



Students, digital devices and success

**OECD Directorate for
Education and Skills**



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Key findings

- Excessive use of digital devices for leisure in classrooms can negatively impact students' academic performance.
- 58% of students in France reported being distracted by using digital devices in at least some maths lessons.
- 59% of students across the OECD said their attention was diverted due to other students using phones, tablets or laptops in at least some maths lessons.
- Students who reported being distracted by peers using digital devices in some, most or every maths class score significantly lower in maths tests.
- 29% of students reported using smartphones several times a day in schools with phone bans, on average across the OECD; 21% used one every or almost every day.
- 43% of French students reported feeling nervous or anxious if their phones were not near them.
- The digital environment offers educational opportunities but also presents risks such as cyberbullying, exposure to inappropriate content and privacy concerns.
- Some studies show a positive link between children's literacy skills and the time they spend watching screens with families, but a negative link if children watch screens alone.
- Policies such as smartphone bans can help mitigate distractions, but effective enforcement and other strategies are needed for focused learning environments.
- Access to digital technology is essential for education; efforts should be made to ensure all students have access to the necessary digital tools and resources with the age-appropriate support and supervision of adults.

Findings from PISA 2022 results.

The digital environment has become an integral aspect of children's lives. It offers many opportunities such as enhancing educational opportunities, expanding social interactions and having fun. However, the digital environment also exposes children to risks such as cyberbullying, the viewing of violent and other inappropriate content, sexual exploitation and abuse and breaches of privacy. Much current debate also centers on concerns that digital technologies can detract from human interaction and reduce the quality of children's social and emotional experiences.

All of these issues have fueled concerns from parents, teachers, governments and young people themselves that digital technologies and social media may be exacerbating feelings of anxiety and depression, disturbing sleep patterns and distorting body image. As we integrate new digital technologies into education, we must acknowledge the challenges and complexities that arise. As stated in the OECD Recommendation on Children in the Digital Environment, it is crucial to establish conditions for a safe and beneficial digital environment. Education systems have a vital role in supporting children to navigate the risks while reaping the benefits.

Digital risks

The OECD recognises four main risk categories for children in the digital environment: content, contact, consumer and conduct risks. Advanced technology, privacy, and health and well-being risks are also identified as cross-cutting risks. With advances in digital technology, there is more worrying material out there, including hate speech, offensive content and false and misleading content. The fact children have greater access to digital devices and the pervasiveness of algorithms also means that they may stumble upon this content more easily.

This has translated into rising concerns about the amount of potentially disturbing and harmful material that kids are seeing online. Other risks, including consumer risks, such as exposure to inappropriate marketing messages and online fraud, also continue to be an issue. In-app purchases and digital marketing pose additional threats to children's well-being and privacy.

There is also evidence that children and adolescents' mental health is impacted by time spent online. Higher rates of screentime for adolescents has been found to be associated with symptoms of anxiety and depression, and young people appear to be more vulnerable to these mental health impacts than adults. The causal pathways behind this require further investigation, but young people's ongoing brain development, exposure to problematic or harmful online content, exposure to online bullying, and the substitution of other activities – in particular sleep but also in-person socialising and exercise – for screen time all likely play a part.

Policymakers have made efforts to tackle many of these issues. For example, many countries have tried to combat online hate speech and fake news by passing rules to restrict false or misleading content. There are also initiatives aimed at enhancing digital literacy and critical thinking skills, particularly among children and youth who primarily consume news from social media, where reliability varies widely.

Associations with learning and well-being

So it should be no surprise that there has been a lot of concern about the amount of time kids use digital tools. Health organisations and medical societies tend to advocate for limiting use of digital devices insofar as they may interfere with other health-promoting behaviours. Insights from the latest PISA survey, which assessed 15-year-olds' skills in maths, reading and science in 81 education systems, suggest that the amount of time that children use smartphones and other digital devices for leisure at school is strongly negatively related to learning outcomes.

While the data suggest a positive relationship between the intentional integration of technology in school education and student performance, the use of smartphones and other digital devices for leisure can be a learning distraction. Notably, the impact on classroom learning could be substantial, with 58% of students in France reporting being distracted by using digital devices in at least some maths lessons, compared to an OECD average of 65%. The proportion topped 80% in Argentina, Brazil, Canada, Chile, Finland, Latvia, Mongolia, New Zealand and Uruguay.

Just as importantly, across the OECD, 59% of students said their attention was diverted due to other students using phones, tablets or laptops in at least some maths lessons. In France the proportion was 53% although in some countries the percentage was far lower, for example just 18% of students in Japan and 32% in Korea reported this level of distraction.

