Learning remotely when schools close: How well are students and schools prepared? Insights from PISA

As school after school shuts down in the face of the Covid-19 crisis (in now more than 140 countries), online learning opportunities have been elevated from a bonus extracurricular facility to a critical lifeline for education.

The opportunities digital technologies offer go well beyond a stop-gap solution during the crisis. Digital technology allows us to find entirely new answers to what people learn, how people learn, where people learn and when they learn. Technology can enable teachers and students to access specialised materials well beyond textbooks, in multiple formats and in ways that can bridge time and space. Alongside great teachers, intelligent online learning systems do not only teach us science; they can simultaneously observe how we study, how we learn science, the kind of tasks and thinking that interest us, and the kind of problems we find boring or difficult. The systems can then adapt the learning experience to suit our personal learning style with far greater granularity and precision than any traditional classroom setting possibly can. Similarly, virtual laboratories give us the opportunity to design, conduct and learn from experiments, rather than just learning about them.

That being said, the Covid-19 crisis strikes at a point when most of the education systems covered by the OECD's latest round of the Programme for International Student Assessment (PISA) are not ready for the world of digital learning opportunities. Below are some sobering numbers. The data were collected as part of the global PISA assessment in 2018, and are based on representative samples from 79 education systems involving over 600,000 15-year-olds. Unless otherwise noted, numbers refer to the average across the 36 OECD countries. Data not provided in this note are accessible through the PISA database.

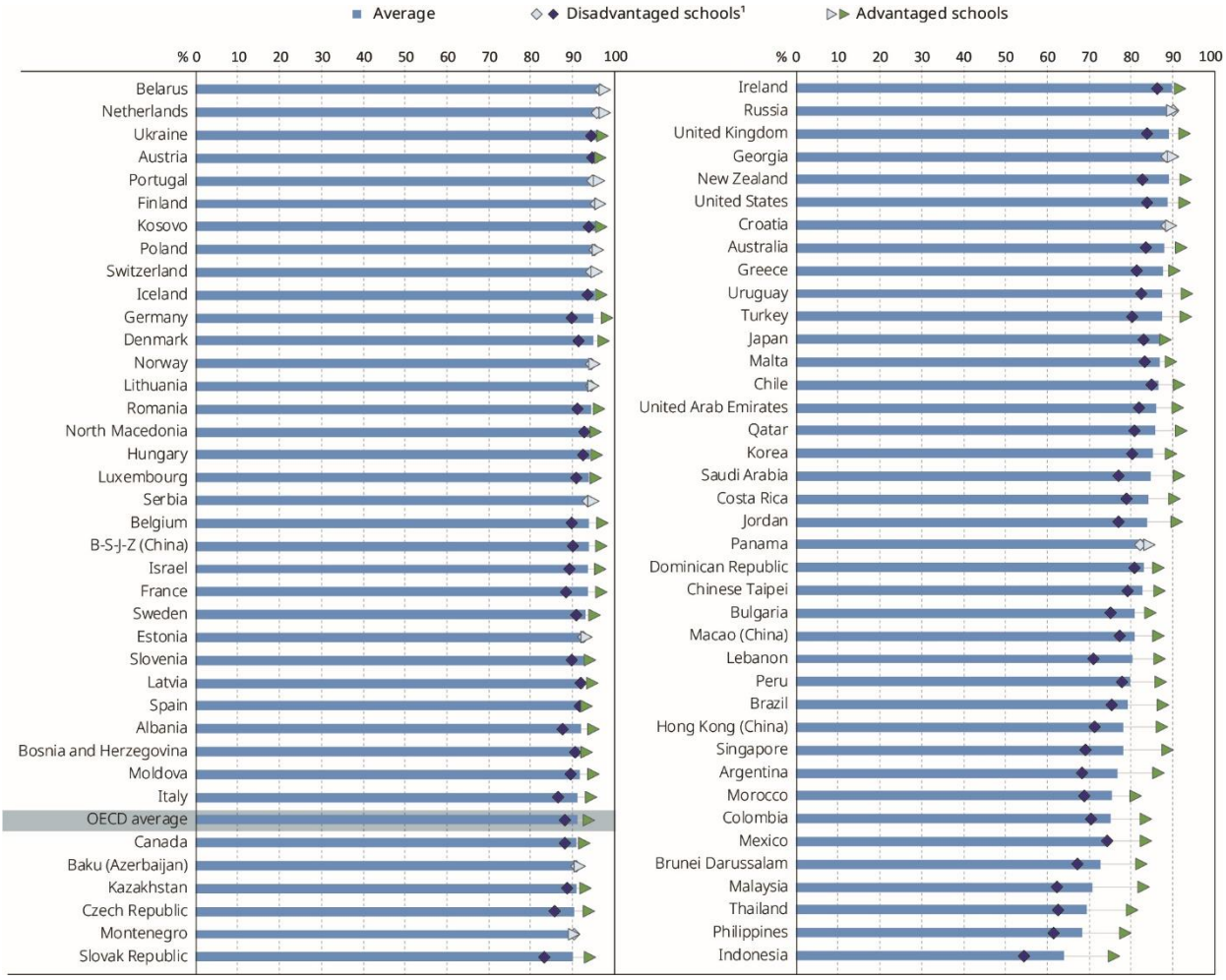
Students' access to the digital world

Let's begin with the basics: on average across OECD countries, 9% of 15-year-old students do not even have a quiet place to study in their homes, and in Indonesia, the Philippines and Thailand it is over 30%

(Figure 1). This is not a random group, but it tends to be students from the most disadvantaged backgrounds. Even in PISA top-performer Korea, one in five students from the quarter of the most socio-economically disadvantaged schools do not have a place to study at home.

