OECD

International Summit on the Teaching Profession

# Reimagining Teaching in an Accelerating World

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*TALIS estimates should be interpreted with caution due to higher risk of non-response bias.

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# Foreword

The International Summit on the Teaching Profession (ISTP) aims to support the teaching profession in meeting the formidable challenges of 21st century education. In March 2026, the Estonian Ministry of Education and Research, the OECD, and Education International are bringing education ministers, union leaders and other teacher leaders together for the 15th gathering of the Summit, under the theme 'Switching gears: Teachers and Learners in the Future Learning Environment'.

One of the secrets of the ISTP's long-standing success is that the summit explores difficult and often contested issues in a setting where ministers and union leaders talk *with* each other, rather than *about* each other, drawing on sound evidence provided by the OECD, the global leader in internationally comparative data and analysis.

This report provides the background for the 2026 ISTP.

## Theme one: reimagining the teaching profession

The first theme of this year's ISTP invites us to step back and look closely at how the teaching profession is evolving. We are living in a world shaped by overlapping global challenges and breathtaking technological shifts. When changes accelerate this quickly, education cannot simply tweak at the margins. We need to rethink learning itself, redesign how we teach, and ultimately reimagine what it means to be an educator today.

The question is no longer whether the teaching profession is changing - it already is. The question is whether we are shaping that change or merely reacting to it. How do we nurture a profession to be agile enough to navigate uncertainty, confident enough to embrace the unknown, and generous enough to empower students to do the same? How do we strengthen the human core of education, such as relationships, collaboration and trust, at a time when everything else seems to be speeding up?

As teaching evolves, so too must our understanding of how one *becomes* a teacher. The traditional, linear pathway into the profession is no longer the default choice for many talented young people. Careers today are longer, more varied and less predictable. As a result, education systems must adapt.  Supporting people who choose teaching is not just a matter of training and recruitment. It is also about purpose and professional identity.

## Theme two: autonomy, trust, and the power to innovate

The second theme focuses on a simple idea with transformative potential: professional autonomy. Education systems everywhere face the same dilemma of how to attract new talent while also nurturing the professional growth of the current teacher workforce. When properly supported, professional autonomy can be a powerful lever.

But autonomy is not a free-floating concept. It only becomes meaningful when grounded in collaboration and built on trust. Trust in school leaders to guide change with vision and care. Trust in teachers to shape their classes and implement curricula with competence, integrity and accountability. And trust in students to take ownership of their own educational journeys.

 

Getting the balance right between autonomy and collaboration is not a technical detail, it is the backbone of resilient, future-ready education systems. At the heart of that system stands the teacher: reflective, responsible, accountable, and deeply aware of their own practice. The policy challenge is clear and urgent. How can policymakers and the teaching profession work together to build and sustain systems that are not governed by compliance, but powered by trust?

## Theme three: turning AI into an educational ally

Education systems are trying to keep pace with technologies that are advancing faster than ever. That race presents both a remarkable opportunity and a profound responsibility: to integrate educational technology, especially artificial intelligence, in ways that genuinely empower educators and help every learner succeed.

AI is no longer something on the distant horizon. It is already reshaping classrooms, workflows and learning experiences. The real question is not whether AI belongs in education, but how we use it wisely. How do we make AI a tool that amplifies human judgement rather than replaces it? And how can it help us tackle some of education's most stubborn challenges - from widening access to high-quality learning, to creating more personalised pathways that help students catch up, stay motivated, and move forward with confidence?

Used thoughtfully and grounded in evidence, AI offers the chance to modernise education by enabling teachers to focus on what is most important. It can also sharpen insight into student needs, and support teachers and learners where they need it most. But these opportunities will only lead to tangible results if education leaders have a clear sense of how they want education to develop.

**Andreas Schleicher**

Director for Education and Skills and Special Advisor on Education Policy to the Secretary-General

# Acknowledgements

The ISTP report was prepared by Andreas Schleicher, Director for Education and Skills, and Special Advisor on Education Policy to the Secretary-General at the Organization for Economic Co-operation and Development (OECD) in Paris.

It is based on material from a number of publications including the OECD Programme for International Student Assessment (PISA), the OECD Teaching and Learning International Survey (TALIS) and the OECD Digital Education Outlook.

The report was edited by Duncan Crawford, designed and laid out by Della Shin with communications support from Sophie Limoges.

# Editorial

Teaching has never been an easy mission. We expect teachers to imagine the future and to start living it today, so their students can thrive in it later. And yet, when they do, society is not always cheering them on. Sometimes people are sceptical or nervous. Sometimes they simply ask, "Why can't we keep doing things the way we used to?"

But that is no longer good enough. Today, the things that are easiest to teach and test are also the easiest to digitise and automate. If a machine can learn it faster than you, remember it longer than you, and apply it more consistently than you, then continuing to teach only traditional subject matter – using traditional approaches - is not a great strategy . So the focus of education needs to shift. From students who can reproduce what they have learned to students who can extrapolate from what they know and apply it creatively in novel situations. Students need an education to not only prepare them for today's jobs, but also for roles that don't yet exist.

This is no easy feat, particularly as we live in a time where information is abundant, but attention is scarce. Where what goes viral often beats what is true. Where statements that feel right, can spread faster than facts that are right. Algorithms don't just show us content, they shape our view of the world, amplifying our beliefs while sometimes quietly muting opposing viewpoints. In this digital marketplace, education is under strain. Teaching reading is no longer just about reading and writing. It is about helping students navigating truth, question their sources, and resist manipulation. It is about helping them to recognise interconnections, navigate ambiguity, and reconcile tensions between competing demands - equity and freedom, autonomy and community, innovation and continuity, efficiency and the democratic process.

Schools have traditionally broken problems into neat little pieces and trained students to solve each piece. Schools themselves have been built on separation: Subjects separated from each other; students separated by expectations for their academic success; schools separated from communities. But modern societies increasingly create value in a very different way: with a greater focus on connecting ideas, integrating perspectives, and seeing patterns where others see fragments. Innovation doesn't come from staying in your lane; it comes from connecting

 

dots no one else sees. Instruction in the past was subject-based, but instruction in the future needs to be more project-based. Students need experiences that help them think across disciplines without losing depth of understanding or rigour.

The past aimed for standardisation and compliance. The future demands personalisation and ingenuity. In the past, schools were technological islands, with technology often limited to supporting and conserving existing practices, and students outpacing schools in their adoption of technology. Now schools need to consider how to use technologies to free learning from outdated constraints.

We have also built schools around individual achievement. Students typically learn on their own and at the end of the school year, we certify what each person has accomplished. But the more interdependent the world becomes, the more we need great collaborators. Innovation is now rarely the product of individuals working in isolation, but rather an outcome of how we mobilise, share and integrate knowledge.

Changing demands have also elevated the role of social and emotional skills and character formation. Social and emotional skills are key to achieving goals, living and working with others and managing emotions. In fact, developing social and emotional skills is often what distinguishes many of the best schools. But for the majority of students, character formation in school remains a matter of luck, depending on whether it is a priority for their teacher, since there are still few education systems that have made such broader goals an integral part of what they expect from students.

Social and emotional skills matter even more in a multi-faceted world. Success depends on how well you collaborate with people who think differently, live differently, and may be thousands of miles away. Students are growing up in a world where their ideas travel instantly across borders, where global challenges ignore boundaries, and where technology connects people to perspectives they may never encounter at home. Employers know this. That is why they value people who are open to the world, curious and adaptable.

The foundations for this don't always come naturally. We are all born with a sense of belonging to our families and communities, but it requires great teachers who help us develop the capacity to relate to others who are different to ourselves and to extend trust beyond our immediate circle. Teachers can help students think for themselves, empathise with others, and grow into responsible citizens. They can nurture a strong sense of right and wrong, and an understanding of the limits of individual and collective action.

This brings us back to the role of teachers. Real learning happens when students are engaged, when they care, when they are intrinsically motivated. Intrinsic motivation doesn't come from grades or threats of disappointment at the dinner table. It comes from four very human things:

- **Purpose**: understanding why something matters.
- **Mastery**: the joy of getting better at something that matters.
- **Relatedness**: feeling valued, supported and connected.
- **Autonomy**: having the freedom to learn.

That is the magic of teaching, where teachers don't just transfer knowledge, but build relationships. Where teachers understand their students, appreciate who they want to become and accompany them on their journey.

The rise of AI should sharpen education's focus on human capabilities that cannot be reduced to code - our consciousness, our capacity to navigate complex relationships, to exercise ethical judgement in uncertainty, to create something genuinely new. These are not pedagogical ornaments or beautiful words, they are what education is all about, and they belong to the pillars on which we build our societies. And if teachers don't protect these pillars with determination, the worlds tremors could wash away the very foundations of our societies.

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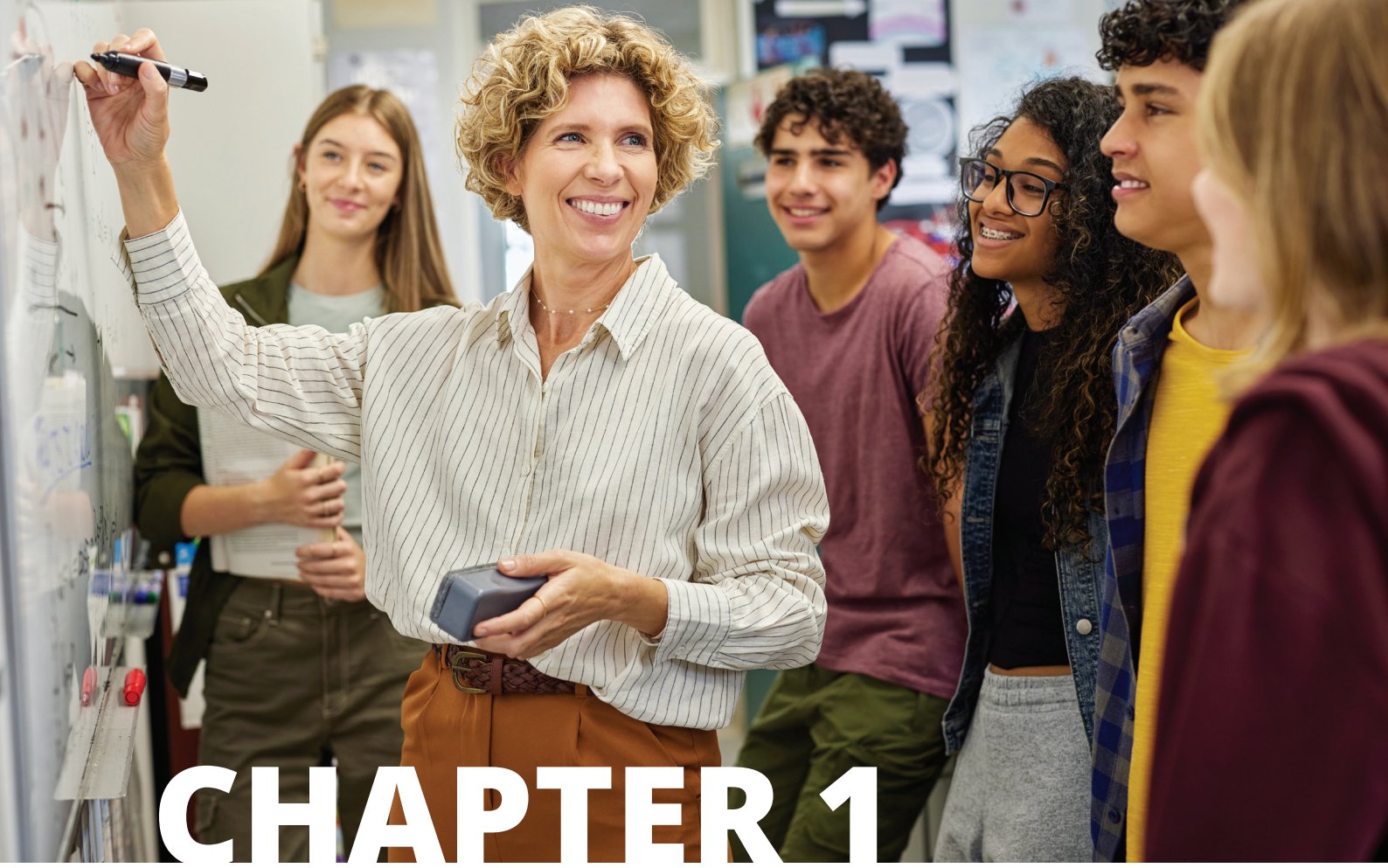


# CHAPTER 1

# The evolving teaching profession

The expectations we place on teachers keep rising. We want them to know their subject inside out, but also to understand who their students are and how real learning actually happens. We know that what teachers know, and what they care about, can change the trajectory of a child's life.

But in practice, our expectations stretch far beyond any formal job description. We ask teachers to be scholars, coaches, social workers and moral guides all at once. We expect them to be passionate and compassionate; to make learning irresistible, not compulsory; to spark curiosity while nurturing responsibility. We expect them to reach students who come from different backgrounds, have different abilities and speak different languages; and to foster tolerance and social cohesion, and to create classrooms where every student feels seen, valued and included.

On top of that, we ask teachers to constantly assess, guide and give feedback, while also turning learning into a team sport, not a solo race. And we don't just want collaboration among students; we want teachers collaborating with one another, across schools and with families. It's hard to imagine students becoming lifelong learners if they don't see adults doing exactly that: stretching their own horizons, questioning old assumptions and staying curious in a changing world.

Now add the digital layer. Today's teachers are working with learners who are always connected, always scrolling, always flooded with information. They are expected to help students navigate everything from information overload and plagiarism to online fraud, privacy violations and cyberbullying. Teachers are asked to be guides in a noisy digital marketplace; helping young people develop a healthy media diet, become critical consumers of online content, make informed choices, and steer clear of harmful behaviors.

And yet, for all the talk of skills, standards and systems, the most powerful part of teaching remains stubbornly human. Ask almost any successful adult, and you'll hear the same story: there was *one teacher* who made a difference. One who believed in them before they believed in themselves. One who showed up at the right moment - with encouragement, high expectations or simply care.

These moments don't fit neatly into spreadsheets. They're hard to measure, impossible to automate and essential to success. But if we design schools and work cultures that nurture these human qualities, we dramatically increase the odds that *every* student, not just the lucky ones, gets the chance to thrive.

This chapter illustrates the evolving teaching profession with selected findings from OECD's TALIS survey.

### What is TALIS?

The Teaching and Learning International Survey (TALIS) is the world's largest international survey about teachers and school leaders. Conducted by the OECD, in 2024 it sampled about 280 000 teachers in 17 000 schools across 55 education systems. The report highlights teachers' experiences in the classroom, information about their working conditions and professional development, and examines themes including AI in education and increasingly diverse student populations.

By capturing the voices of teachers and principals, TALIS helps policymakers and education leaders craft informed strategies to improve teaching quality and learning environments. TALIS 2024, released 7 October 2025, is the fourth round of the survey since its launch in 2008.

## Are teachers happy teaching?

Global headlines about teaching often portray the profession as being in crisis. Stories about teacher shortages, falling student outcomes and violent attacks on school grounds give the impression that the "noble profession" might have lost some of its appeal. So, policymakers will be heartened to learn that nine in ten teachers report that they are satisfied with their jobs overall, on average, across OECD education systems participating in TALIS. Almost three-quarters of teachers would also choose to work as a teacher again, on average, if they had the option to do so.

## Figure 1. Share of lower secondary teachers who agree or strongly agree they are satisfied with their jobs


*Estimates should be interpreted with caution due to higher risk of non-response bias.