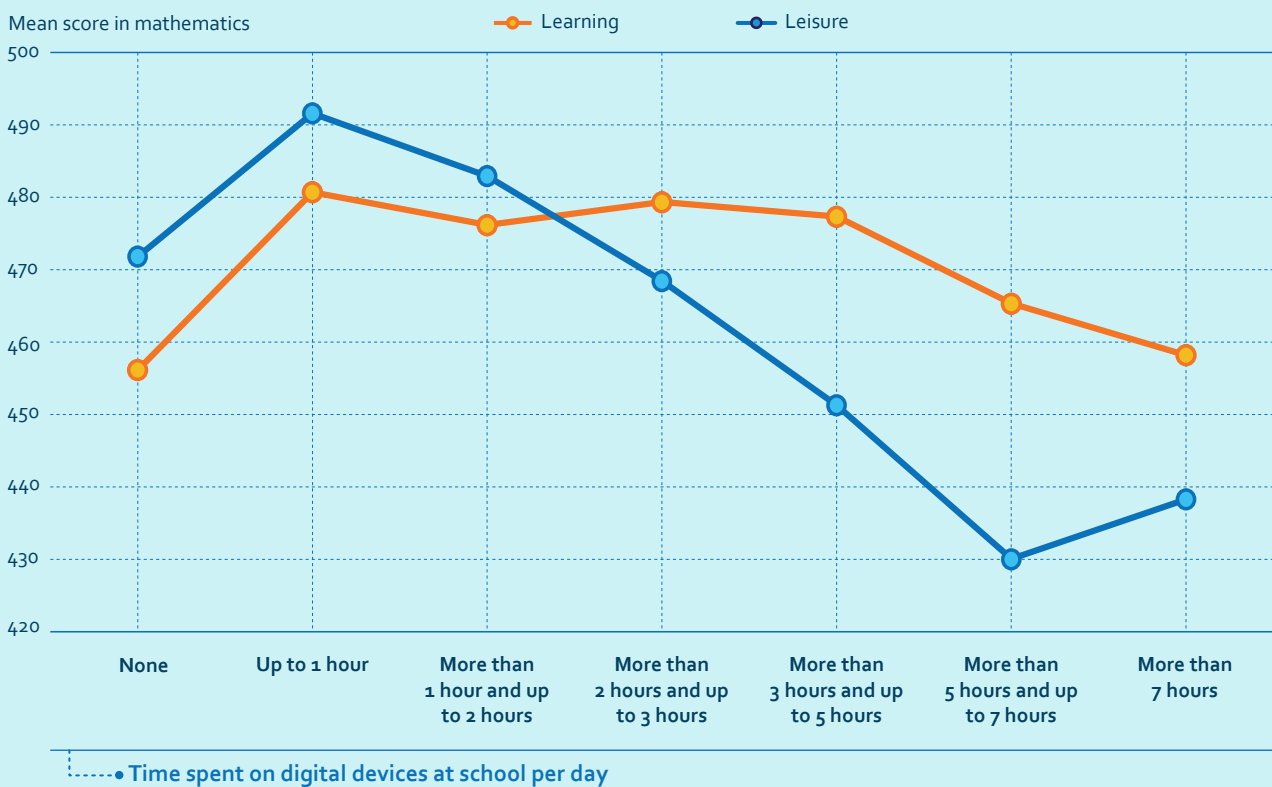
Digital distraction is not merely an inconvenience; it appears to have a tangible association with learning outcomes, according to PISA. Students who report being distracted by peers using digital devices in some, most or every maths class score significantly lower in maths tests, equivalent to three-quarters of a year's worth of education. The amount of time spent on digital devices for leisure at school, particularly for more than an hour a day, also seems to correlate with a significant drop in maths scores.

While students who devoted one to five hours a day to learning on digital devices generally achieved better learning outcomes than their non-using counterparts, those who used them more than an hour a day at school for leisure — such as using social media apps, browsing the internet or playing games —experienced

a significant decline in their maths scores. On average across OECD countries, students who spent up to one hour a day for leisure activities on digital devices at school scored 49 points higher in maths than their counterparts who spent five to seven hours daily glued to their screens, even after adjusting for students' and schools' socio-economic profiles. All in all, students who used their smartphone at school in most maths lessons were 1.4 times as likely to be distracted than students who did not.

Time spent on digital devices at school and mathematics performance

Based on students' reports; OECD average



Note: Differences between categories are all statistically significant (see PISA Results Volume II Annex A3).

Source: OECD, PISA 2022 Database, Volume II Annex B1, Chapter 5 (Figure II.5.14).