Figure 1. Access to a quiet place to study

Percentage of students that have access to a quiet place to study, PISA 2018



Note: Statistically significant values are shown in darker tones.

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Countries and economies are ranked in descending order of the average percentage of students that have access to a quiet place to study.

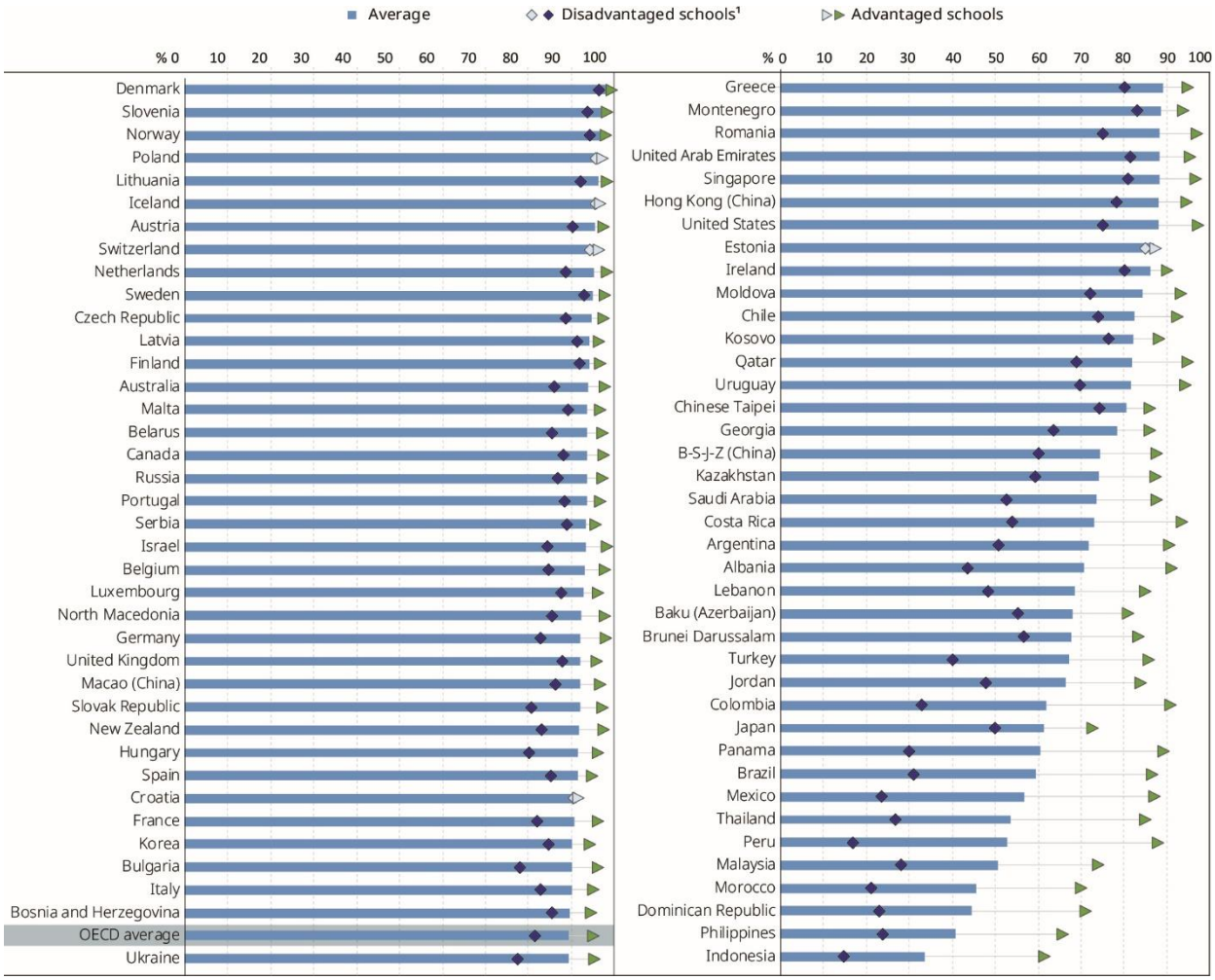
Source: OECD, PISA 2018 Database

A quiet place to study is a good start, but an obvious prerequisite to online learning is having access to a computer that students can use to do their work in their homes. In Denmark, Slovenia, Norway, Poland, Lithuania, Iceland, Austria, Switzerland and the Netherlands, over 95% of students report that they have a computer to use for working at home, but in Indonesia, it is only 34% (Figure 2). Here, too, there tend to be very large gaps across socio-economic groups. For example, virtually every 15-year-old in socio-economically advantaged schools in the United States has a computer to work with at home, but only three

out of four students in disadvantaged schools have one; in Peru, it is 88% of students in privileged schools, versus just 17% in disadvantaged schools.