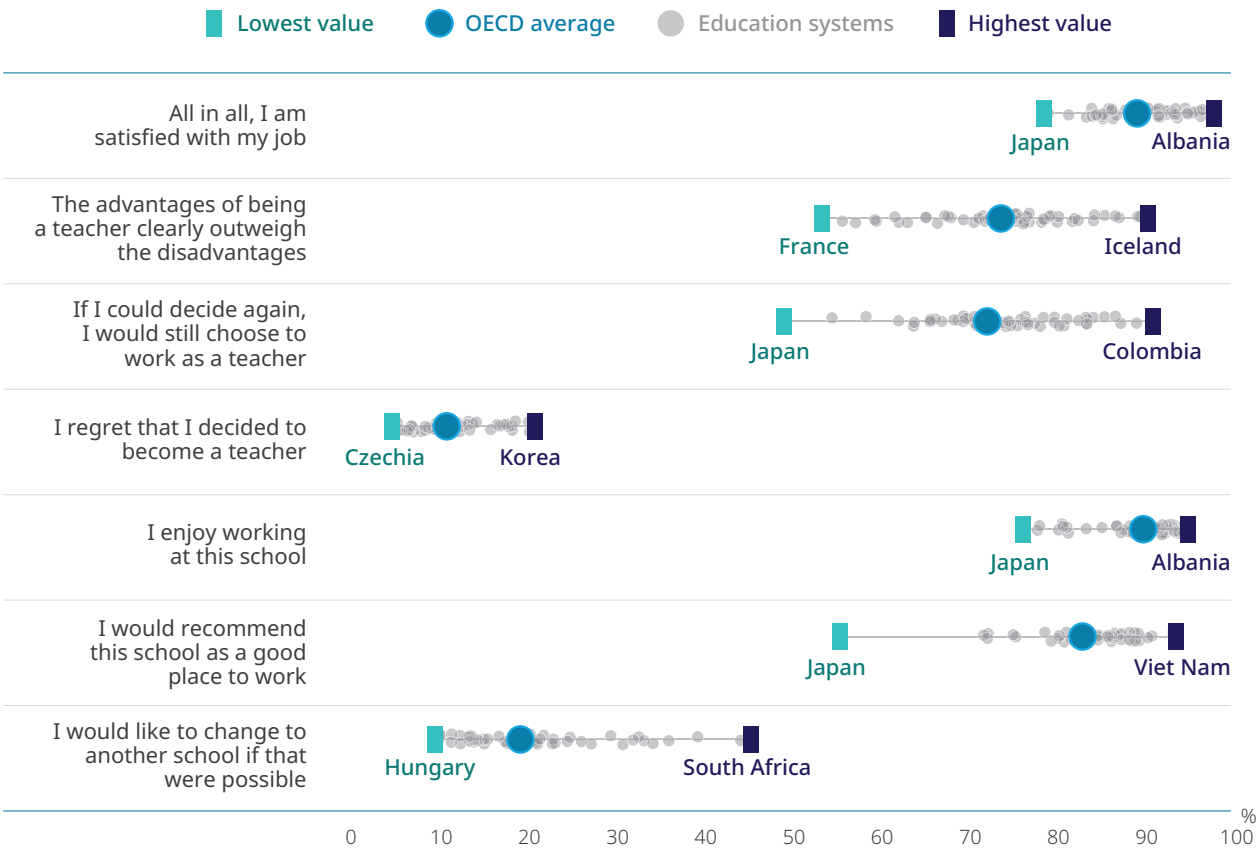
**Note**: This graph is occasionally simplified version of the original. You can see the original table in the full report, OECD (2025), *Results from TALIS 2024: The State of Teaching*, TALIS, OECD Publishing, Paris, https://doi.org/10.1787/90df6235-en.

**Source**: OECD (2024), TALIS 2024 Database, Table 2.6.

While teacher experiences and opinions will obviously differ, overall the data firmly point towards most teachers, in most places, being satisfied with their jobs. Indeed, almost 95% of teachers surveyed by TALIS say they often feel happy while teaching. The share of teachers who say that the advantages of being a teacher outweigh the disadvantages has remained stable.

## Figure 2. Teachers' job satisfaction is high

Share of teachers who "agree" or "strongly agree" with the following statements




**Source:** OECD, TALIS 2024 Database, Tables 2.6 and 2.8.

What could explain high levels of job satisfaction when working conditions are often far from ideal? To start with, few professions offer the sense of purpose that teaching does: 95% of teachers cite the opportunity to make a worthwhile social contribution as being important to them, according to TALIS data.

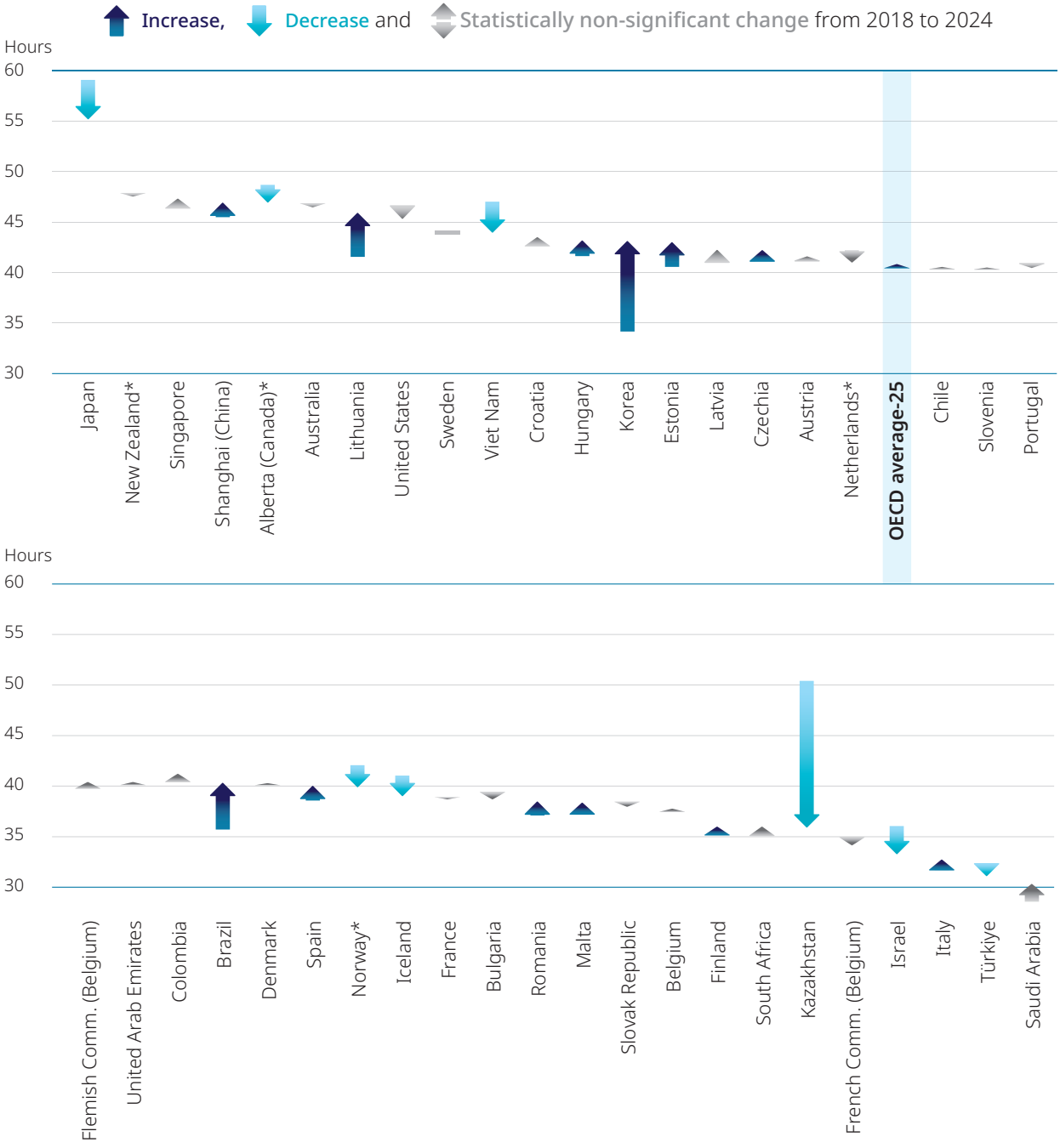
Most teachers in OECD countries work in public-sector roles, and in most developed economies these positions can be shielded from the volatility of market cycles. Pension schemes, healthcare benefits and predictable career progression can make teaching a financially stable profession, if not a lucrative one.

Teacher pay has long been a focal point in discussions about education reform. The share of teachers who are satisfied with their salaries has increased in 23 out of 43 education systems surveyed by TALIS since 2018. On average, around two in five teachers are satisfied with their salaries. In some education systems the proportion is higher. In Austria, the Flemish and French Communities of Belgium, Bulgaria, Colombia, Denmark, Kazakhstan, the Netherlands*, Saudi Arabia and Uzbekistan, more than three in five teachers are satisfied with their pay. However, in other systems wages remains a major issue: less than one in five teachers are satisfied with their paycheques in Iceland, Malta, Portugal and Serbia. It is noteworthy that TALIS data show little international relationship between the level of teacher salaries and teachers' job satisfaction.

## Figure 3. In most systems, teachers' overall workload remained the same

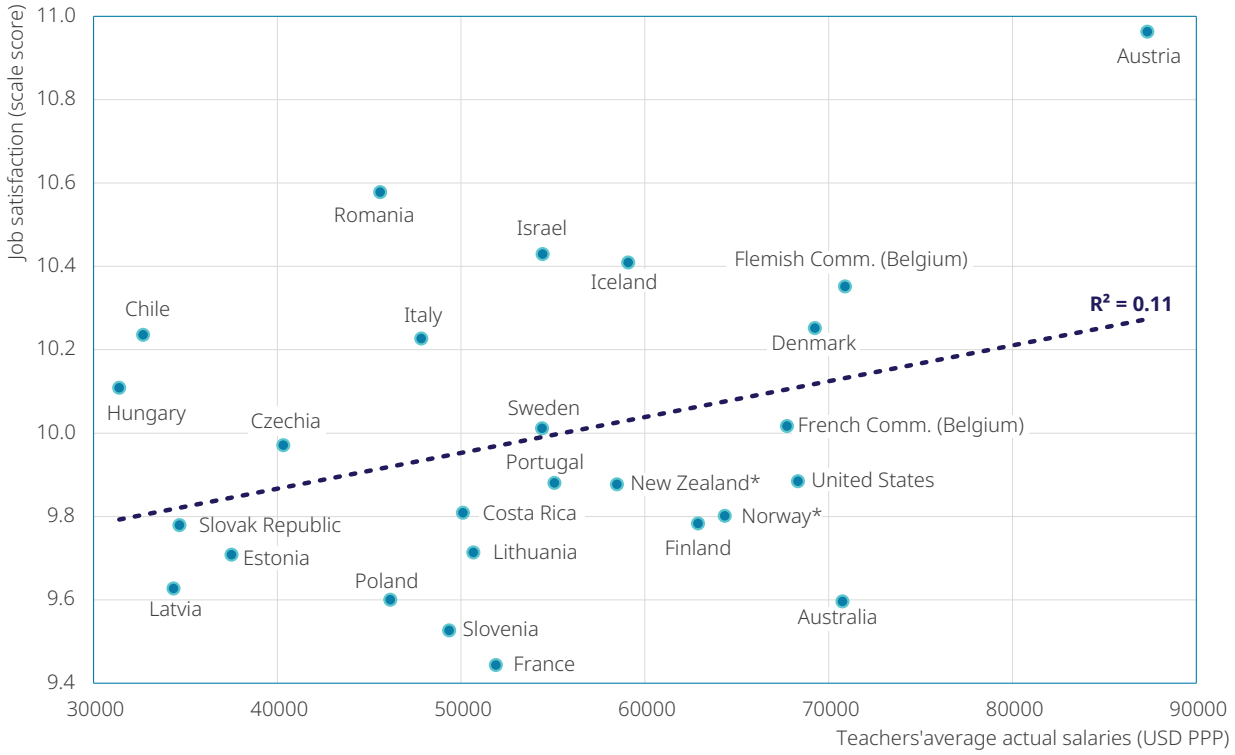
Average number of hours per week full-time teachers report spending on job-related tasks




*Estimates should be interpreted with caution due to higher risk of non-response bias.

**Source**: OECD, TALIS 2018 and TALIS 2024 Databases, Table 3.8.

## Figure 4. Salary alone doesn't make teachers like their job




*Estimates should be interpreted with caution due to higher risk of non-response bias.

**Source**: OECD, TALIS 2024 Database, Table 7.69 and Table 7.62.

According to TALIS, the most important predictors of teacher job satisfaction do not relate to material factors but to other aspects of their working conditions. Many teachers are driven by a deep sense of purpose, and access to professional development, strong leadership and a positive school culture can contribute as much as salaries in terms of teacher motivation.

Stress is another factor to consider. Teachers are constantly juggling multiple responsibilities, from managing diverse student needs and maintaining classroom discipline to meeting curriculum standards and administrative expectations. About one in five teachers say they experience stress "a lot" in their work, on average, according to TALIS. In contrast, according to Gallup's State of the Global Workplace report, two out of five employees report experiencing a lot of daily stress.

Are teachers really less stressed than other professions? TALIS data show that, overall, around half of teachers experience little or no stress in their work across all education systems. Although in some places, teachers seem to be having a harder time. More than 30% of teachers in Alberta (Canada)*, Australia, Bahrain, Costa Rica, Malta and New Zealand* experience stress "a lot" in their work.

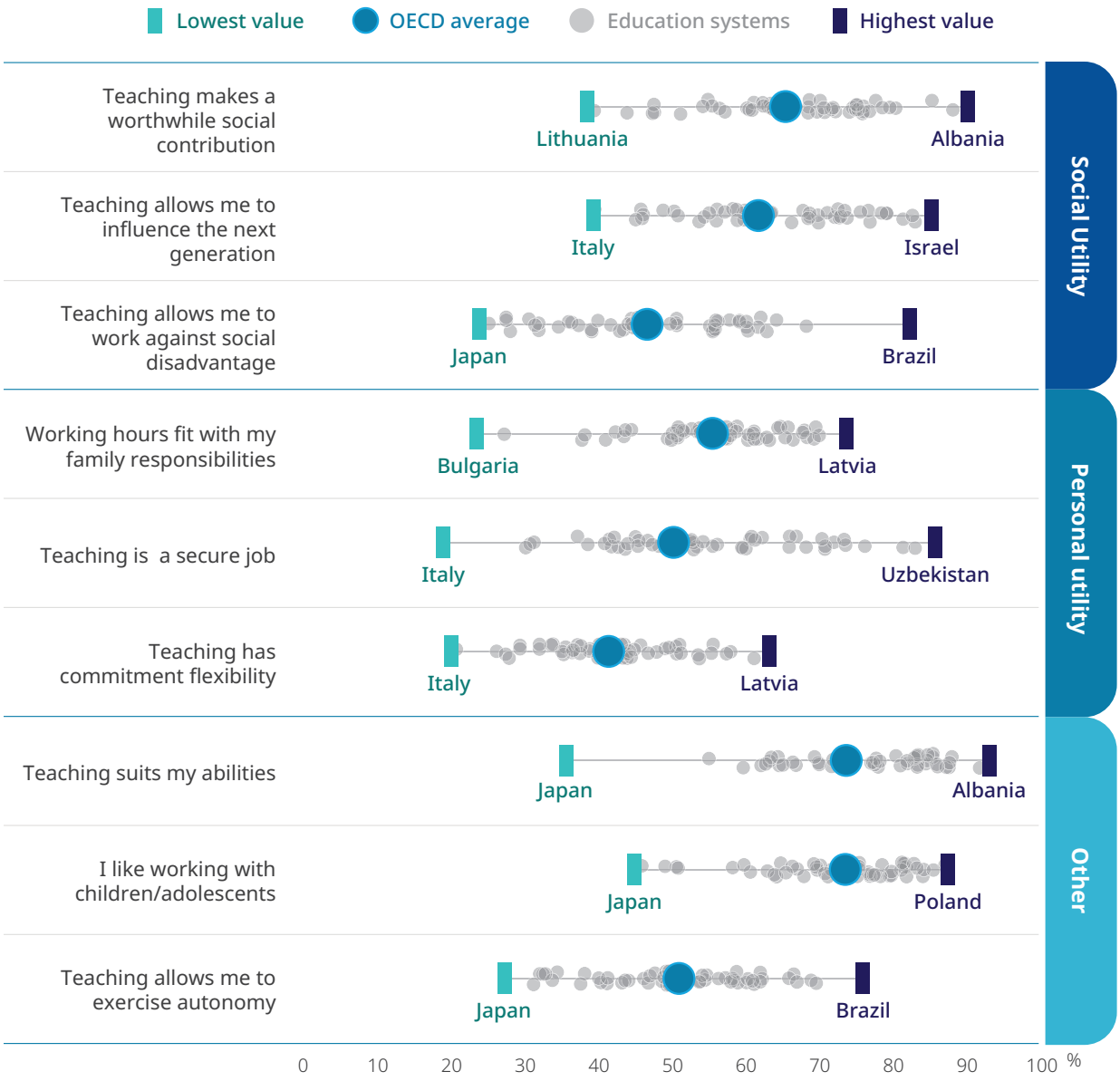
 

The school environment – and how teachers are perceived by society - can have a big impact on whether teachers feel supported and empowered. When teachers feel respected and valued by society, it helps attract high-calibre candidates and plays a role in retaining them. TALIS data show that the status of teachers has declined in some nations, but remains high in others. More than 70% of teachers feel valued by society in Saudi Arabia, Singapore, the United Arab Emirates and Uzbekistan, with the share topping 92% in Viet Nam. Teachers who believe the profession is valued by society are less likely to want to leave teaching within the next five years, on average.

Looking at all the data together, the latest TALIS survey reveals a diverse picture. But rather than a profession in decline, the data show that teaching continues to attract individuals driven by purpose, resilience and passion. Overall, yes, teachers are happy in their jobs. This is something public policy can build on.