The battle against distraction

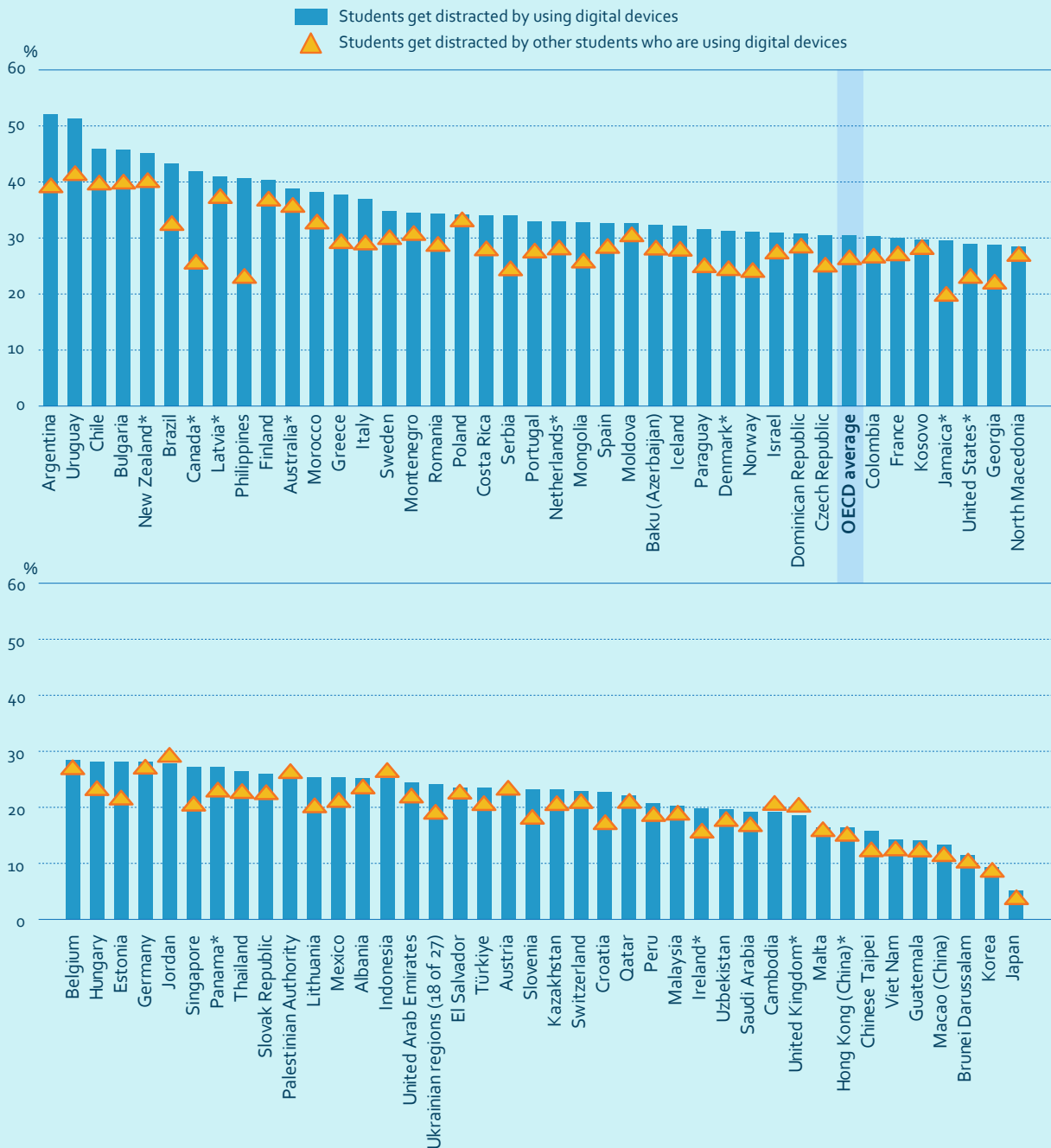
This highlights how the use of digital devices in classrooms has become a double-edged sword. On one hand, these devices can expand access to learning resources and provide flexibility, including promoting digital inclusion for students with disabilities. On the other hand, the temptation for students to multitask, shift attention to non-academic activities, or explore the vast information available on their devices can impact their concentration and, consequently, their academic performance.

That said, not all digital devices contribute equally to distraction. Students who frequently use smartphones at school are more susceptible to their attention wandering, with the allure of non-educational activities and notifications proving hard to resist. In contrast, PISA data suggest that the use of educational software exhibits a more moderate negative association with concentration. This supports other emerging research which indicates that what children consume and do in digital environments is as important as the length of time they spend on digital devices.