Figure 2. Access to a computer for schoolwork

Percentage of students that have access to a computer they can use for schoolwork, PISA 2018



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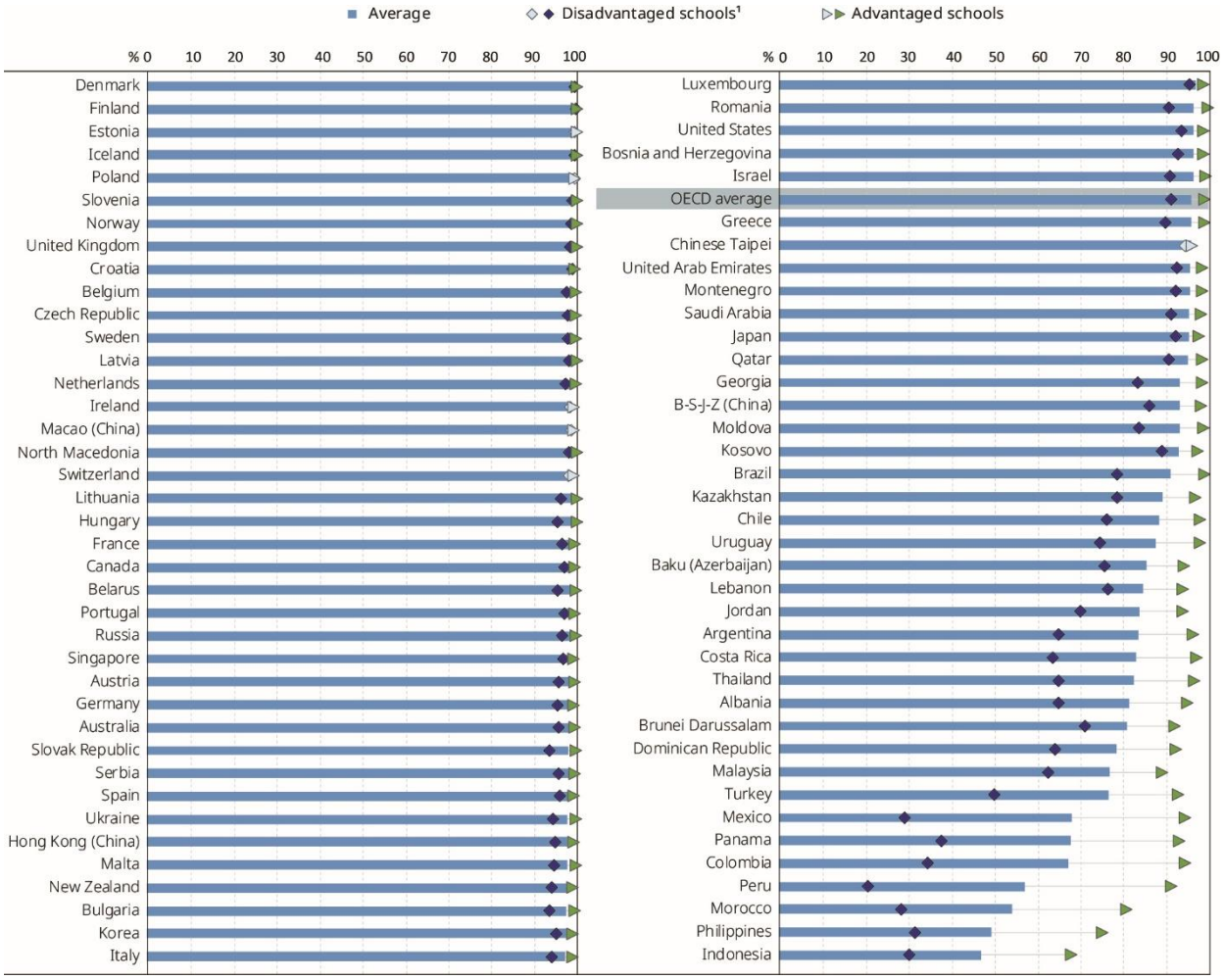
Countries and economies are ranked in descending order of the average percentage of students that have access to a computer they can use for schoolwork.

Source: OECD, PISA 2018 Database

Then there is the Internet, which is required for online learning. Here again, there are countries where Internet access at home is close to universal, while in others it reaches just half of 15-year-olds (Figure 3). In Mexico, 94% of 15-year-olds from privileged backgrounds have a link to the Internet in their homes, compared to just 29% of those from disadvantaged backgrounds. Internet access is an area where geography also matters in many countries.

Figure 3. Access to a link to the Internet

Percentage of students that have access to a link to the internet, PISA 2018



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Preparedness of teachers and schools

The other part of the equation is, of course, how well educational institutions are equipped and accustomed to online learning, and how well teachers are prepared and engaged in online learning.

Even where online education does not directly rely on schools, the state of technology in schools provides some indication of the readiness of the education system and its experience with technology. Moreover, the success of many students over the coming weeks and months will hinge critically on their ability to maintain close relationships with their teachers. This is particularly true for students from disadvantaged backgrounds, who may not have the parental support or who lack the resilience, learning strategies or

engagement to learn on their own. There should be no illusions about the impact that the combination of economic hardship and school closures could have on the poorest children.