## Figure 5. Teachers' motivation to teach

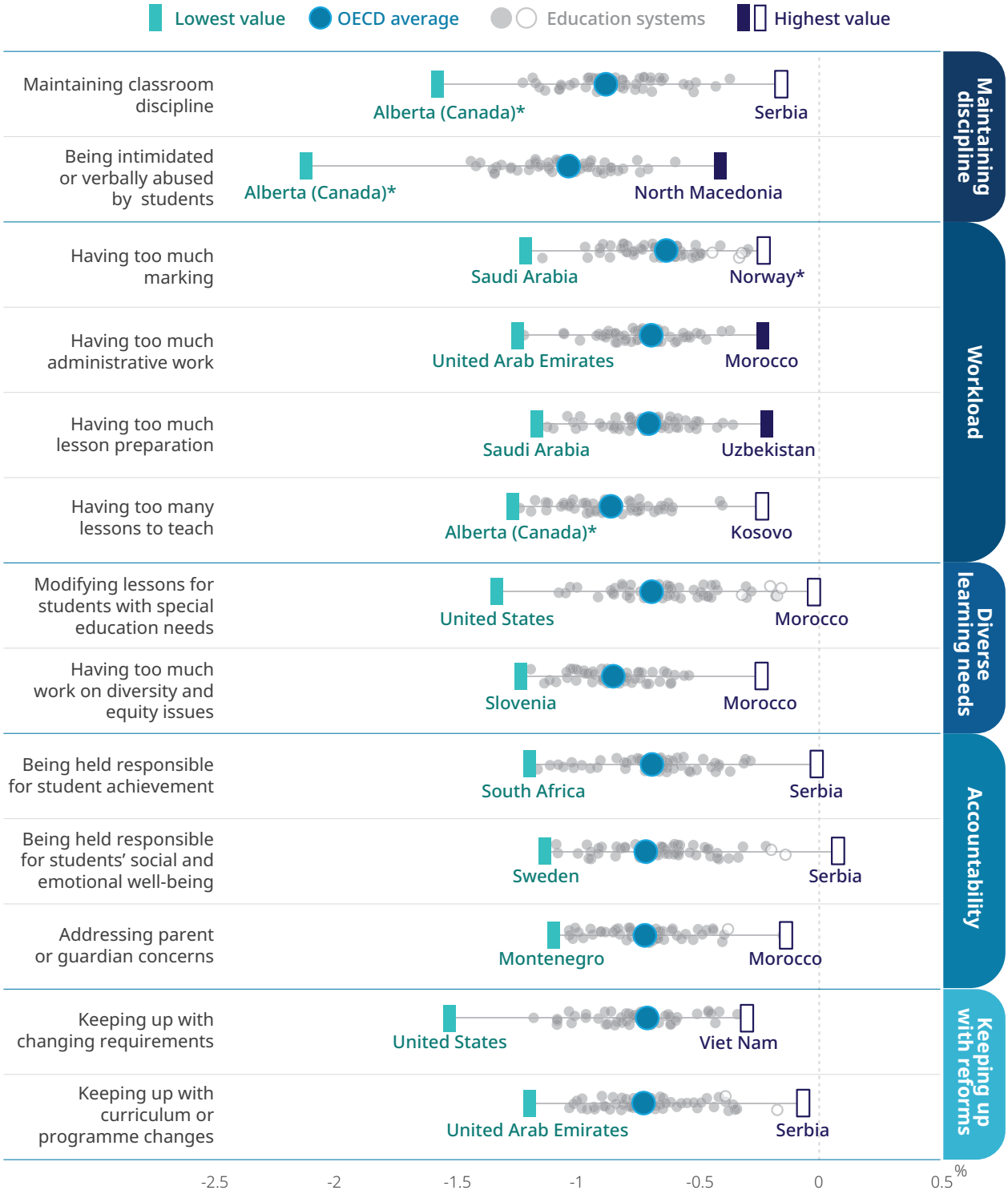
Share of teachers who report that the following factors are of "high importance" to them as a teacher




**Source**: OECD, TALIS 2024 Database, Table 7.13.

## Figure 6. Maintaining discipline, in particular intimidation or verbal abuse by students, is more closely associated with job dissatisfaction than other demands

Change in the scale of teacher job satisfaction associated with encountering the following as sources of stress "quite a bit" or "a lot" at work



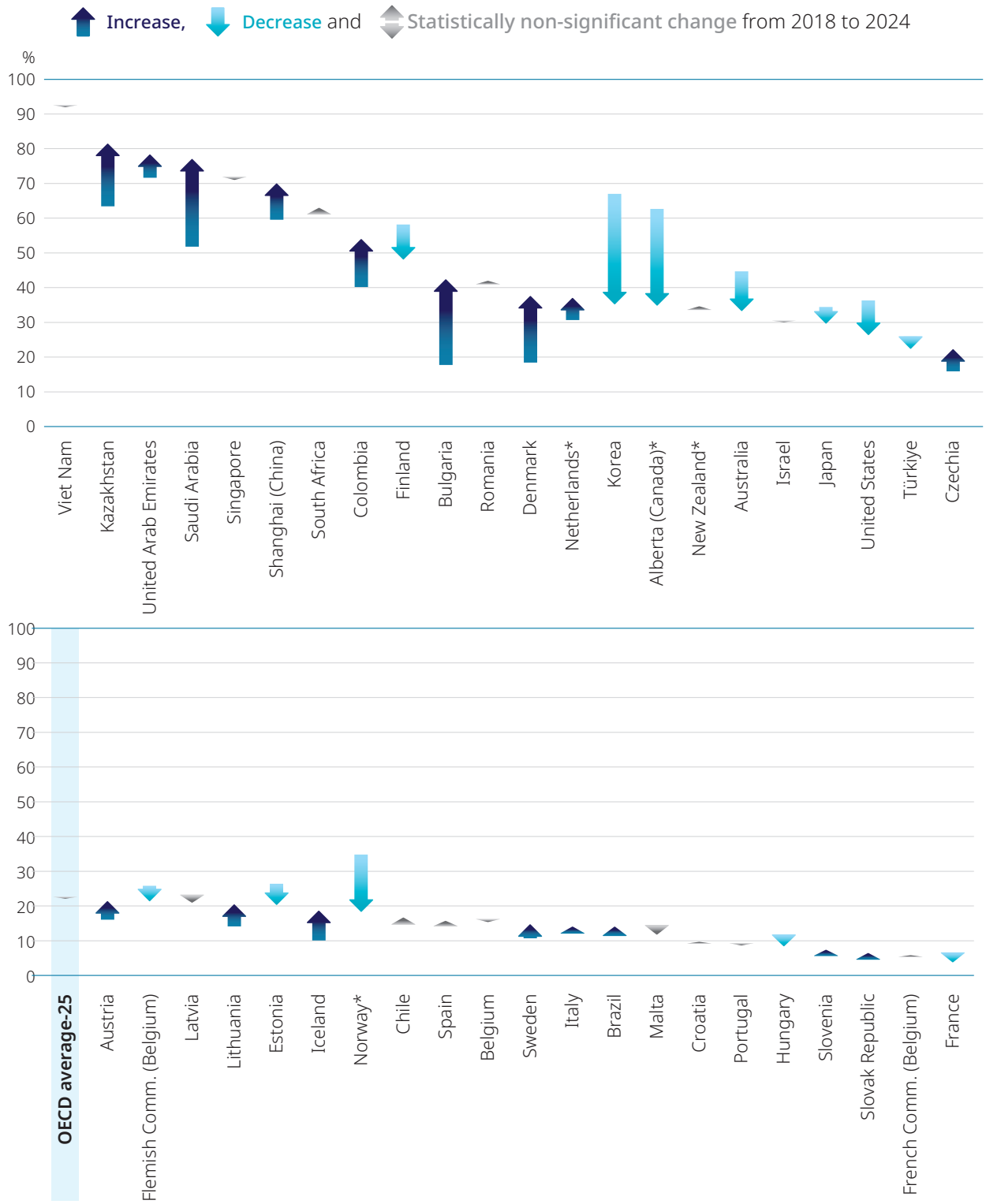

*Estimates should be interpreted with caution due to higher risk of non-response bias.

**Source**: OECD, TALIS 2024 Database, Table 2.48.

## Figure 7. Perceptions of being valued have evolved differently across systems

Share of teachers who "agree" or "strongly agree" that the teaching profession is valued by society




*Estimates should be interpreted with caution due to higher risk of non-response bias.

**Source**: OECD, TALIS 2018 and TALIS 2024 Databases, Table 3.8.

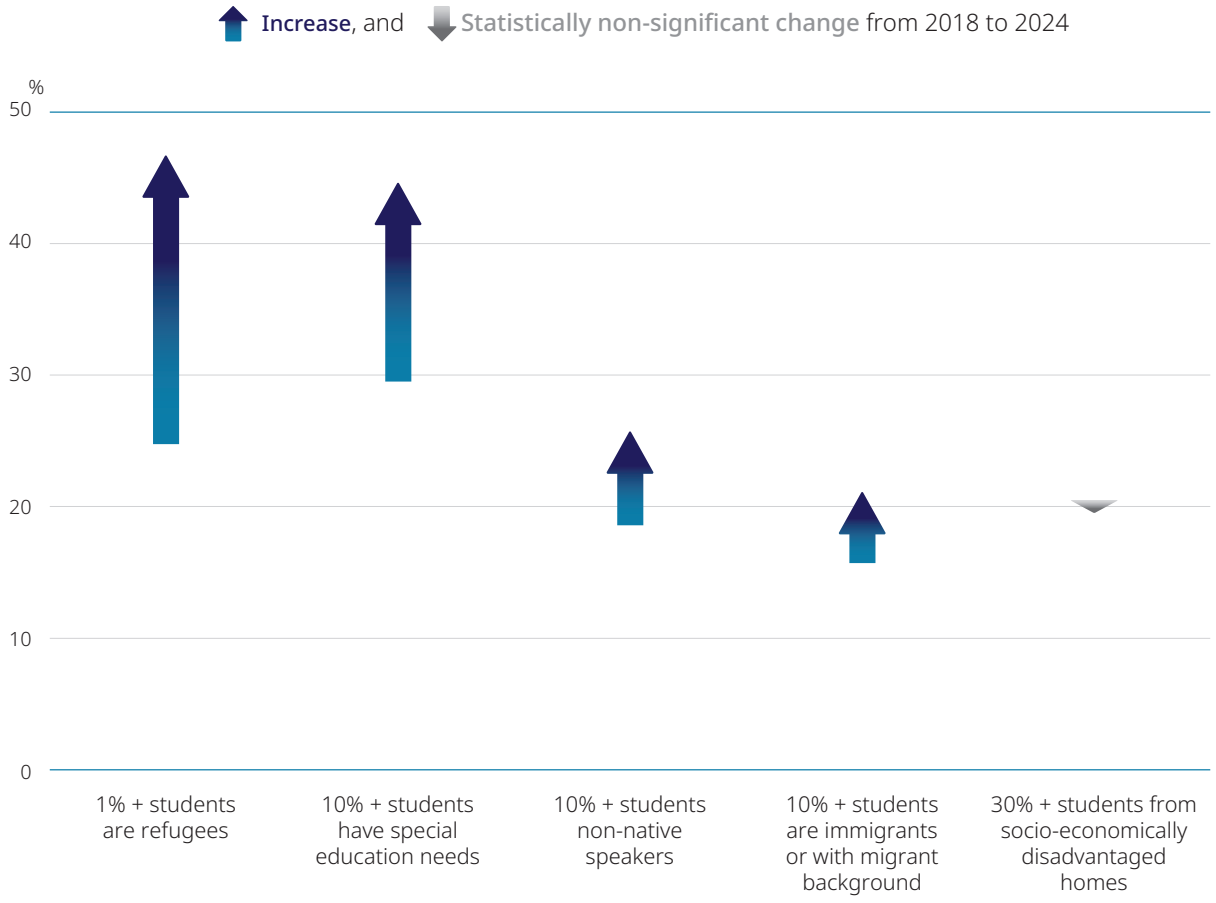
## How do teachers manage a modern classroom?

Across many countries, teachers are spending increasing amounts of time maintaining classroom discipline. In fact, TALIS data show that the share of class time allocated to keeping discipline has increased in almost all OECD systems, from 13% in 2018 to 16% in 2024 on average. What is going on?

TALIS data offers several clues as to why teachers are spending more time on discipline. For example, in Finland and Kazakhstan the proportion of teachers having to tell students to follow classroom rules has increased markedly (18 and 28 percentage points, respectively) since 2018. In Latvia, there has been a huge rise in the share of teachers needing to calm students who are disruptive (up 36 percentage points). More than a third of teachers in Chile, Finland, Portugal and South Africa report a lot of disruptive noise and disorder in the classroom. In Brazil, the figure is a massive 57% compared to an OECD average of 21%. And, overall, almost one in five teachers across the OECD say they lose quite a lot of time due to students interrupting lessons.

### Figure 8. Students are more diverse

Share of teachers in schools with the following compositions (OECD average-24)



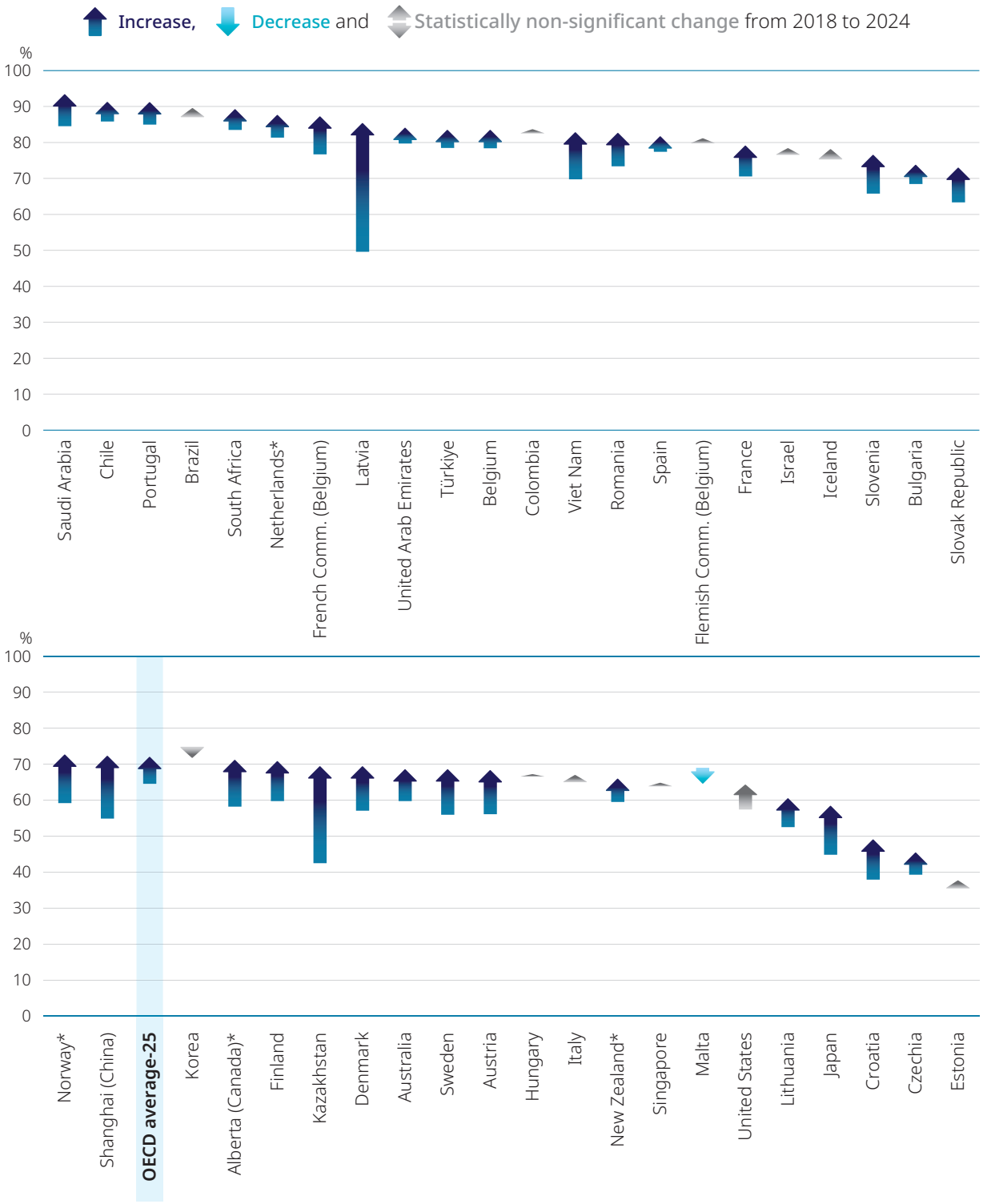

**Note**: Results based on responses of principals.

**Source**: OECD, TALIS 2018 and TALIS 2024 Databases, Table 1.26.

## Figure 9. Teachers need to deal with disruptive students more frequently

Share of teachers who "frequently" or "always" calm students who are disruptive




*Estimates should be interpreted with caution due to higher risk of non-response bias.

**Note**: Results refer to lessons taught to a class randomly selected from teachers' current weekly timetables during the week preceding the survey.