Furthermore, it is somewhat stating the obvious, but students appear to be less distracted in class when they switch off notifications from social networks and apps on their digital devices, do not use digital devices to take notes or search for information, and when they do not feel pressured to be online and answer messages while in class. The use of digital devices in schools also raises questions regarding children's well-being. For example, in France, 43% of students reported feeling nervous or anxious if their phones were not near them, according to PISA data, similar to the average across OECD countries. The data suggest that students who felt this way scored 9 points less in PISA tests than the average, across the OECD. They were also less satisfied with their lives, had less emotional control and were less resistant to stress, although the direction of the causation cannot be determined based on the available data.

Distraction from digital devices in mathematics lessons

Percentage of students who reported that the following happens in every or in most of their mathematics lessons



Countries and economies are ranked in ascending order of the percentage of students who reported that they get distracted by using digital devices.

Source: OECD, PISA 2022 Database, Volume II Annex B1, Chapter 3 (Figure II.3.4).

To ban or not to ban

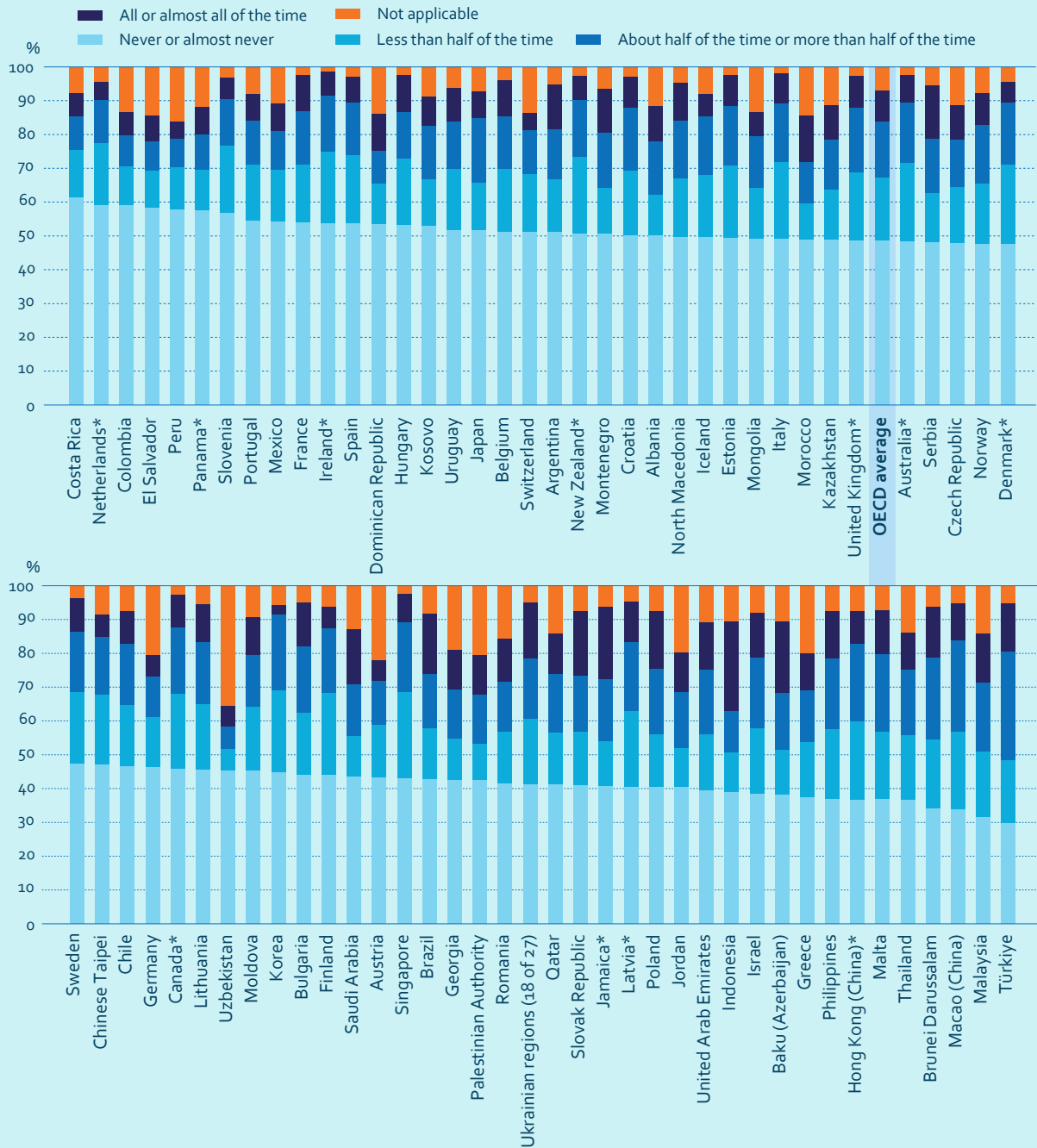
It is therefore no surprise that how to mitigate distractions in schools is a key policy debate. Many educational institutions have introduced rules to address the distraction issue, but their effectiveness is nuanced. When a school's written statements or rules are too generally designed, imprecise or lenient, they are unlikely to support effective teaching and learning with digital devices. Teachers also need to be able to enforce the rules but will likely often struggle to monitor students effectively, even when incorporating digital devices into lessons.