The needs of these children will be front-of-mind for their teachers, which underlines the importance of keeping teachers closely engaged and connected with learners. There is one further consideration: the PISA 2018 assessment revealed that even among 15-year-old students, on average across OECD countries, just 1 in 9 students was able to distinguish between fact and opinion, based on implicit cues pertaining to the content or source of the information. Thus, without considerable guidance and support from teachers, it is unlikely that students will be able navigate the world of online learning on their own.

Availability of technology

For a start, on average across OECD countries, there is almost one computer for educational purposes available at school for every 15-year old student (the computer-student ratio is equal to 0.8). In Austria, Iceland, Luxembourg, Macao (China), New Zealand, the United Kingdom and the United States, the computer-student ratio is 1.25 or more, while in Albania, Brazil, Greece, Kosovo, Montenegro, Morocco, Turkey and Viet Nam, there is only one computer available for every 4 students (ratio = 0.25) or less.

In most countries, the distribution of computers in schools tends to be more equitable than at home. In fact, in 16 countries and economies, the computer-student ratio is actually greater in disadvantaged schools than in advantaged schools..than their peers in schools with fewer computers per student. On average across OECD countries, one additional computer per student in a school was associated with a 12-point decline in reading scores before accounting for other factors, and with a 6-point decline after accounting for students' and schools' socio-economic profile. While this negative association between computers-per-student and students' scores may have many reasons, it does suggest that it takes more than providing technology to reap benefits in terms of better learning. This is a warning signal at a time when online learning has become the only option.

Fixed workstations at school will not be of much help when students need to learn at home. In this sense, it is encouraging that 40% of all computers available to 15-year-olds in school are portable. In a few high-income countries, most computers available at school are portable: in Denmark, Norway, Singapore and Sweden, 9 out of 10 computers are portable and in the United States, 8 out of 10 computers are portable. By contrast, in 50 countries and economies, only 30%, at most, of all computers available at school are portable. In Cyprus, Georgia, Jordan, Malta, Morocco, the Philippines and Thailand, only 1 in 10 computers, at most, are portable.

Portable computers are more frequently available in socio-economically advantaged than in disadvantaged schools, on average across OECD countries and in 21 education systems that participated in PISA 2018. Indeed, the growth in the availability of portable computers at school between 2015 and 2018 was due to gains amongst schools in the second, third and top quarters of the distribution of schools' socio-economic profile, while amongst disadvantaged schools, the share of portable computers did not change during the period. As a result, the disparity in access to portable computers related to socio-economic status increased between 2015 and 2018.

Use of technology and preparedness of teachers

Technology is only as good as its use. PISA 2018 asked school principals about different aspects of their school's capacity to enhance teaching and learning using digital devices. On average across OECD countries, 65% of 15-year-olds are enrolled in schools whose school principal considers that their teachers have the necessary technical and pedagogical skills to integrate digital devices in instruction. This highlights the enormous training needs that lie ahead of education systems to get ready for educational technology. Again, this varies considerably between socio-economically advantaged and disadvantaged

schools. In Sweden, for example, this is 89% in advantaged schools but just 54% in disadvantaged schools. These numbers signal that schools may reinforce rather than moderate the disadvantage that comes from individual home backgrounds (On average across OECD countries, about 60% of 15-year-old students are enrolled in schools whose principals consider that teachers have sufficient time to prepare lessons integrating digital devices, ranging from close to 90% in the four Chinese provinces to little more than 10% in Japan (Figure 5). The picture is similar when it comes to the availability of effective professional resources for teachers to learn how to use available digital devices (Figure 6). About 55% of students were in schools where teachers are provided with incentives (Figure 7) to integrate digital devices into their teaching or have sufficiently qualified technical assistant staff (Figure 8).