**Source**: OECD, TALIS 2018 and TALIS 2024 Databases, Table 1.35.

These statistics could suggest that classrooms are being more unruly, at least in some places. The growing challenges teachers face also result in more time spent on classroom management.

First, let's consider student behaviour itself and the context. Many students are struggling with motivation, anxiety and self-directed learning. In the smart phone world, students are seconds away from using social media or playing a computer game at any moment. Indeed, OECD data tell us that nearly one in three students get distracted by using digital devices in class on average. That is one of the reasons why many schools have banned phones in class and a growing number of countries have forbidden digital devices on school grounds or implemented restrictions.

However, the challenge is not just about keeping students off their phones; it is about guiding them to use devices responsibly and in a way that supports learning. Teachers are now expected to coach students on how to navigate digital spaces, evaluate sources and stay focused amid constant notifications. This shift demands a new kind of classroom management, one that blends behavioural oversight with digital literacy education. And if teachers do not receive effective support to manage today's classrooms, that can lead to opportunities for student misbehaviour.

Even minor things, such as talking out of turn or ignoring instructions, can erode a teacher's authority and potentially escalate into more serious incidents, such as verbal or physical confrontations. According to TALIS, intimidation or bullying on school grounds is the most reported safety issue, on average. Across OECD countries, 19% of teachers work in schools where student bullying or verbal abuse on school grounds occurs regularly, according to principals' reports. The figure tops 40% in Finland, Malta, Norway and Sweden and is around 50% in the Flemish Community of Belgium. These behaviours can have devastating effects on victims, including anxiety, depression and a decline in academic performance. Bullying also contributes to a toxic school climate. All this impacts negatively on teacher job satisfaction.

TALIS results also reflect the growing diversity in classrooms across the world, resulting in extra challenges for teachers. TALIS data show that about one in five teachers say more than 10% of their students have difficulties understanding the language of instruction. In some education systems, this is a particular issue. The share rises to about 25% in Bahrain, Latvia, Saudi Arabia and the United States, and exceeds 50% in Morocco and South Africa. If students cannot understand what the teacher is saying, it is not surprising if teachers may have to spend time repeating classroom rules.

TALIS data show that the share of low-achieving students in a classroom has a greater association with disruption than aspects like class size, language difficulties or special educational needs. Meeting the needs of low-achieving students requires extra time and personalised instruction, which can put significant pressure on a teacher's focus. This potentially leads to increased disruption.

When considering these different accumulating demands, is it any wonder that some teachers may find it more difficult to deliver well-structured lessons? This, in turn, can make classroom management more challenging.

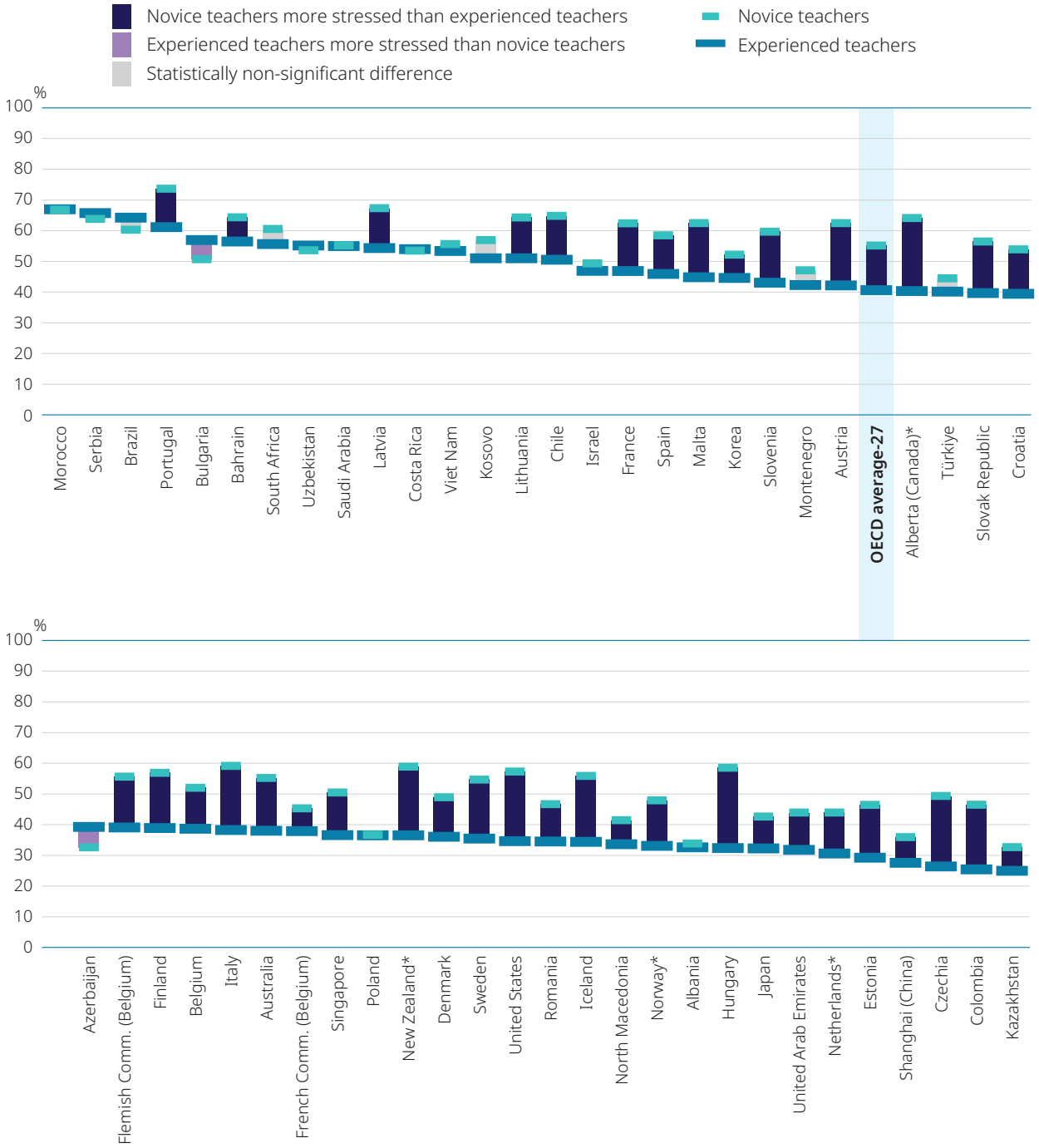
When teachers set clear expectations for behaviour and create a safe, structured and supportive learning environment they spend less time on classroom management and students spend more time on learning . And with fewer behavioural interruptions, teachers can devote more energy to teaching and students can focus more effectively on learning. In contrast, an inconsistent approach to disrespectful behaviour may send students signals that in some cases such behaviour is acceptable.

TALIS data show that teachers with high self-efficacy in classroom management consistently report lower levels of stress related to discipline, often by over 40 percentage points. This is potentially because they perceive behavioural challenges not as threats, but as manageable aspects of their role. When teachers are confident in their ability to respond effectively to disruptions, it helps create a buffer against emotional exhaustion and burnout. In unruly classrooms, this can make discipline feel less overwhelming and more like a solvable part of the teaching process.

## Figure 10. Maintaining discipline is more stressful for novice teachers

Share of teachers who report that maintaining classroom discipline is a source of stress "quite a bit" or "a lot"




*Estimates should be interpreted with caution due to higher risk of non-response bias.

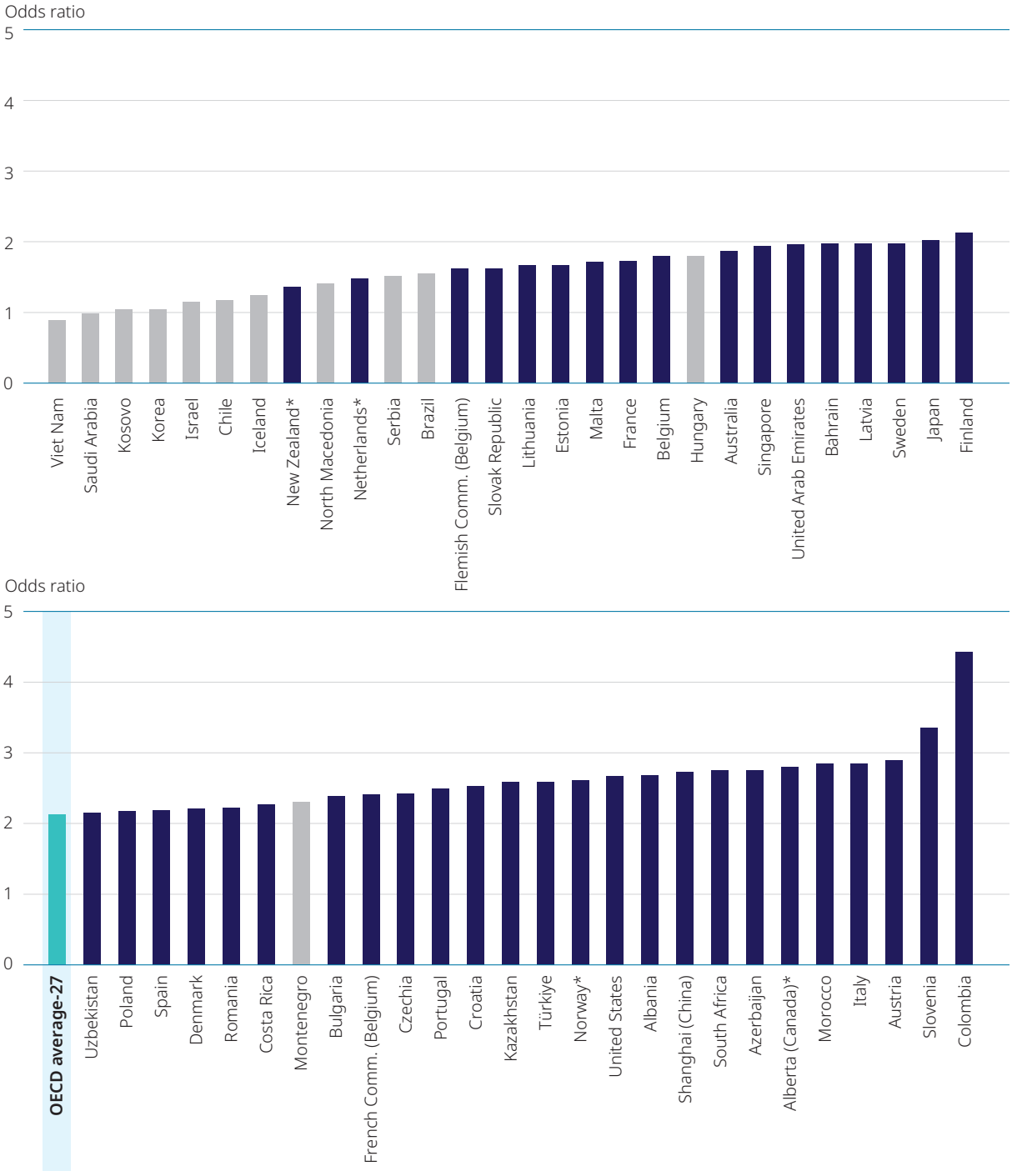
**Notes**: Novice teachers refer to those with up to five years of teaching experience. Experienced teachers refer to those with more than ten years of teaching experience.

Statistically significant coefficients are shown in solid dark blue and light blue, while non-significant coefficients are transparent.

This graph is occasionally simplified version of the original. You can see the original table in the full report, OECD (2025), *Results from TALIS 2024: The State of Teaching*, TALIS, OECD Publishing, Paris, https://doi.org/10.1787/90df6235-en.

**Source**: OECD (2024), TALIS 2024 Database, Table 3.16.

## Figure 11. Change in the likelihood† of teachers saying they will quit related to intimidation or verbal abuse by students




† Change in the likelihood of teachers reporting that they intend to leave the profession within the next five years associated with experiencing intimidation or verbal abuse by students as a source of stress "quite a bit" or "a lot".

*Estimates should be interpreted with caution due to higher risk of non-response bias.

**Notes**: An odds ratio indicates the degree to which an explanatory variable is associated with a categorical outcome variable. An odds ratio below 1 denotes a negative association; an odds ratio above 1 indicates a positive association; and an odds ratio of 1 means that there is no association. After controlling for teacher and school characteristics.

The analysis is restricted to teachers who report that retirement from work sector is "not at all likely" or "not very likely" to lead them to leave teaching within the next five years.

Statistically significant coefficients are shown in green and blue, while non-significant coefficients are shown in grey.

This graph is occasionally simplified version of the original. You can see the original table in the full report, OECD (2025), *Results from TALIS 2024: The State of Teaching*, TALIS, OECD Publishing, Paris, https://doi.org/10.1787/90df6235-en.

**Source**: OECD (2024), TALIS 2024 Database, Table 7.12.

## Some teachers struggle to support social and emotional skills

Education systems around the world increasingly recognise social and emotional skills as an essential part of schooling. Skills like empathy, self-efficacy and emotional control are not just helpful, but essential for individual and societal success. The diversification of classrooms adds even greater importance to supporting students' social and emotional development. Yet, according to TALIS data, many teachers doubt whether they can nurture these skills in their students. In particular, male teachers are almost always less confident at developing these skills than their female peers.

TALIS surveyed teachers on a range of lesson goals, such as giving feedback and presenting information clearly, and asked whether they felt confident achieving these objectives. Out of all the goals, teachers said they are least likely to achieve supporting students' social and emotional learning. In fact, on average, just over two-thirds of teachers' report being able to help students manage their emotions, thoughts and behaviour across the OECD. In contrast, more than 90% of teachers believe they can teach general subjects with clarity.

Why do fewer teachers feel capable of handling tasks linked to social and emotional learning compared to other teaching responsibilities? The data doesn't give a clear answer. However, a likely reason is that many teachers are working without a clear policy roadmap. While some countries have embedded social and emotional skills into their national curricula and assessment frameworks, in some schools they are considered soft extras, not foundational competencies.

This is unfortunate, as OECD analysis suggests that these skills can be as important as cognitive skills in predicting life and labour market outcomes, according to the latest OECD Survey of Adult Skills. While professional development and training can help, relying on workshops or one-off sessions can leave teachers without the sustained support they need to integrate social and emotional skills into everyday learning. A more transformative solution involves embedding them directly into the curriculum and assessments. Social and emotional skills should be woven into the fabric of education – not treated as an add on. For example, co-operation, self-control and empathy can be integrated into sciences, humanities and sports. This will ensure they become part of the educational culture.

Easy-to-use assessment tools for classrooms are also needed to send a clear message that these skills matter. Self-assessments, peer feedback and teacher observations are all helpful, but it is also important to use tools that prompt students to demonstrate social and emotional skills in action. Ongoing large-scale monitoring is also a must.

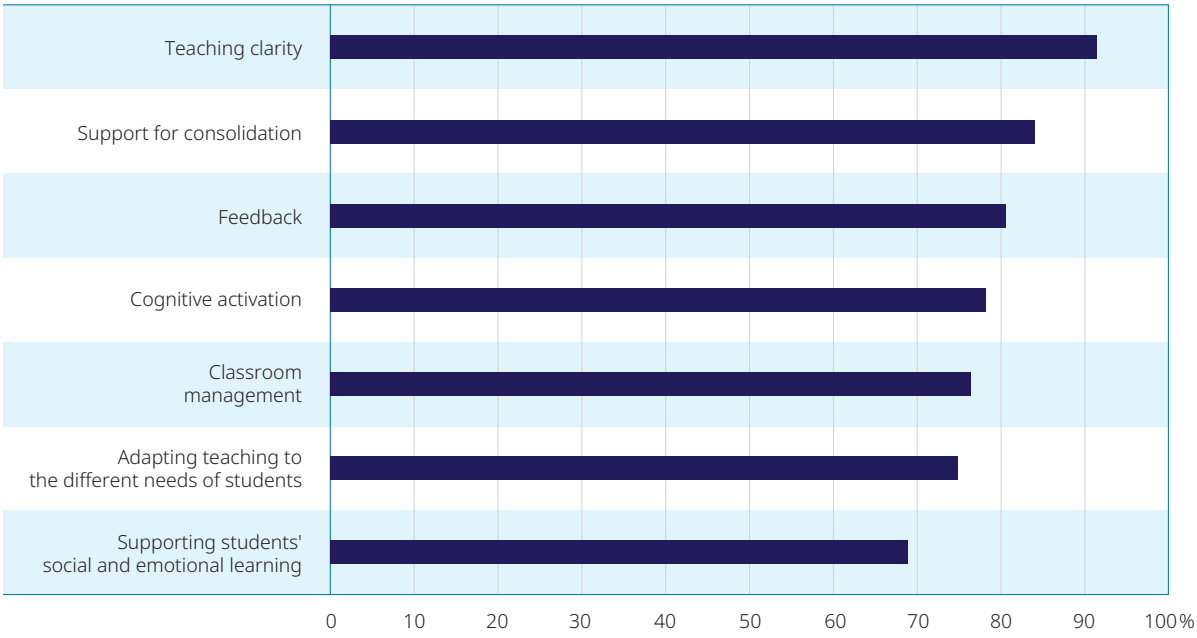
All these changes are doable. The OECD's Survey on Social and Emotional Skills has gathered clear evidence showing that skills like empathy, self-control and stress resistance show high teachability across diverse contexts. Although some are trickier to teach and harder to assess. Optimism, for example, unlike algebra or grammar, has been hard to define.