One action that has demonstrable impact is a ban on smartphones at school. PISA data suggest that such bans can be effective, although with a lot depending on enforcement. Even in schools with phone bans, 29% of students reported using smartphones several times a day, on average across the OECD, with 21% using one every day or almost every day at school. France, which has banned phones in schools for kids up to the age of 14 until they attend Lycée, did not take part in this area of the PISA survey.

The possible relationship between mobile phone bans and students' digital behaviour outside of school further underscores the complexity of the issue. At schools with phone bans in Canada, Chile, Indonesia, Korea, New Zealand, Peru, the Philippines, the Slovak Republic and Chinese Taipei, students were less likely to turn off notifications from social networks and apps on their digital devices when going to sleep. The data suggest that even in schools with bans, students may struggle to adopt responsible behaviour regarding phone use.

Feeling nervous/anxious when digital devices are not near

Based on students' reports



Countries and economies are ranked in descending order of the percentage of students who never or almost never feel nervous/anxious when they don't have digital devices near them.

Source: OECD, PISA 2022 Database, Annex B1, Chapter 5

Sharing screen time early on

As reflected in the PISA data, one critical aspect that must not be overlooked is the context in which children use screens. For example, the nature of the content being viewed and interactions during screen time are likely important factors. Some studies have shown a positive correlation between children's literacy skills and the time they spend watching screens with their families. While a negative link was observed when kids watched screens alone, a positive association emerged when parents watched screens together with their children. This underscores the potential value of the quality of interactions during screen time.

This is backed up by other OECD research into the impact of technology on young children, aged two to six. According to the OECD's "Empowering Young Children in the Digital Age" report, screen time can be positive if supervised and focused on educational content. Digital technologies can potentially enrich learning activities through interactive features, the report found, and lay the foundation for skills crucial in later life, such as fostering interest in fields like artificial intelligence, programming and engineering.

However many issues warrant attention, including extended screen time and exposure to inappropriate content, as previously discussed. Educators, caregivers and parents must comprehend the benefits of technology in active and educational contexts, while enforcing time constraints to ensure a holistic learning experience, the report argues.

Addressing digital divides

It is also important to consider the widening digital access and skills gaps that disproportionately affect many groups, including girls and disadvantaged children across the globe. The COVID-19 pandemic underscored the importance of extending education beyond traditional school boundaries, emphasising the need for devices and connectivity at home for effective digital education. During the pandemic, remote lessons, digital tools, and educational apps became integral components of the learning experience, offering personalised and adaptive approaches to education.

However, many children lacked access to technology during this period. The lack of available devices and connectivity in some homes posed a significant hurdle, which could have negatively impacted learning outcomes. While some countries implemented initiatives during the pandemic to level the playing field, many of these efforts, such as providing free access to educational platforms, have been discontinued.

Other issues, such as funding disparities among public schools across different regions, may result in varying provisions of digital tools. This can also potentially widen the achievement gap and inequality of opportunities between richer and poorer neighborhoods, or urban and rural communities. Governments need to ensure a minimum baseline of digital tools and resources across all schools to prevent such disparities.

Teachers also need opportunities to develop digital competences to ensure all teachers have the confidence and skills to effectively integrate digital resources into their teaching. 70 percent of students in France in 2022 were taught by teachers who have the necessary technical and pedagogical skills to integrate digital devices into teaching, according to principals, up from 56 percent in 2018. 87% of French students also have an effective online learning support platform – up from 35% in 2018. But the proportion of French students whose teachers have time to prepare lessons which integrate digital devices into their classes has dropped to 58% in 2022, down from 81% four years earlier.

What else to consider?

As much learning now takes place through a connected device, digital literacy is crucial. 21st-century literacy means checking facts before basing opinions on them. It means asking questions about sources of information: Who wrote this? Who made this video? Is it a credible source? Does it even make sense? What are my biases? All this belongs in school and teacher-training curricula. It has applications far beyond detecting false and misleading content; this is about ensuring people can make informed decisions - the basis for functioning democracies.

However, the ability and habit of reading long pieces of text is key to building up reading skills. According to the OECD's "21st-Century Readers: Developing Literacy Skills in a Digital World" report, reading digital texts more frequently showed a negative association with reading performance in 55 countries and economies, even after accounting for students' and schools' socio-economic profiles. In contrast, reading fiction texts and reading long texts more frequently was positively associated with reading performance. On average across OECD countries, students who had to read longer pieces of text for school (101 pages or more) achieved 31 PISA score points more in reading than those who reported reading smaller pieces of text (10 pages or less), after accounting for students' and schools' socio-economic profiles and students' gender.