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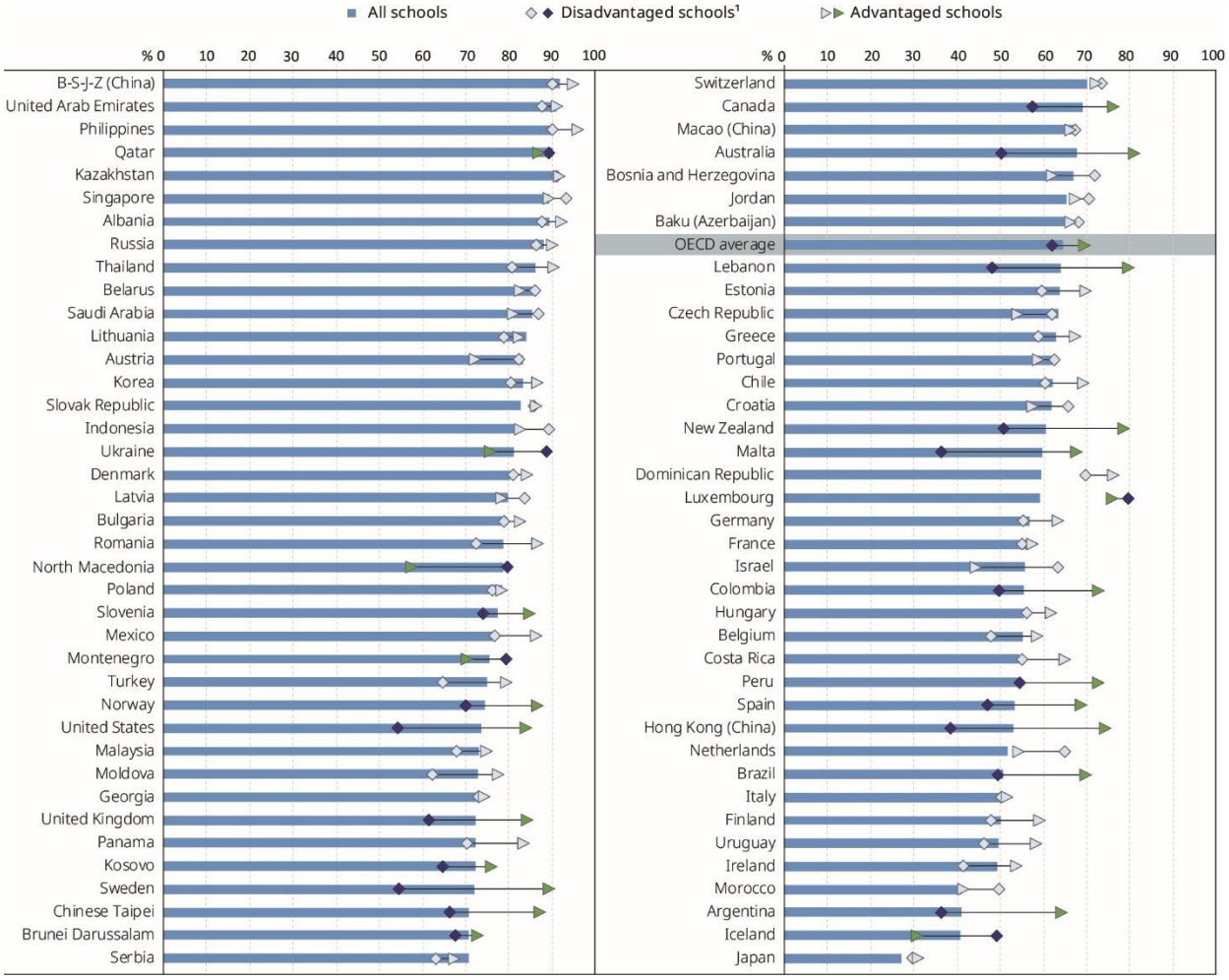
Figure 4. Teachers have the necessary technical and pedagogical skills to integrate digital devices in instruction

Percentage of students in schools whose principal agreed or strongly agreed that teachers have the necessary technical and pedagogical skills to integrate digital devices in instruction, PISA 2018



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Countries and economies are ranked in descending order of the percentage of schools where teachers have the necessary technical and pedagogical skills to integrate digital devices in instruction.

Source: OECD, PISA 2018 Database

Figure 5. Teachers have sufficient time to prepare lessons integrating digital devices

Percentage of students in schools whose principal agreed or strongly agreed that teachers have sufficient time to prepare lessons integrating digital devices, PISA 2018

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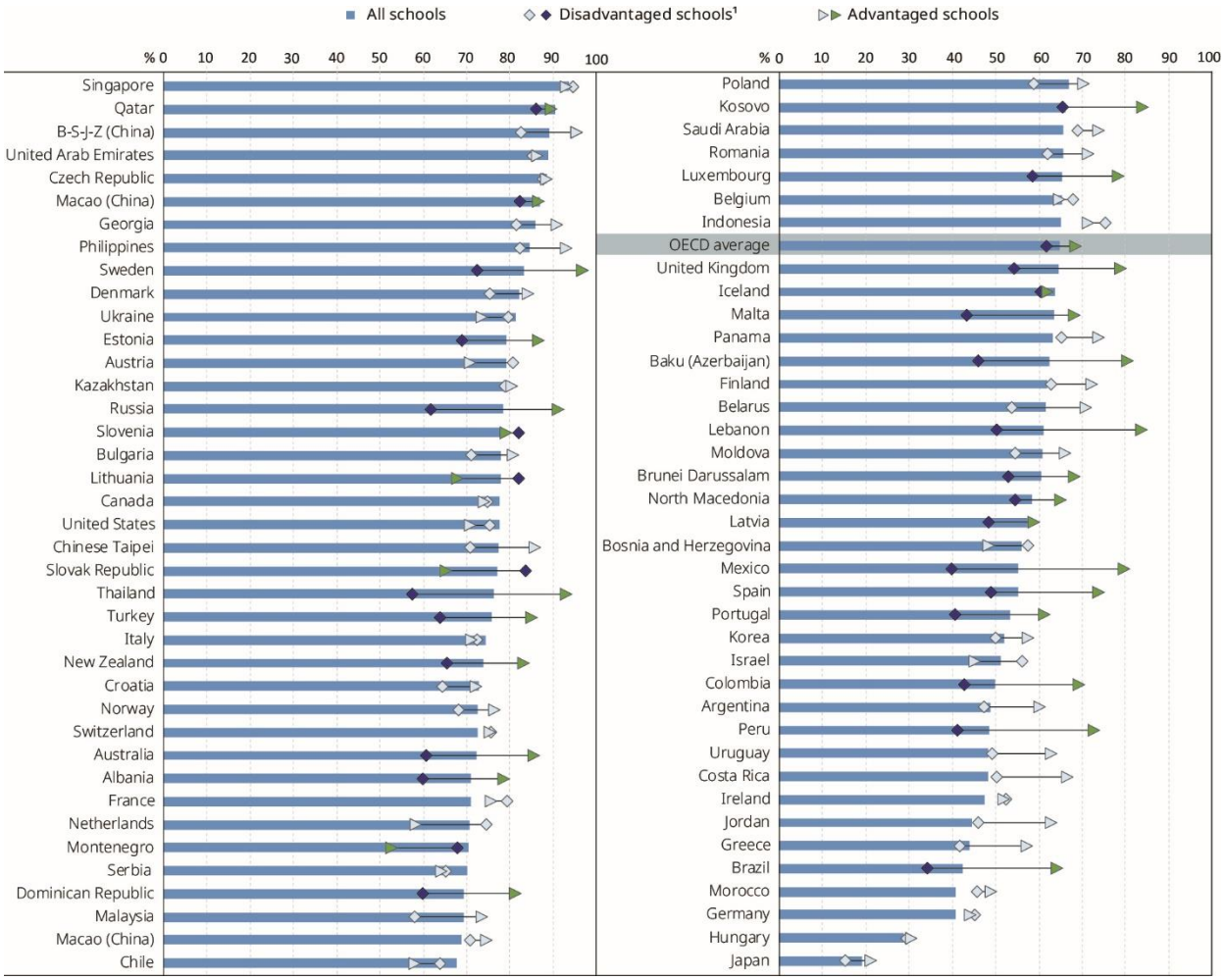
Source: OECD, PISA 2018 Database