And some education systems have already taken steps to embed social and emotional learning across school life. In Alberta, Canada, teachers receive lesson plans and activities to promote such skills in daily routines. Similarly, Portugal has taken steps to integrate social and emotional skills into schools, including through a manual that includes templates for activities to promote self-regulation, empathy and co-operation in students.

Looking ahead, if education systems seriously recognise the importance of social and emotional skills, then these skills should not be treated as extras. That means policymakers need to develop awareness of the teachability of these skills and rethink teacher preparation, with structured support for teachers.

## Figure 12. Teachers are less successful in supporting students socially and emotionally

Share of teachers who fulfill their lesson aims in...




**Note**: Results refer to lessons taught to a class randomly selected from teachers' current weekly timetables during the week preceding the survey.

**Source**: OECD, TALIS 2024 Database, Table 2.1.

## Mentoring is on the rise

For decades, teaching has been a relatively solitary profession. New teachers, fresh from training, were often thrust into classrooms with little more than a curriculum guide and a pile of textbooks. Meanwhile, more experienced teachers were expected to independently navigate the various teaching challenges they faced. This is still the case in some places today. While the importance of effective teacher learning is widely recognised, many teachers are working in relative isolation and are left to largely manage their own personal learning. But in some countries mentoring is gaining traction – and this is a good thing!

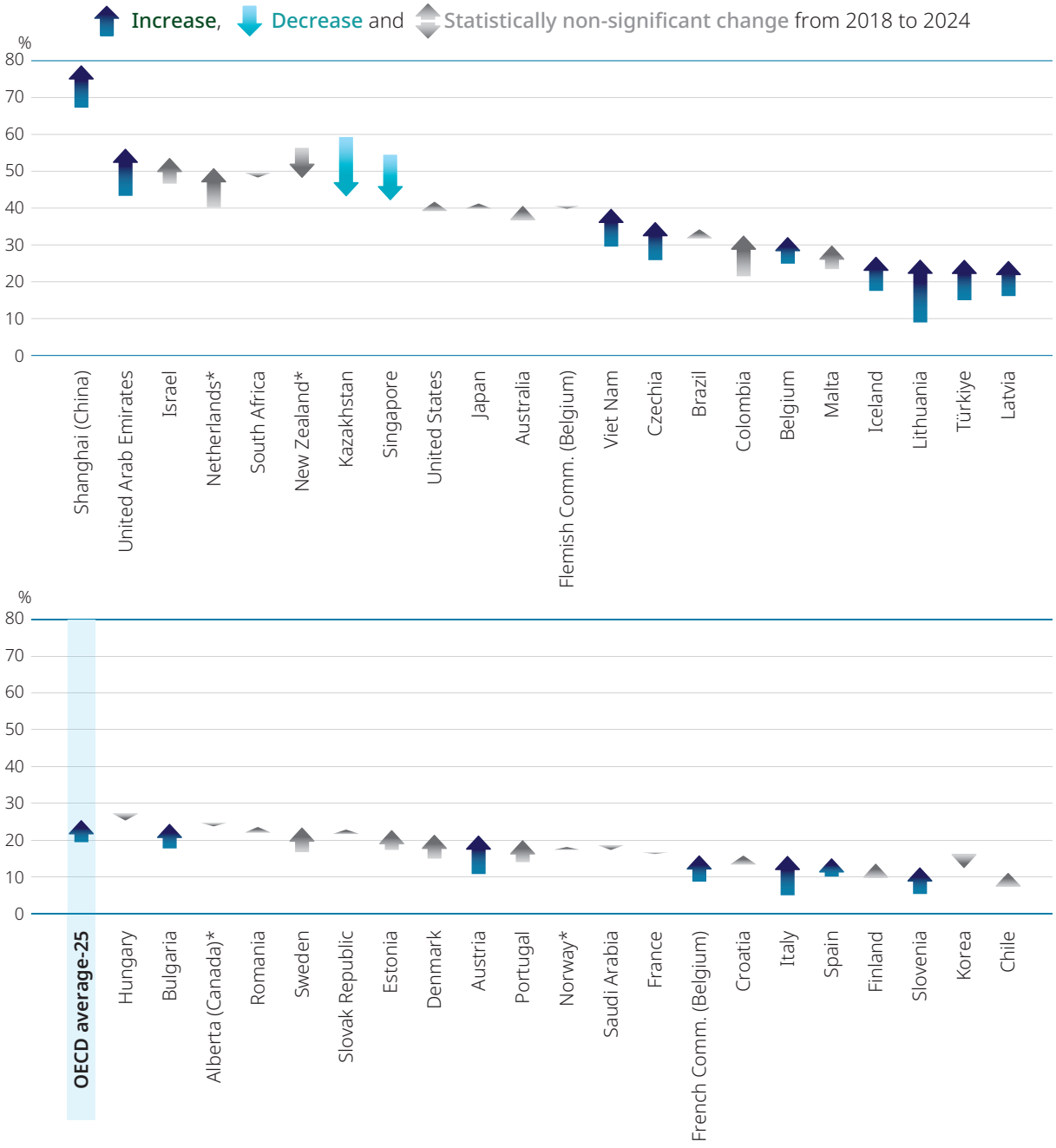
TALIS data show that the share of novice teachers with an assigned mentor has increased in about one-third of education systems. This signals, perhaps, something of a cultural shift. And it is long overdue. Mentoring pairs novice teachers with experienced colleagues who can offer guidance, feedback and emotional support. For example, in Singapore all new teachers are paired with an instructional mentor in the first two years of their career. And in the Netherlands, primary school teachers are supported through structured, continuous mentoring in their first years of practice.

Across the OECD, about one in four novice teachers now has an assigned mentor, on average. And some education systems are streets ahead. More than 50% of teachers with less than five years of experience have a mentor in Bahrain, Israel, Poland, United Arab Emirates, Uzbekistan and the Netherlands*. In Shanghai (China) the proportion is nearly 80%.

These education systems are leading the way and although mentoring remains relatively uncommon overall, its growing popularity indicates that some teachers are receiving extra support. There are many benefits: TALIS data show that novice teachers with a mentor are often more likely to report fulfilling their lessons' aims, have an improved sense of confidence and have higher job satisfaction. Mentees can gain competence more quickly, while mentors often rediscover purpose and refine their own practice. Induction programmes for beginning teachers have also been shown to reduce the number of teachers dropping out of the profession.

## Figure 13. Novice teachers are receiving more support

Share of novice teachers who have a mentor




*Estimates should be interpreted with caution due to higher risk of non-response bias.

**Note**: Novice teachers refer to those with up to five years of teaching experience.

**Source**: OECD, TALIS 2018 and TALIS 2024 Databases, Table 4.11.

TALIS data reveal some of the areas where mentoring could provide support. For example, around a third of novice teachers say they need classroom management training, which is up 6 percentage points since 2018. More experienced teacher mentors can share strategies for maintaining discipline and managing students in the classroom. They can also give guidance on curriculum planning, help newcomers navigate school policies and administrative tasks, as well as the unique culture of their school environment.

Why is mentoring becoming more popular? The data doesn't give a definitive answer. However, a few factors are likely in play. First, teacher shortages have made retention issues a strategic imperative. For example, around 5% of teaching positions were not filled in Sweden or Austria at the start of the school year in 2022, according to OECD data. TALIS data show that one in five teachers under the age of 30 intend to leave teaching in the next five years, on average. Mentoring can be part of the solution to help prevent burnout and attrition.

Second, the COVID pandemic highlighted the need for more robust professional networks. Remote teaching, shifting expectations and the emotional strain of working in a crisis underscored the need to provide teachers with greater support.

Third, many high performing education systems use mentoring as a key strategy to develop effective teachers and strengthen school systems. Studies show that teacher candidates in high performing countries typically receive intensive induction or mentoring programmes at the start of their careers. This is borne out by the TALIS data. The share of novice teachers being mentored is above the OECD average in Australia, Czechia, New Zealand, Poland and Singapore. In all these countries, 15 years-old students perform above the OECD average in maths, reading and science, as measured by PISA.

Given all the evidence, policymakers should look to implement mentoring programmes at scale. However, a note of caution: it may be challenging to expand mentoring programmes rapidly. Analysis of teacher coaching programmes found that small trials had larger positive effects than larger programmes implemented at scale. One reason might be that it is hard to find enough teachers capable of coaching many other colleagues, especially when their learning needs are so different. So, there is work to do in ensuring effective implementation. Technology can help overcome some of the challenges by helping recruit mentors and improving mentor-mentee matching. But the direction is clear – the path towards more mentoring is a good thing.

# CHAPTER 2

# Strengthening the professional autonomy of educators and school leadership

## How to balance teacher autonomy with accountability in the classroom?

The heart of great teaching is ownership. Successful education systems will do whatever it takes to develop ownership of professional practice by the teaching profession. Some people say teachers lack the capacity and expertise to deliver on autonomy. There may be some truth in that. But simply perpetuating a prescriptive model of teaching will not produce creative teachers: those trained only to reheat pre-cooked hamburgers are unlikely to become master chefs.

By contrast, when teachers feel a sense of ownership over their classrooms, when students feel a sense of ownership over their learning, that is when productive teaching takes place. But most important, teachers must assume ownership of the profession because of the pace of change in 21st-century school systems. Even the most urgent efforts to translate a government-established curriculum into classroom practice typically drag out over a decade, because it takes so much time to communicate the goals and methods through the different layers of the system. This slow implementation process leads to a widening gap between what students need to learn, and what and how teachers teach.

However, education systems often face tensions between granting teachers' professional autonomy and holding them accountable for the decisions they make. Indeed, TALIS data show that the level of autonomy afforded to teachers varies considerably across countries. For example, fewer than 30% of lower secondary teachers have significant responsibility to choose the learning materials they use in lessons in Azerbaijan, Bahrain, Japan, Morocco and Uzbekistan. In contrast, the share is above 90% in Denmark, Estonia, Iceland, Italy, the Netherlands, Poland and Slovenia, according to principals' reports. So how much freedom should teachers have in the classroom?

According to TALIS data, teachers who report higher levels of autonomy in designing lessons and teaching methods tend to feel more confident in managing classrooms and delivering lessons. More autonomy also correlates with higher job satisfaction, lower stress and greater confidence in adapting lessons to students' needs, in most cases by a large margin.

This seems to suggest that greater teacher autonomy is a good thing. However, TALIS only tells us there is a correlation. Not what the driving factor is. For example, confidence could be the main reason why teachers act more autonomously and are less stressed.

It is also important to note that the data show a stronger link between autonomy and self-efficacy among experienced teachers. Educators who have spent ten years or more in front of a blackboard tend to flourish when they are free to tailor their approach. In contrast, too much autonomy for novice teachers, who might lack support structures, could have a negative impact.

How should policymakers respond? While autonomy is often championed as an important component of teaching, that should not mean a lack of coherence in practice. Idiosyncratic or unscientific methods risk undermining student outcomes and the credibility of teachers. It is important for policymakers to promote a shared professional culture grounded in evidence-based practice. Education systems should consider which teachers are granted more freedom and under what circumstances. A teacher's profile – their experience, confidence and competence – should inform decisions about autonomy. For example, a novice teacher may need structure and mentorship before being expected to exercise autonomy.

Countries have confronted these issues in different ways. In Slovenia, for example, a decade-long reform of upper secondary education saw teachers gradually take on greater responsibility for whole-school planning and implementation. This meant that teachers had considerable autonomy to shape classroom practices. At the same time, accountability was built into the system through shared strategic goals and national resources to guide teachers' work.

Colombia has embedded teacher involvement by allowing teachers to participate in educational governing bodies, giving them a say on curriculum and policy. The country has also strengthened teacher autonomy through five annual weeks dedicated to institutional development. In this time, teachers can work on teaching practices as well as their school's planning and partnerships. These examples of structured programmes balance freedom with shared responsibility. They create space for teacher-led initiatives to work alongside broader educational goals.

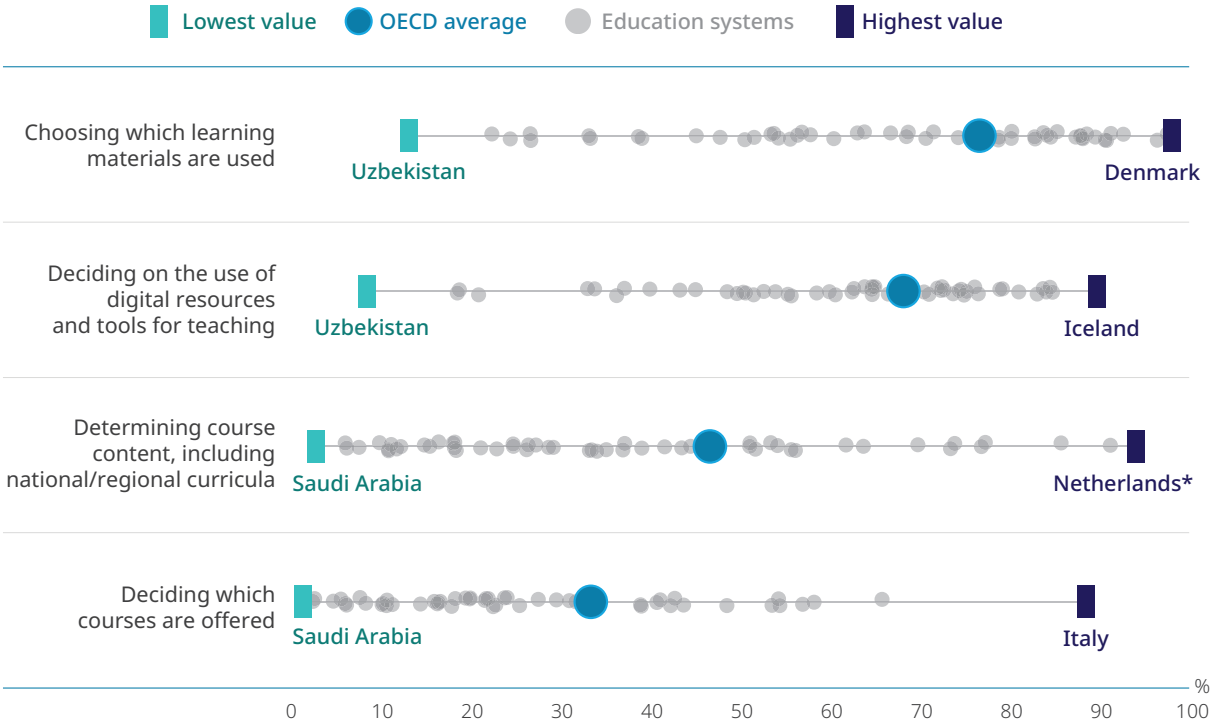
But allowing freedom in the classroom should not mean a lack of oversight. And at the moment, there is sometimes insufficient oversight in countries where teacher autonomy is high. For example, in Italy and Norway, where many teachers report having substantial instructional autonomy, about one in four have never been appraised. In Finland, the share exceeds one third. Education leaders, effectively, may not really know what teachers are doing in the classroom.

This can have serious implications. Successful accountability systems allow teachers to innovate while maintaining clear benchmarks for success. Policymakers need to cultivate environments for teachers to work together to frame good practice, such as through classroom observation and professional learning communities. This will ensure that autonomy is exercised collaboratively and responsibly; and help legitimise instructional autonomy while maintaining standards.

## Figure 14. At the school level, teachers are more involved in decisions related to instruction

Share of teachers in schools where they have a significant responsibility for...




*Estimates should be interpreted with caution due to higher risk of non-response bias.