Heavy use of digital devices and the Internet can take away time that could otherwise be used to read books or do other activities, such as sports. It is stating the obvious that physical activity is beneficial for development and sets good habits for adulthood. But even before the global disruption caused by the COVID-19 pandemic, a significant number of children were not engaging in sufficient levels of physical activity. Within the EU in 2018, about 25% of 11-year-olds and roughly 14% of 15-year-olds met the daily exercise recommendation of one hour of moderate-to-vigorous physical activity, according to OECD data. The World Health Organization (WHO) advises a minimum of 60 minutes of exercise per day for children. More strikingly, physical activity each day has decreased between 2006 and 2018 for both 11-year-olds and 15-year-olds.

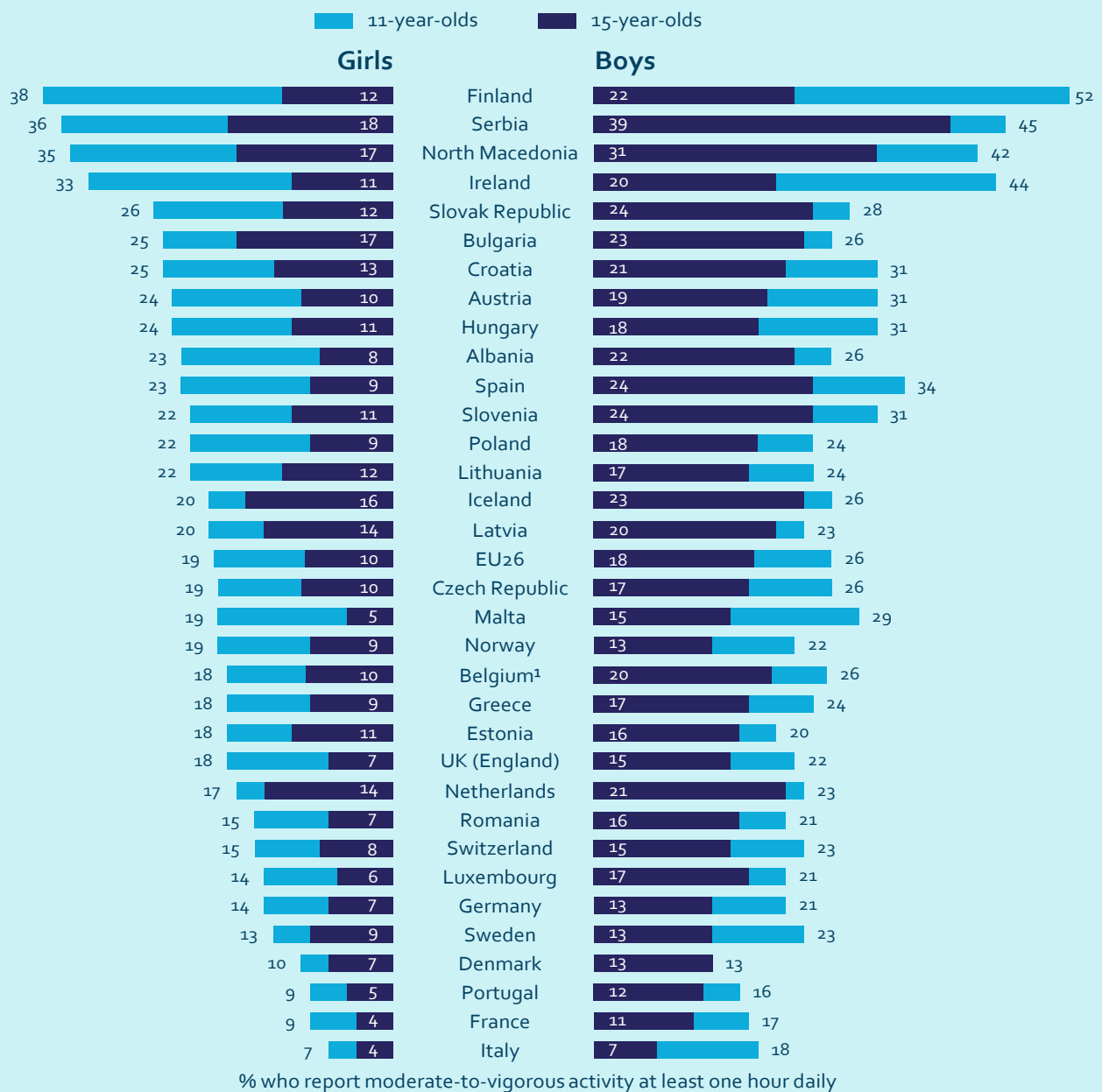
Among surveyed nations, Italy, France, Portugal, and Denmark reported some of the lowest physical activity rates among both genders. Conversely, Finland and Ireland were noted for their higher levels of activity. A consistent trend across all countries was that boys were generally more active than girls. Factors influencing the amount of physical activity undertaken by children include the availability of safe space and equipment, increasing road traffic, overscheduling and overprotective parenting, lack of green spaces in urban centres, their school curricula and activities that compete for their attention – including the use of mobile devices and the web.