Figure 6. Effective professional resources for teachers to learn how to use digital devices are available

Percentage of students in schools whose principal agreed or strongly agreed that effective professional resources for teachers to learn how to use digital devices are available, PISA 2018



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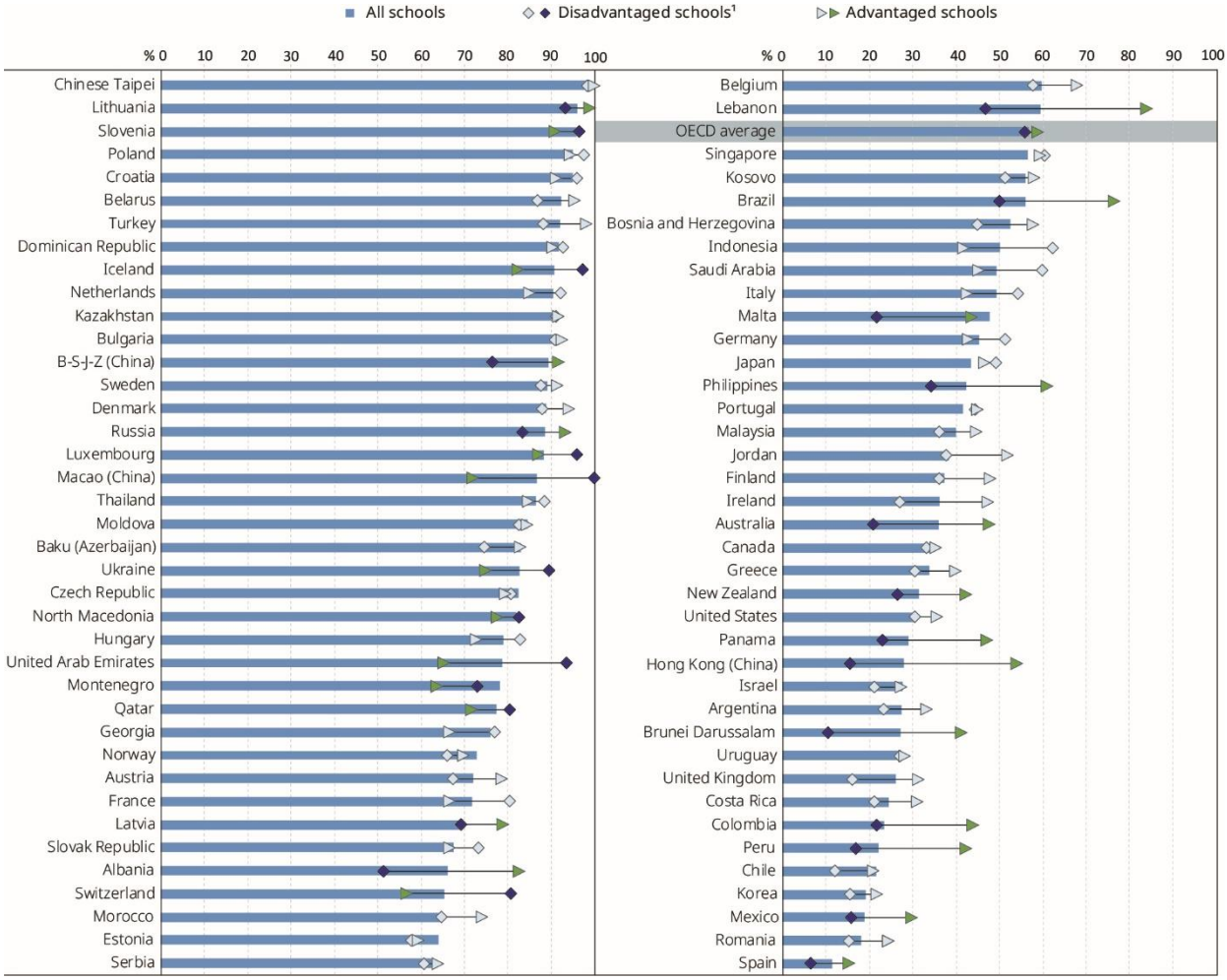
Source: OECD, PISA 2018 Database