**Note**: Results based on responses of principals.

**Source**: OECD, TALIS 2024 Database, Table 5.1.

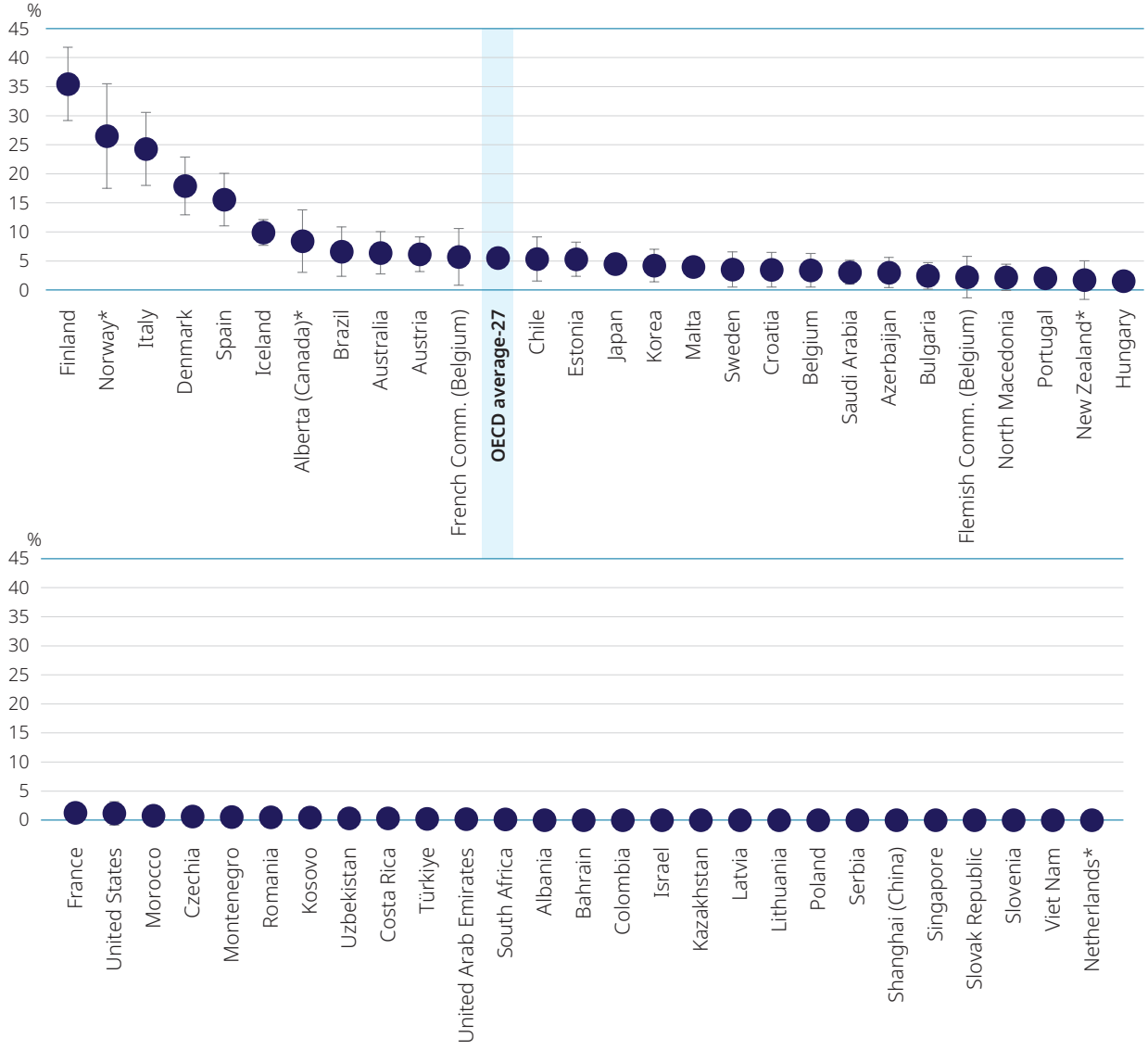
However, if accountability systems go too far, they can have a negative impact. When systems become punitive or disconnected from real classroom work, they can limit and undermine autonomy altogether. That, in turn, can breed an atmosphere of compliance, rather than creativity, and harm the quality of teaching.

This does not mean that we should take freedom as an argument to be idiosyncratic. If you were an airline pilot and you announced to passengers that, although you were taught to land against the wind, you felt like trying to land with the wind, they would understandably become anxious. In a similar way, school leaders face the challenge of balancing teachers' desire to try new or unconventional approaches with the responsibility to ensure that practice remain safe, evidence-based and effective. As many areas of teaching still lack clear standards of practice, teachers may infer that complete autonomy should apply in all areas, even in those where the evidence base is well established. As a result, when there is no common agreement on professional practice, teachers may feel disempowered when leaders steer them towards particular evidence-informed approaches.

Finding out which pedagogical approaches work best in specific contexts takes time, investment in research, and collaboration so that good ideas can spread and be scaled across the profession. Achieving that will require a major shift from an industrial work organisation to a truly professional work organisation for teachers and school leaders, in which professional norms of control replace bureaucratic and administrative forms of control. In turn, more professional discretion accorded to teachers will allow them greater latitude in developing student creativity and critical thinking skills that are central to success in the 21st century, and that are much harder to develop in highly prescriptive learning environments. Supporting such a shift is what we should expect from 21st-century education policy.

## Figure 15. Autonomy needs to be accompanied by accountability

Share of teachers who report having "substantial" or "full autonomy" in implementing the curriculum flexibly and who have never been appraised




*Estimates should be interpreted with caution due to higher risk of non-response bias.

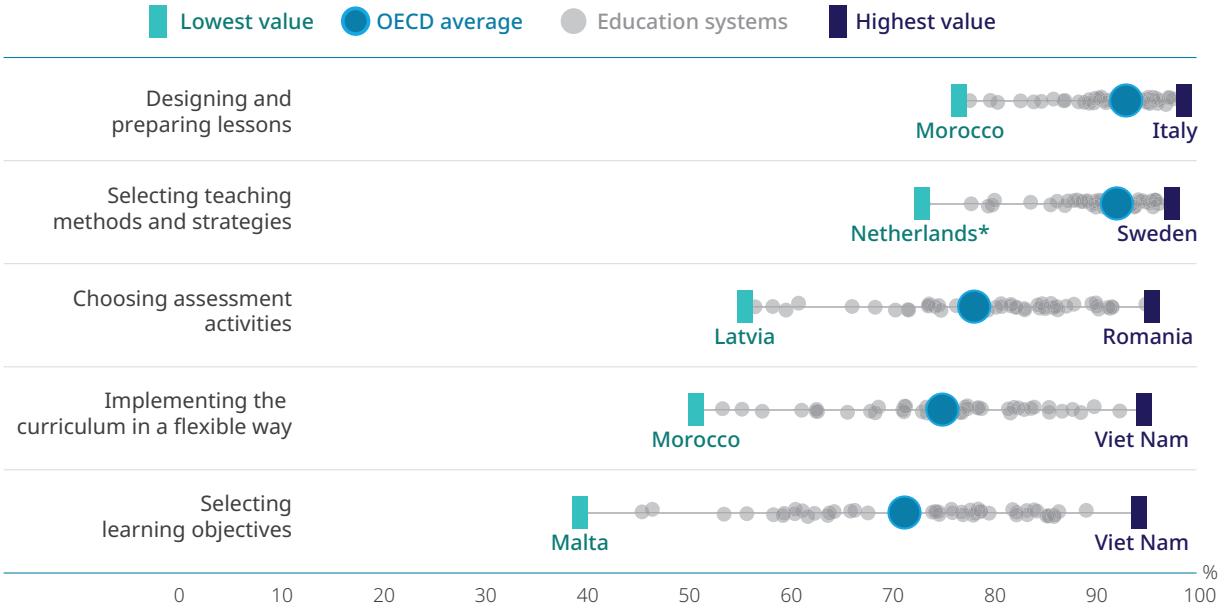
**Note**: Results based on responses of principals.

**Source**: OECD, TALIS 2024 Database, Table 5.1.

## Figure 16. Teachers' autonomy varies by task

Share of teachers having "substantial" or "full" autonomy over the following aspects of planning and teaching




*Estimates should be interpreted with caution due to higher risk of non-response bias.

**Note**: Results refer to tasks teachers perform for a class randomly selected from their current weekly timetable during the week preceding the survey.

**Source**: OECD, TALIS 2024 Database, Table 5.31.

## Teaching is becoming more of a team sport

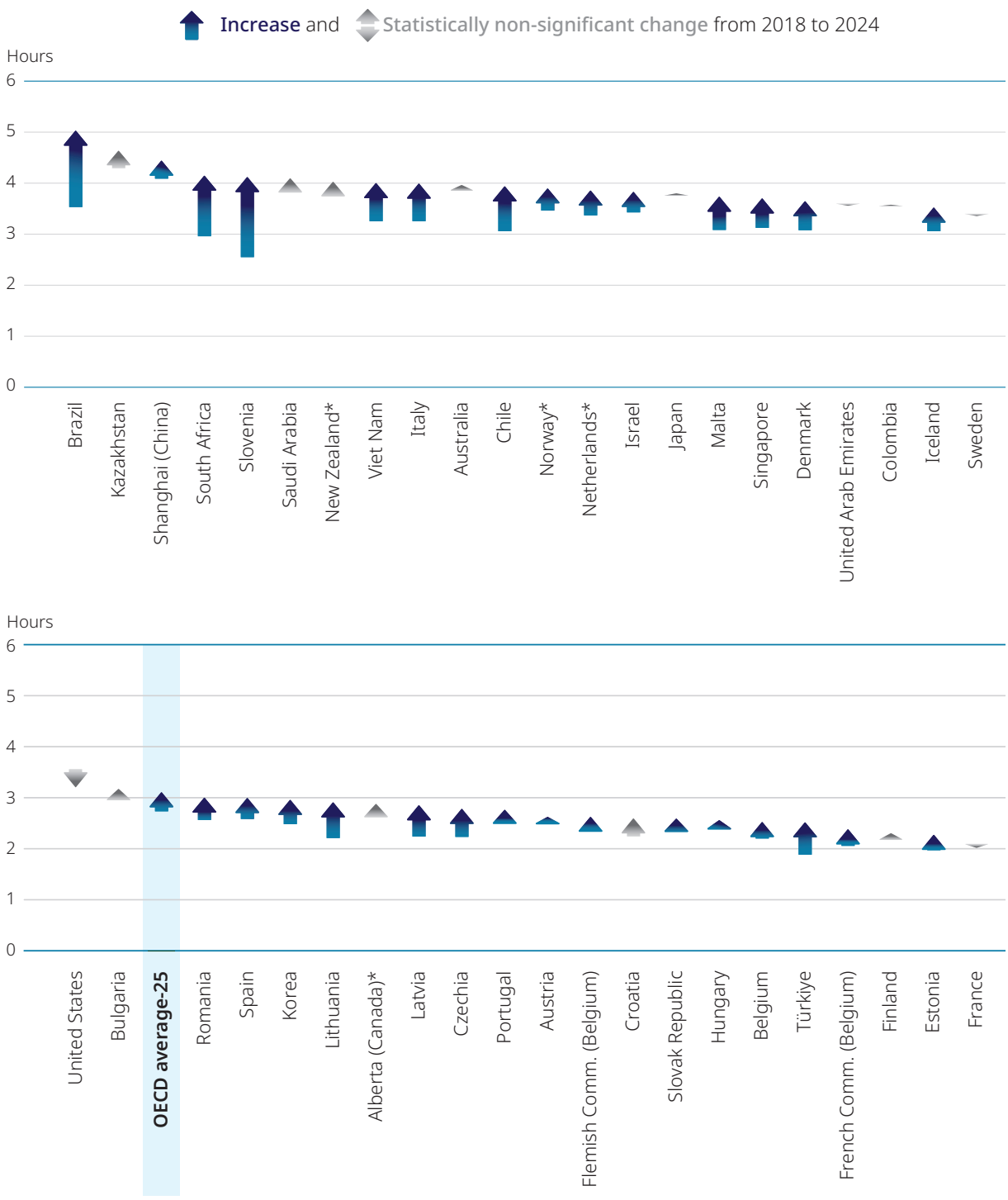
While professional autonomy is important, without a collaborative culture it can lead to fragmentation, isolation and idiosyncratic practice.

The benefits of teacher collaboration have long been trumpeted by policymakers. Creating lesson plans together, co-developing assessments and reflecting on classroom practice are ways to improve the quality of teaching and student outcomes, according to extensive research. So education leaders will be happy to see that teachers are spending more time working together. Indeed, according to TALIS, full-time teachers report spending just over 3 hours per week participating in teamwork and dialogue with colleagues, on average across the OECD. Some countries have seen a particularly big jump. Brazil, for example, has leaped from 3.5 hours in 2018 to 5 hours in 2024.

TALIS asked teachers how often they collaborate; tasks such as team teaching and sharing teaching materials. Across the OECD, 31% of teachers report teaching jointly as a team. The proportion is particularly high in some countries. In Austria, Azerbaijan, Denmark, Italy, Japan and Uzbekistan the share of teachers engaged in team teaching is 50% or more. In Viet Nam the figure is 69%. In contrast, less than 10% of teachers in Bulgaria, Cyprus, Lithuania, Malta, Montenegro and Morocco teach jointly in the same class. In Croatia, the figure is a paltry 3%.

## Figure 17. Teachers are cooperating more

Hours per week spent by full-time teachers on teamwork and dialogue with other teachers




*Estimates should be interpreted with caution due to higher risk of non-response bias.

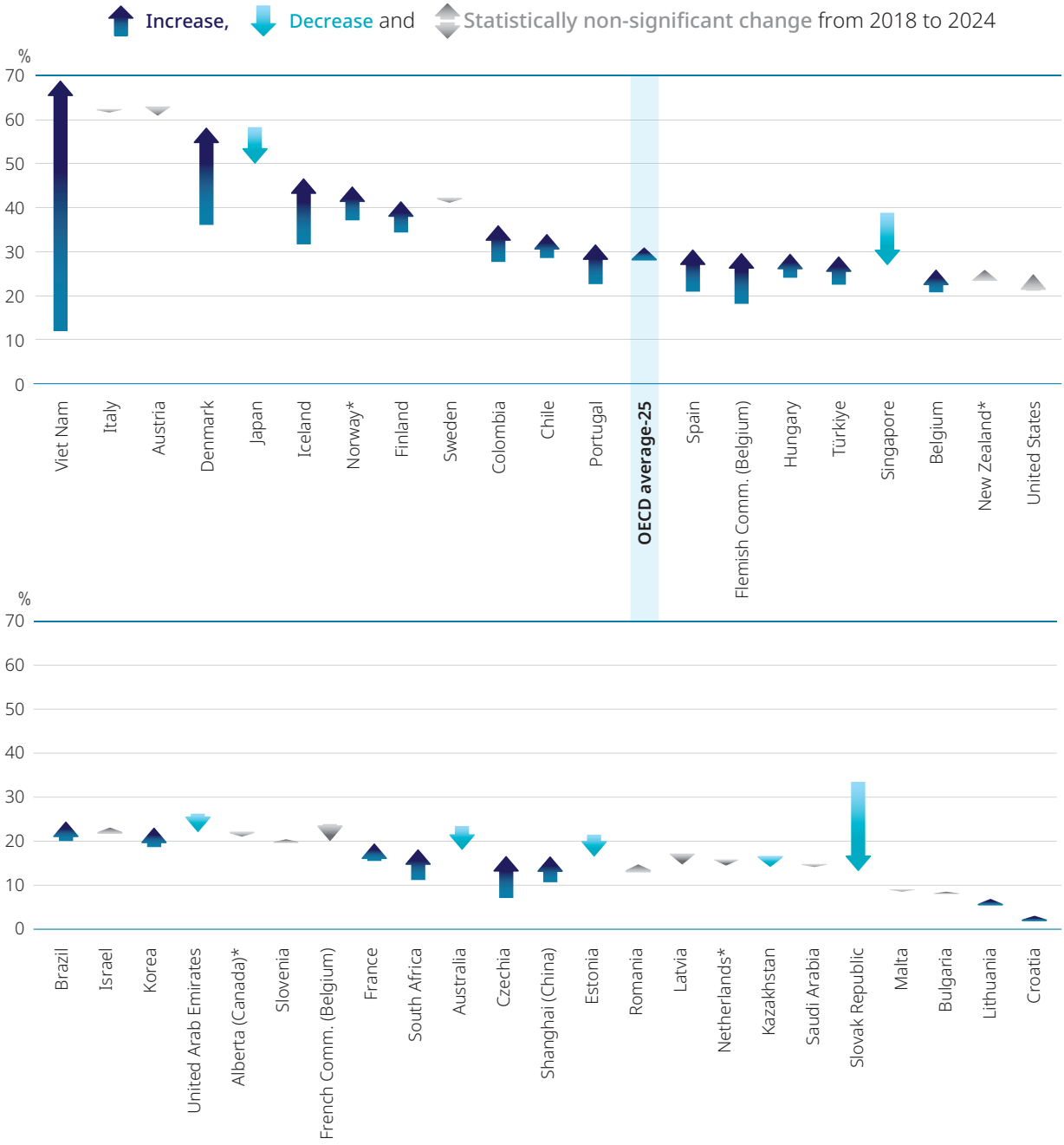
**Note**: The analysis is restricted to full-time teachers.

**Source**: OECD, TALIS 2018 and TALIS 2024 Databases, Table 6.2.

## Figure 18. Team teaching has become more common

Share of teachers who teach jointly as a team in the same class at least once a month




*Estimates should be interpreted with caution due to higher risk of non-response bias.