Push for a ban?

So, what can schools do to strike a balance between the benefits and challenges of digital technology? Digital tools have potential. They offer innovative pathways for learning and personalisation, including the opportunity to give access to a wide variety of perspectives and opinions. However, the pitfalls, including distractions and potential impacts on mental well-being, must not be overlooked. More than a dozen countries have already implemented phone bans in classrooms to minimise distractions, promote face-to-face interaction, and prevent cheating. By implementing such policies, schools aim to create a focused learning environment, foster interpersonal skills, maintain academic integrity, and ensure a safe and inclusive atmosphere. In terms of screen time, many experts have emphasised the need for a precautionary approach and the importance of not just concentrating on the length of time spent on devices, but on how children consume content. Experts have also advised turning off devices when not in use, limiting exposure to blue-light emitting devices before bedtime, and designating certain times and locations such as the dinner table as media-free zones. PISA data suggest that phone bans in schools can help alleviate digital distractions, but not always. As we navigate this complex landscape, it is imperative for educators, policymakers, and parents to collaboratively find solutions that harness the benefits of digital technologies while safeguarding the focus and well-being of students. Only then can we ensure that the digital classroom becomes a space of enrichment rather than a source of distraction.

Share of 11- and 15-year-olds meeting WHO recommended daily physical activity

2018



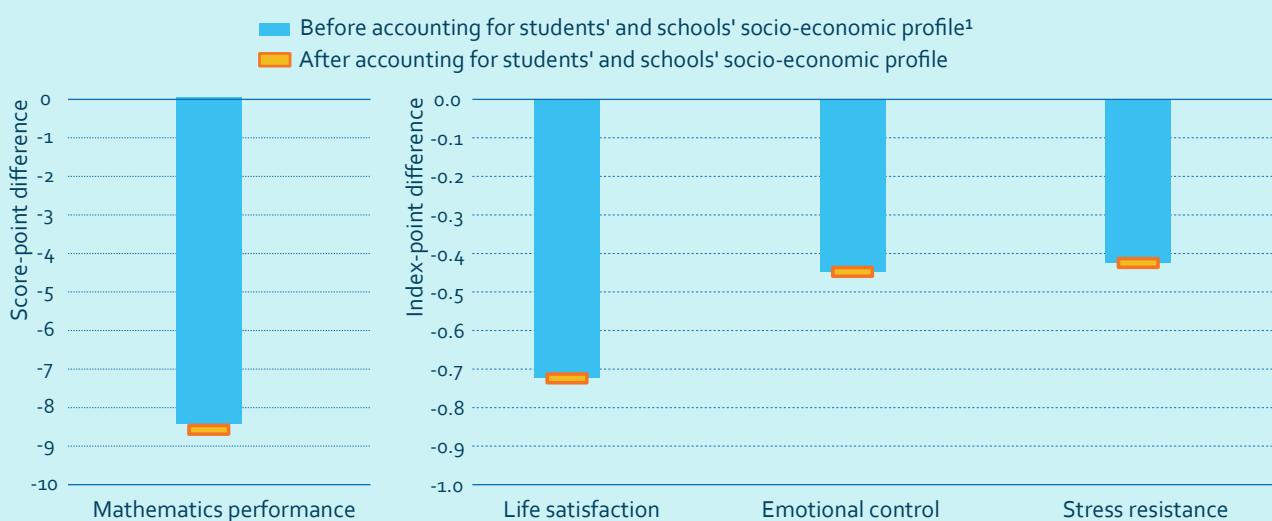
Notes: The EU average is unweighted.