Figure 7. Teachers are provided with incentives to integrate digital devices in their teaching

Percentage of students in schools whose principal agreed or strongly agreed that teachers are provided with incentives to integrate digital devices in their teaching, PISA 2018



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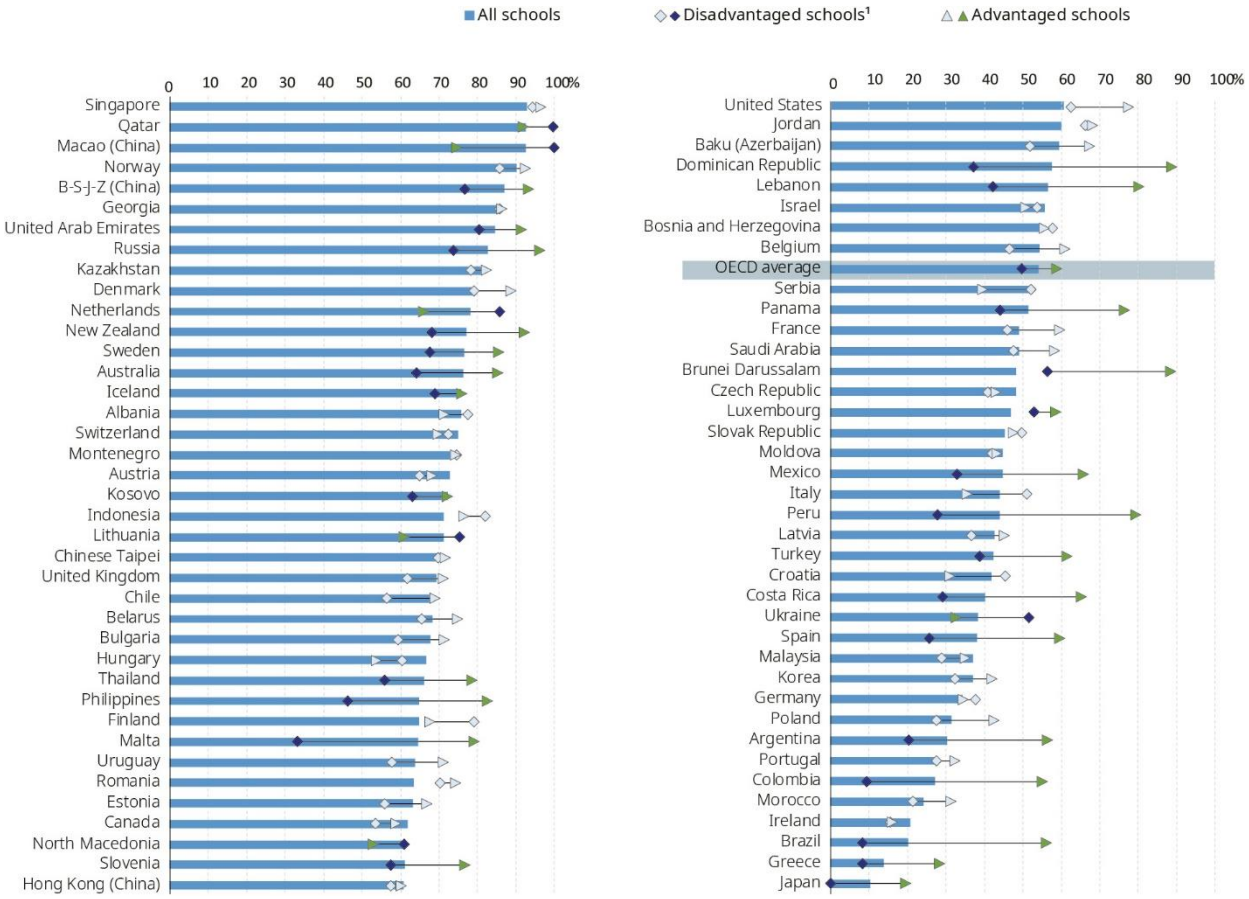
Source: OECD, PISA 2018 Database

Figure 8. The school has sufficient qualified technical assistant staff

Percentage of students in schools whose principal agreed or strongly agreed that the school has sufficient qualified technical assistant staff, PISA 2018