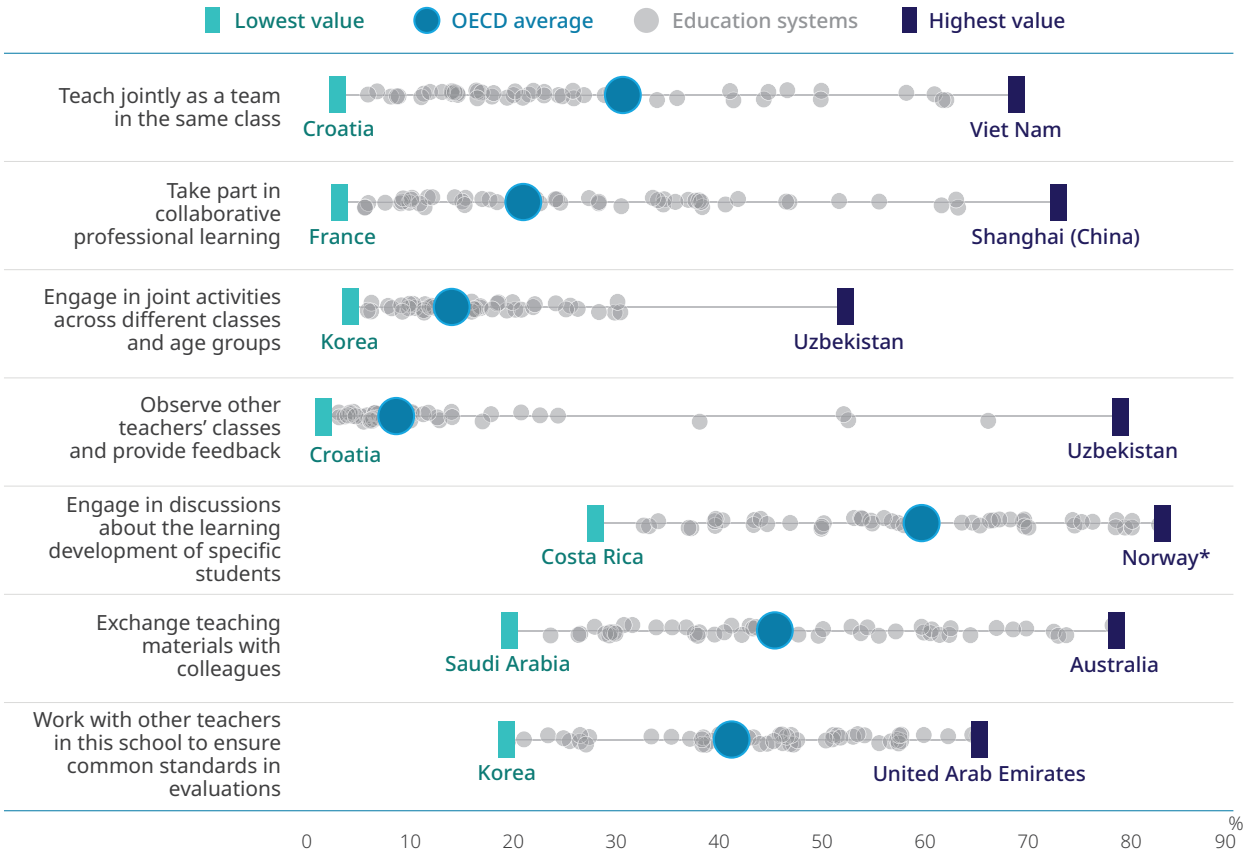
**Source**: OECD, TALIS 2018 and TALIS 2024 Databases, Table 6.7.

These statistics reveal how far some countries have progressed in this area, while others lag behind. This is important because the more teachers take part in training, the more confident they feel about teaching. They are also more likely to use teaching methods that get students thinking and actively involved. OECD data show teachers who work closely with their colleagues tend to use these strategies more often.

This suggests that when teachers share ideas, visit each other's classrooms, and support one another, they are more likely to use effective teaching strategies. As a result, schools should encourage teachers to work together and engage in professional networks, rather than work alone. Teachers who collaborate more often also show higher levels of job satisfaction.

## Figure 19. Teachers cooperate in different ways

Share of teachers who do... at least once per month




*Estimates should be interpreted with caution due to higher risk of non-response bias.

**Source**: OECD, TALIS 2018 and TALIS 2024 Databases, Table 6.3.

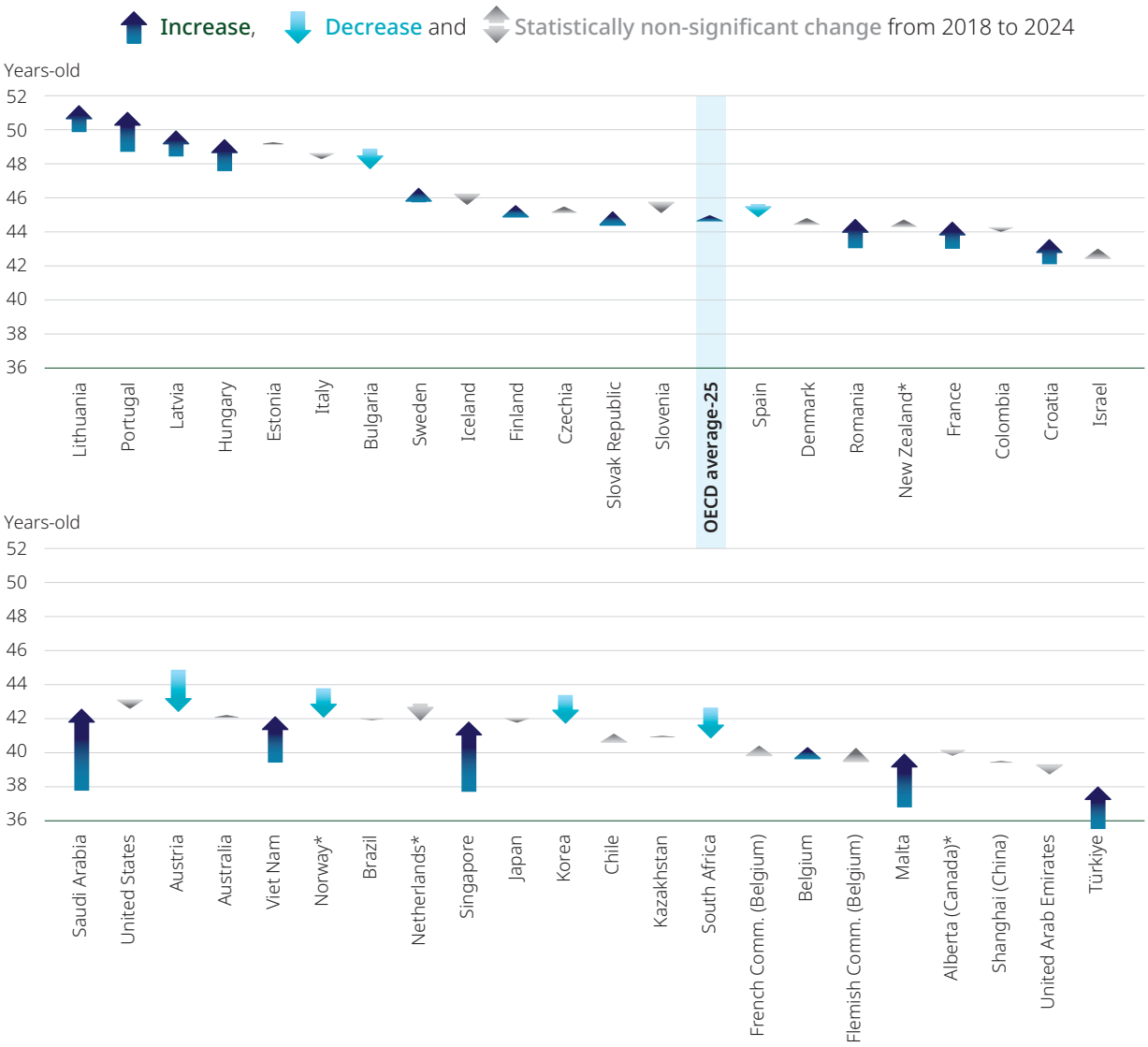
There are other areas where TALIS data reveal a lack of co-operation. Only 9% of teachers, on average across the OECD, observe other teachers' classes and provide feedback. And 46% exchange teaching materials with colleagues monthly or more, although female teachers are more likely to do so than their male counterparts. Despite the evidence that teamwork among teachers is a good thing, the reality inside many schools remains stubbornly solitary.

Why is this the case? There are many reasons. Time is the most obvious constraint. School schedules are notoriously rigid, and carving out hours for collaboration often means sacrificing instructional time or could mean teachers work unpaid. Cultural norms also play a role. In some countries, hierarchy and deference to seniority are deeply ingrained, which may mean younger teachers hesitate to critique or co-plan with more experienced colleagues. In others, those who embrace teacher autonomy might resist teamwork. Teaching is often seen as a craft, honed through personal experience and individual flair. Asking teachers to expose their practice to scrutiny could feel like an affront to their professional identity.

## Figure 20. The average age of teachers increased in many education systems between 2018 and 2024

Average age of lower secondary teachers




*Estimates should be interpreted with caution due to higher risk of non-response bias.

**Source**: OECD, TALIS 2018 and TALIS 2024 Databases, Table 1.4.

Looking ahead, if education systems are serious about improving outcomes, they should bolster collaboration. That means rethinking timetables, investing in training, and cultivating cultures of trust. It also means recognising that teamwork is not an add-on, but a core component of being a teacher.

Many teachers and schools are ready for this shift. To encourage their growth, policy needs to inspire and enable innovation, and identify and share best practice. That shift in policy will need to be built on trust: trust in education, in educational institutions, in schools and teachers, in students and communities. In all public services, trust is an essential part of good governance. Successful schools will always be places where people want to work, and where ideas can flourish, and where trust is both offered and received.

We know too little about how trust is developed in education, how it is sustained over time, or how it can be restored if broken. But trust cannot be legislated or mandated; that is why it is so hard to build into traditional administrative structures. Trust must be intentional. It can only be nurtured and inspired through healthy relationships and constructive transparency. At a time when command-and-control systems are weakening, building trust is the most promising way to advance and fuel modern education systems.

## How to ensure young teachers want to stay in the classroom

In many OECD countries, the ageing of the teaching workforce is a growing concern. A significant proportion of educators are nearing retirement age, which threatens to create staff shortages. For example, lower secondary teachers in Lithuania, Portugal and Latvia are over 50 years-old, on average, according to TALIS data (the OECD average is 45). This demographic trend puts pressure on these education systems to hire younger teachers and to ensure they receive enough support to maintain teaching standards. But some of these countries are also struggling with high numbers of young teachers quitting. What can be done in those contexts to ensure young teachers stay in the classroom?

TALIS data suggest some countries are finding better policy solutions than others. Fewer than 10% of teachers under the age of 30 intend to leave teaching in the next five years in Azerbaijan, Italy, Spain and Sweden (countries where the average age of teachers is at least 45 years old). This share is half the OECD average and four times less than the percentage who want to leave in Latvia (53%), Lithuania (50%) and Estonia (49%).

There is no magic bullet and one-size-fits all solution but countries can take inspiration from each other. In Italy, for example, where the average teacher is 48 years old, policymakers have begun to make strides in retaining younger teaching talent. Reforms have focused on improving job stability by offering clearer career progression and merit-based components to teachers' salaries. Compulsory professional development opportunities have also helped new teachers build confidence and competence early on. Italy is one of only a handful of countries that have seen a decrease in the average teacher age in lower secondary schools.

Iceland, where the average age of teachers is 46, is another country where policymakers recognised they faced a looming teacher shortage, particularly in rural and remote areas. Enrolment in teacher education had declined with just 165 new teachers graduating in 2019. A five-year initiative to tackle the issue included streamlining teacher education with a flexible master's programme, easing hiring rules, and boosting financial support for student teachers through paid placements and graduation grants. Since then, Iceland has seen a 160% increase in teacher graduations compared to the previous five-year average – with 454 teachers graduating in 2022.

These initiatives show that targeted actions can make a difference. In contrast, the Baltic states have struggled to find an effective response. They face the twin challenges of an ageing teacher population and vast numbers of early-career teachers planning to leave the profession. Low pay and limited support contribute to this situation. The three Baltic countries also have the lowest share of male teachers in the world.

Part of the issue might also be that teachers do not feel valued by society. In Latvia, Lithuania and Estonia, only around 20% of lower secondary teachers believe the teaching profession is valued. TALIS data show that teachers who do not feel valued are more likely to consider quitting. In addition, younger generations are increasingly less likely to stay in one profession throughout their working lives. This is partly driven by digitalisation, giving people more flexible career options, including greater opportunities for remote and freelance work. This trend affects all professions, including teachers.

This is not necessarily a bad development. Turnover can introduce fresh ideas. It also naturally filters out teachers who may lack motivation, improving overall teaching quality. But schools

need to rethink how they attract and retain high-quality teachers. Improving professional development opportunities for mid-career teachers is a no-brainer. Providing clearer advancements is likely more sustainable than endlessly recruiting replacement teachers. Education leaders should also develop policies that encourage people in other careers to take up teaching. Iceland, for example, has the highest share of second career teachers in the world – people who became teachers after a significant amount of time in a different job. Flexible teaching options could be a benefit here, such as guest-lecturing. This would help attract professionals who wish to contribute but who cannot fully commit to a traditional teaching schedule.

Ultimately, education leaders must not bury their heads in the sand and simply hope schools will be able to hire new teachers when required. This is a policy matter, and policymakers need to act. If they do not, some education systems risk chronic teacher shortages, which will stretch resources and harm students' academic development and prospects.

## Attracting the most talented teachers to the most challenging classrooms

TALIS data and other research show that more experienced teachers are more likely to meet their lesson aims. So, imagine a world where the most experienced, older teachers work in the most challenging classrooms. Where seasoned educators teach students with the toughest social and academic prospects.

The concept makes sense. And in many countries assessed by TALIS, there is a relative balance. However, in certain education systems, young teachers aged under 30 disproportionately report working in the most demanding classroom environments. In comparison, older, more experienced teachers often seem to get the opportunity to work in less challenging schools.

TALIS data reveal some especially large gaps. For example, in Bahrain, Colombia, Israel and United Arab Emirates, the share of teachers under 30 who report working with students with language difficulties is 15 percentage points higher than that of their older colleagues. Younger teachers are also more likely to say they work with students presenting special education needs in 15 out of 53 systems surveyed by TALIS. The gap is largest in the Netherlands, where 73% of younger teachers report teaching classes with a high share of students with special needs - 19 percentage points higher than their older colleagues.

A similar pattern is observed for behavioural problems. In most education systems, younger teachers are significantly more likely than older colleagues to report that over 10% of their students have anti-social or disruptive behaviour. The difference is 25 percentage points in Latvia and Portugal. However, one interpretation of the data could be that older teachers are better equipped to handle bad behaviour, so report it as less of an issue.

These disparities not only negatively affect young teachers, but also students, and ultimately the entire education system more broadly. Younger, inexperienced teachers are more likely to be confronted with challenging classrooms during a period when they are still developing their class management skills and confidence. Almost one in three novice teachers report needing training focused on classroom management, on average, more than the share of experienced teachers. On top of this, new teachers will sometimes have to operate with limited support systems. These circumstances increase the odds of young teachers burning out or abandoning the profession altogether. In turn, students in demanding classrooms, who are already disadvantaged by circumstance, may see their teachers struggle or quit. This inevitably creates a cycle of instability and undermines long-term strategies to improve educational outcomes.

This mismatch between the complexity of teaching contexts and the preparedness of new teachers underlines the need for smart deployment strategies and targeted support. So what can policymakers do? Some countries offer compelling policy ideas. In Japan, for example, teachers are expected to rotate schools throughout their careers. This is to ensure that all schools have access to effective teachers and a balance of experienced and novice teachers. In Korea, a mandatory rotation system requires teachers to move to a different school every five years. Incentives - such as extra pay, smaller classes and the ability to choose the next school where one works – are also used to attract skilled educators to the most challenging schools. Pairing high- and low-performing schools can also be beneficial. In Shanghai, for example, the "empowered management programme" allows teachers and school leaders from both types of schools to work together, including observing classes and discussing effective practices.

Many OECD countries have brought in targeted financial incentives to encourage teachers to work in schools perceived as more difficult working environments. These "pay rewards", if well designed, can help encourage teachers to work in tougher schools and can be more cost efficient than across-the-board salary incentives. However, while bonuses and salary increases may draw teachers to hard-to-staff schools, they do not guarantee retention or sustained performance.

More effective strategies tend to combine career incentives with robust support mechanisms. For example, offering accelerated career progression, leadership opportunities or access to advanced professional development can be more motivating than financial rewards. Policymakers need to rethink how they organise schools and empower educators. They must also not neglect the basics: developing a positive work environment and providing sufficient resources, supportive leadership and collaboration among staff. All of these have been shown to boost teacher satisfaction and retention.