1. The value for Belgium is the unweighted average of the Flemish and French Communities.

Source: 2017/2018 Health Behaviour in School-aged Children (HBSC) survey in Europe and Canada data from Inchley, J. et al. (2020)

Feeling nervous/anxious when digital devices are not near and selected student outcomes

Based on students' reports; OECD average



1. The socio-economic profile is measured by the PISA index of economic, social and cultural status.

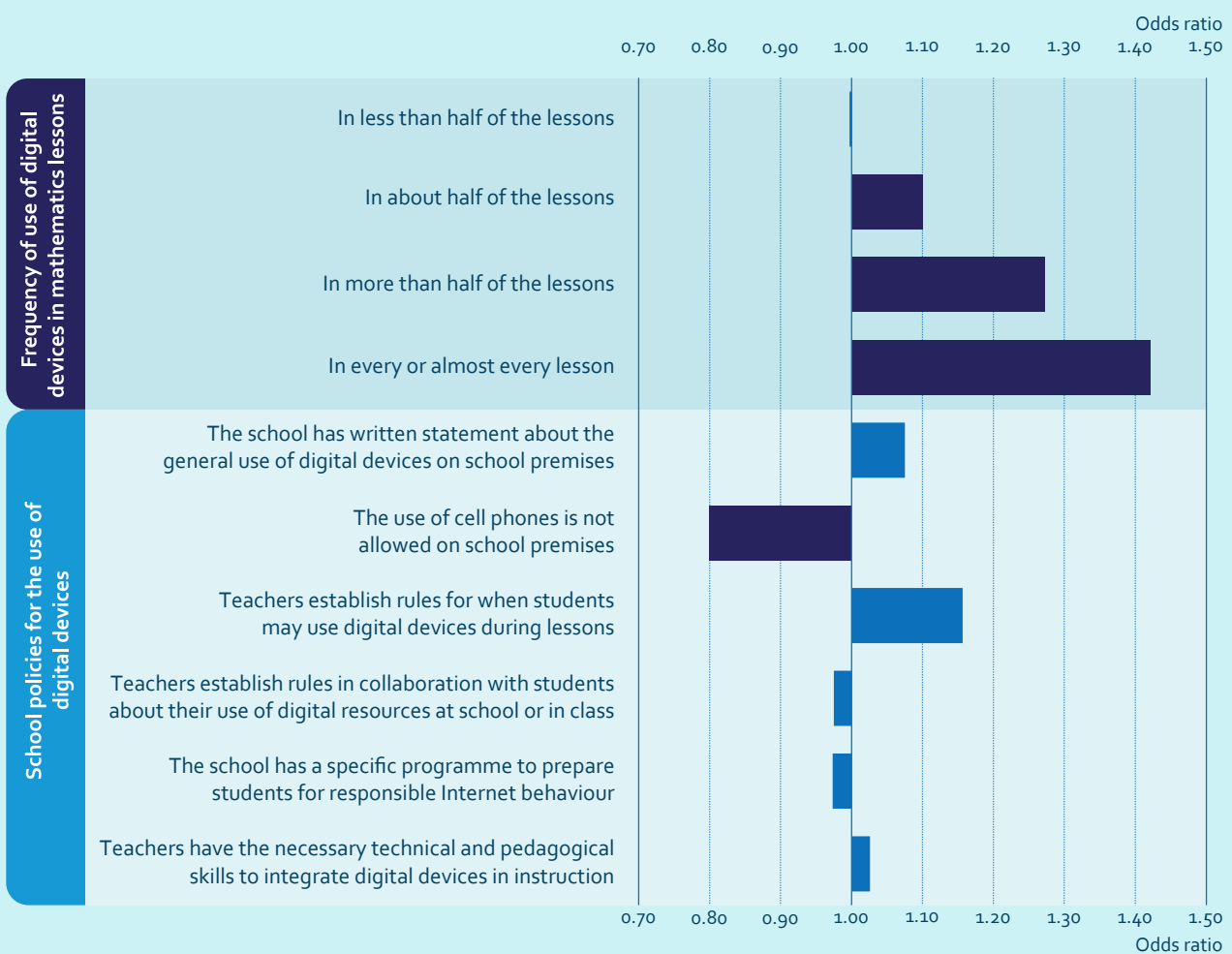
Notes: All values are statistically significant before and after accounting for students' and schools' socio-economic profile (see Annex A3).

The results show the difference between students who feel nervous/anxious less than half of the time, about half of the time, more than half of the time or all or almost all of the time when they don't have their digital devices near them compared to those who never or almost never feel nervous/anxious when they don't have their digital devices near them.

Source: OECD, PISA 2022 Database, Annex B1, Chapter 5.

Digital devices, distraction and school policies

Change in the likelihood of students becoming distracted by using digital devices in mathematics lessons when students reported that they use their smartphone at school and school principals reported the school's policy on smartphone use; OECD average



Note: Statistically significant differences are shown in a darker tone (see Annex A3).

Source: OECD, PISA 2022 Database, Annex B1, Chapter 5

This report has been authorised by Andreas Schleicher, Director of the Directorate for Education and Skills, OECD.

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