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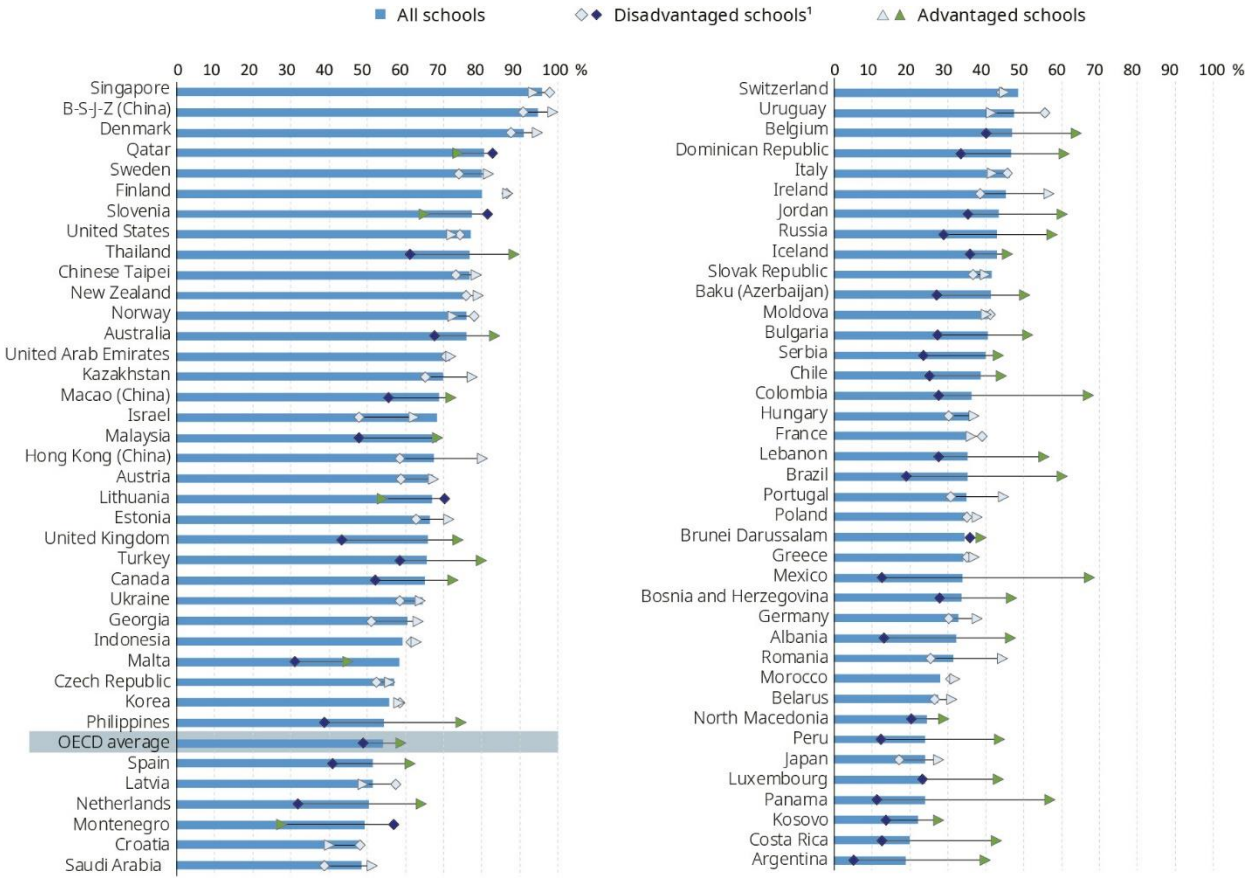
Countries and economies are ranked in descending order of the percentage of schools that have sufficient qualified technical assistant staff
Source: OECD, PISA 2018 Database

Access to effective online learning platforms

What counts perhaps most in this crisis is access and availability of effective online platforms for learning. On average across OECD countries, almost half of 15-year-olds are enrolled in schools whose principal reported that an effective online learning support platform is available. Again, there is large variation within and across countries. In Singapore, the four Chinese provinces and Macao (China), and Denmark, 9 out of 10 students are enrolled in schools that have an effective online learning support platform, whereas in Argentina, Costa Rica, Kosovo, Panama, Luxembourg, Japan, Peru, the Republic of North Macedonia, Belarus and Morocco it is less than 30% (Figure 9).

Figure 9. An effective online learning support platform is available

Percentage of students in schools whose principal agreed or strongly agreed that an effective online learning support platform is available, PISA 2018



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Countries and economies are ranked in descending order of the percentage of schools where an effective online learning support platform is available
Source: OECD, PISA 2018 Database

School practices for using digital devices effectively

Using digital devices and ICT effectively and safely, to enhance teaching and learning, may also depend on schools' policies and practices. PISA 2018 asked school principals whether they had formal guidelines (e.g. written statements, programmes or policies) or specific practices (e.g. regularly scheduled meetings) that focus on how to use digital devices effectively and safely in the classroom.

On average across OECD countries, the most common school practices intended to improve learning through the use of digital devices were: having regular discussions between school principals and teachers about the use of digital devices for pedagogical purposes (63% of students attended schools that practice this); having written school statements about the use of digital devices (62% of students); and having a specific programme to prepare students for responsible Internet behaviour (60% of students).

By contrast, on average across OECD countries, the least common practices were: having a specific programme to promote collaboration amongst teachers on the use of digital devices (36% of students attended schools that have such a programme); having a scheduled time for teachers to meet to share, evaluate or develop instructional materials and approaches that use digital devices (44% of students); and having a written statement specifically about the use of digital devices for pedagogical purposes at school (46% of students).

School guidelines and practices to enhance teaching and learning using digital devices are more often observed in socio-economically advantaged schools than disadvantaged schools.

The bottom line

In this moment of crisis, digital technology holds great promise to provide learners with access to high quality learning. However, most education systems need to pay close attention to ensure that technology does not amplify existing inequalities in access and quality of learning further. This is not only a matter of providing access to technology and open learning resources, but will also require maintaining effective social relationships between families, teachers and students, particularly for those students who lack the resilience, learning strategies or engagement to learn on their own. Technology can amplify the work of great teachers, but it will not replace them.