of 2.1 pps over the preceding 5 years. In 2019, five Member States (Belgium, Denmark,

129 2030 Digital Compass: the European way for the Digital Decade.

130 The European Pillar of Social Rights Action Plan COM (2021) 102. Adopted on 3 March 2021.

131 Digital Economy and Society Index (DESI) 2020.

132 The now superseded ET2020 benchmark aimed for at least 95% of children between age of four and the age for starting compulsory primary education to participate in ECEC. This was reached in 2019, with an EU average of 95.3%.

133 The source data come from the joint UOE data collection (online data code: [educ_uoe_enra21]). The EEA target should not be confused with the Barcelona target (online data code: [ilc_caindformal]), which focuses on formal childcare. The share of participation in early childhood education and care as used for the EEA target captures attendance of ECEC programmes that fall under the ISCED 0 category.

134 As can be expected at this young age, the sex distribution of children participating in ECEC is very balanced, with never more than a percentage point difference between boys and girls.