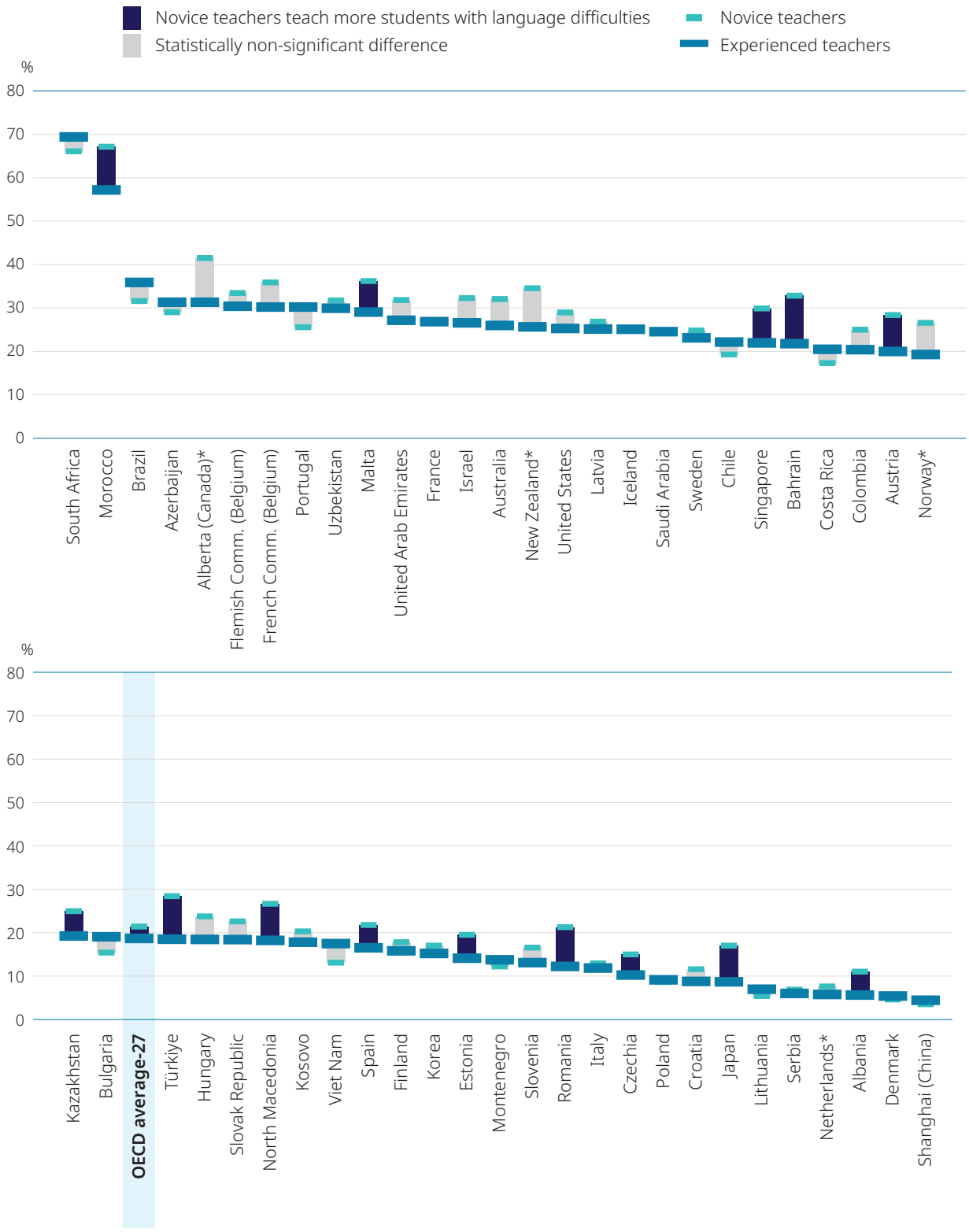
Countries like Singapore and New Zealand have introduced differentiated career tracks that allow teachers to advance while staying in the classroom, rather than taking on administrative roles. Other strategies, such as less class-contact time or smaller classes, are also worth considering for schools in difficult areas or that have specific education needs. Technology can also help, especially in remote or underserved regions where teacher expertise is limited. Digital platforms can bring high-quality instruction to students regardless of geography, enabling remote schools to benefit from "master teachers" through live-streamed lessons, virtual mentoring and shared digital resources.

Looking ahead, education leaders need to promote the idea that it is a smart career move for experienced teachers to work in the toughest schools. For long-term success, policymakers must go beyond attracting teachers to the profession. They need to make disadvantaged schools places where teachers feel valued, supported and rewarded. At the moment, veteran teachers sometimes gravitate toward institutions with higher academic reputations, better resources and lighter workloads. Without greater incentives, that situation is not going to change.

## Figure 21. Novice teachers are often allocated to more difficult environments

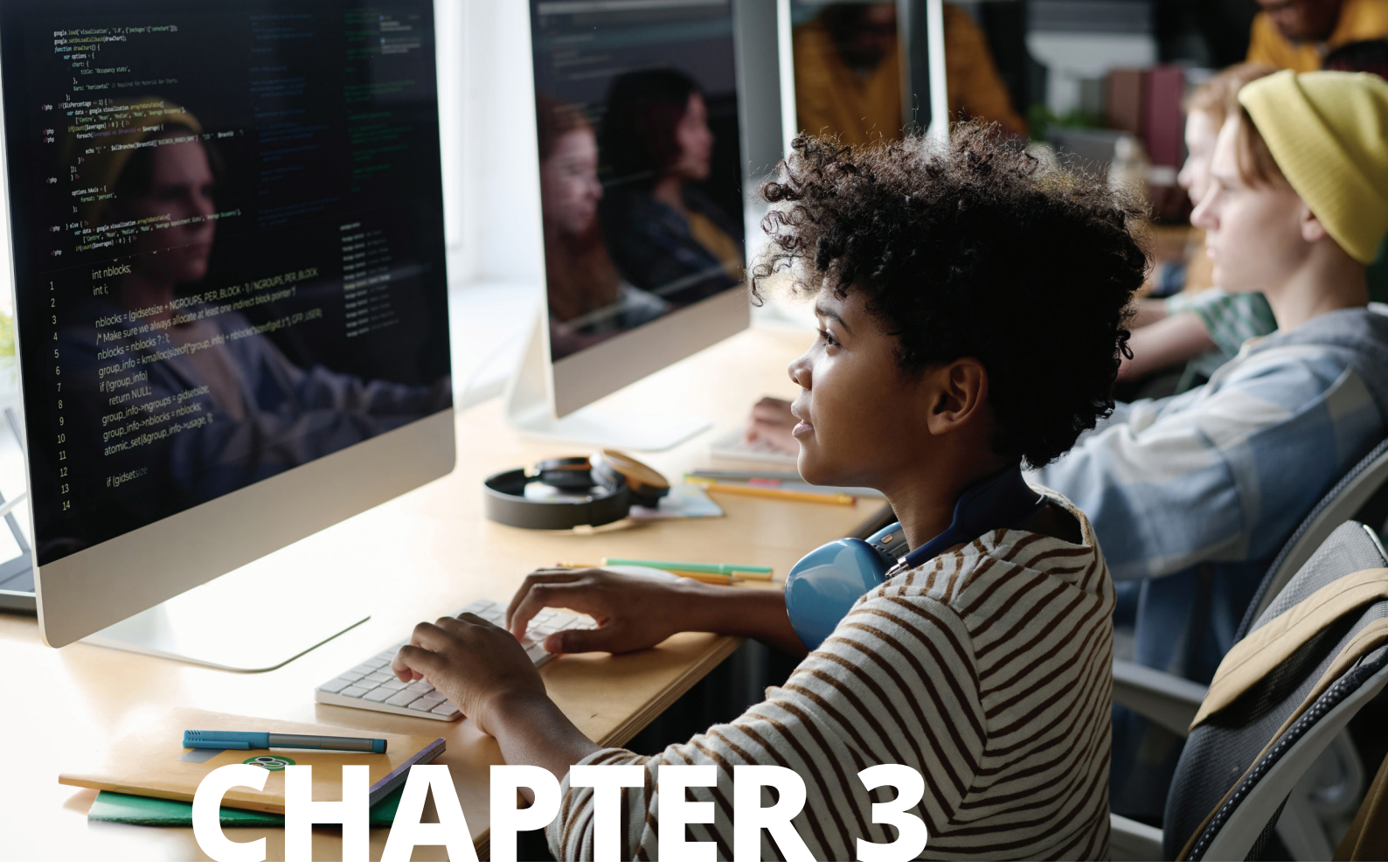
Share of teachers with more than 10% of students with difficulties in understanding the language of instruction




*Estimates should be interpreted with caution due to higher risk of non-response bias.

**Note**: Older teachers refer to those aged 50 and above. Younger teachers refer to those under age 30. Results refer to lessons taught to a class randomly selected from teachers' current weekly timetables during the week preceding the survey.

**Source**: OECD, TALIS 2024 Database, Table 3.25.



# CHAPTER 3

# Embracing the opportunities of artificial intelligence and educational technology

## The AI moment in education

For years, AI in education hummed quietly in the background. It powered grading systems, adaptive tests and learning analytics but few outside the edtech field ever noticed. Then came generative AI, and everything shifted. Unlike earlier tools, GenAI didn't arrive through ministries or school procurement plans. It landed straight on students' phones and teachers' laptops. That changed everything.

General-purpose GenAI tools are not designed to help students learn; they are built to do things for us. They write essays, solve problems, translate texts and generate code. Unsurprisingly, the first reaction from education systems was concern - about cheating, academic integrity and whether grading could still be trusted. But that response revealed something deeper: education's long-standing dependence on credentials as proof of learning, rather than learning itself.

And yet, the genie is not going back into the bottle. Students already use GenAI widely outside classrooms, more so as they grow older. Parents use it at work and at home. Teachers use it to draft lesson plans, quizzes and feedback. Researchers use it to refine language, explore data, and solve problems that once took months or years. GenAI is no longer an experiment; it is part of education's lived reality.

Its capabilities are undeniable. General-purpose GenAI can engage in dialogue, adapt to context, and synthesise information at a scale no human can match. In science, its potential is already transformative. AlphaFold, a generative AI system, predicted the structures of nearly all known proteins in a single year - a task that once consumed entire PhDs. That breakthrough has reshaped medicine and refocused human effort on harder questions. GenAI doesn't just retrieve knowledge; it accelerates its production.

But this power comes with real risks. GenAI systems "hallucinate", producing plausible but false answers. They are not fully consistent because they are shaped by probabilities rather than understanding, reflecting the perspectives of their training data. And even when the answers sound authoritative, they do not understand in any human sense. Their outputs demand scrutiny - often more, not less, than traditional AI systems.

For education, the stakes are high. When GenAI performs tasks for students, it risks pulling them out of the zone where real learning happens, when struggle, effort and growth take place. The same risk applies to teachers and leaders who outsource feedback, assessment, or even strategic thinking to machines, hollowing out processes whose value lies in process rather than output.

Yet used wisely, GenAI offers real opportunity. It can personalise the cognitive struggle of learning without sacrificing social cohesion, support students through conversational tutoring, and provide explanations when human help is unavailable. It can help teachers adapt instruction, analyse learning data through natural language, and focus their energy where it matters most: relationships, judgement and inspiration. It can expand access for second-language learners, rural students and those historically underserved.

The choice facing education systems is not really whether GenAI should be allowed, but how to ensure its pedagogical intent and shape its most effective use. GenAI will remain part of our societies. Education's task is to ensure it strengthens learning, rather than quietly replacing it.

In 2024, when the TALIS data were collected, about a third of teachers were already using AI for work, mostly for planning lessons and learning about teaching topics. The uptake has probably grown since then. Out of those teachers using AI in 2024, TALIS data also reveal a quarter employ it to assess or mark students' work. This represents a fundamental shift in how students are evaluated and raises a fundamental question: is it a good development or not?

The attraction of AI is obvious as teachers regularly say they are short on time. Between planning lessons, teaching and managing classrooms, and marking assessments, the workload can be relentless. So, if AI software claims it can assess hundreds of maths tests in seconds, it is no surprise that some teachers jump at the chance. AI is simply better than humans at doing certain things, particularly tasks requiring repetitive precision. But outsourcing assessment risks that teachers lose the connection to their students and the understanding of what their students can do. Out of teachers who use AI, at least 50% in Azerbaijan, Kazakhstan, North Macedonia, South Africa, Türkiye and Viet Nam mark schoolwork with it, according to TALIS data. In Uzbekistan, the share reaches an astonishing 85%. That is fast take-up given that Chatgpt was only launched at the end of 2022. It is also a major change that, in most cases, has occurred without formal policies or consistent training.

For critics, the speed at which AI has been adopted is a risk, with technology companies competing for a global market with little regard for oversight. But for supporters, AI is the solution to numerous issues that teachers contend with on a daily basis. Across the OECD, 40% of teachers report that too much marking is a source of stress. By instantly assessing grammar, coherence and structure, proponents of AI argue it allows teachers to spend more time on lesson planning and mentoring students, freeing them from "never ending" marking.

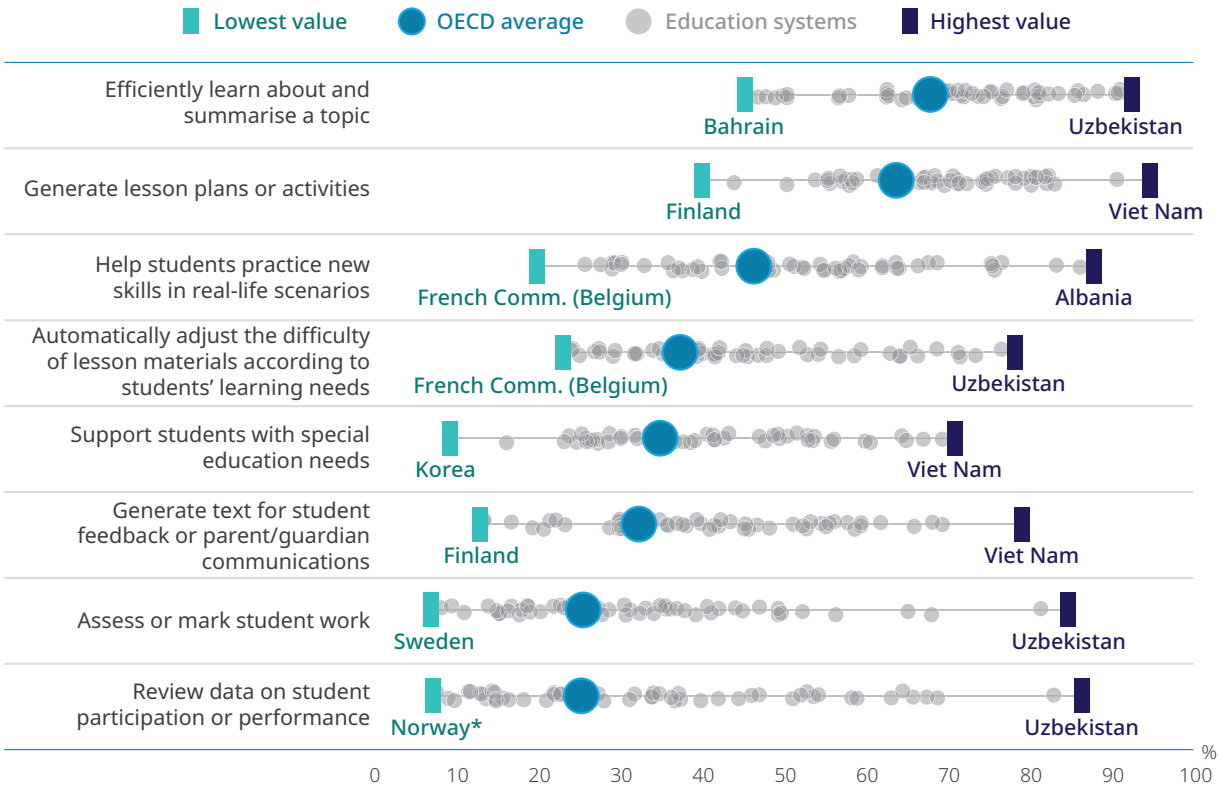
But there is a lack of robust, large-scale independent evidence that proves AI enhances student learning. AI may struggle to capture subjective elements of assessment, such as creativity or originality and it may also have difficulty understanding context or cultural influences. In addition, there are privacy and data security concerns. And left unchecked, AI may spread misinformation,and algorithmic grading may amplify racial, gender and socio-economic biases rather than erase them.

These issues raise concerns about what checks have been carried out before implementing AI in the classroom. The effectiveness of algorithms varies considerably. Does the AI grade fairly across different student demographics? Does its feedback genuinely help students improve? Education leaders and schools should know the answers before deploying the software, particularly as some surveys suggest that nearly two-thirds of adults oppose the use of technology for marking.

Another profound shift to consider is the relationship between teacher and student. Traditionally, marking has been about more than just correcting errors. It is a form of dialogue with teachers' comments offering insight and encouragement to students. If replaced by AI, does it weaken the personalised relationship between teacher and student? Could some students make less effort if they realise AI, and not teachers, are marking their work?

## Figure 22. AI is useful for some tasks more than others

Of teachers who use AI, the share who report using it to do the following tasks




**Source**: OECD, TALIS 2024 Database, Table 1.60.

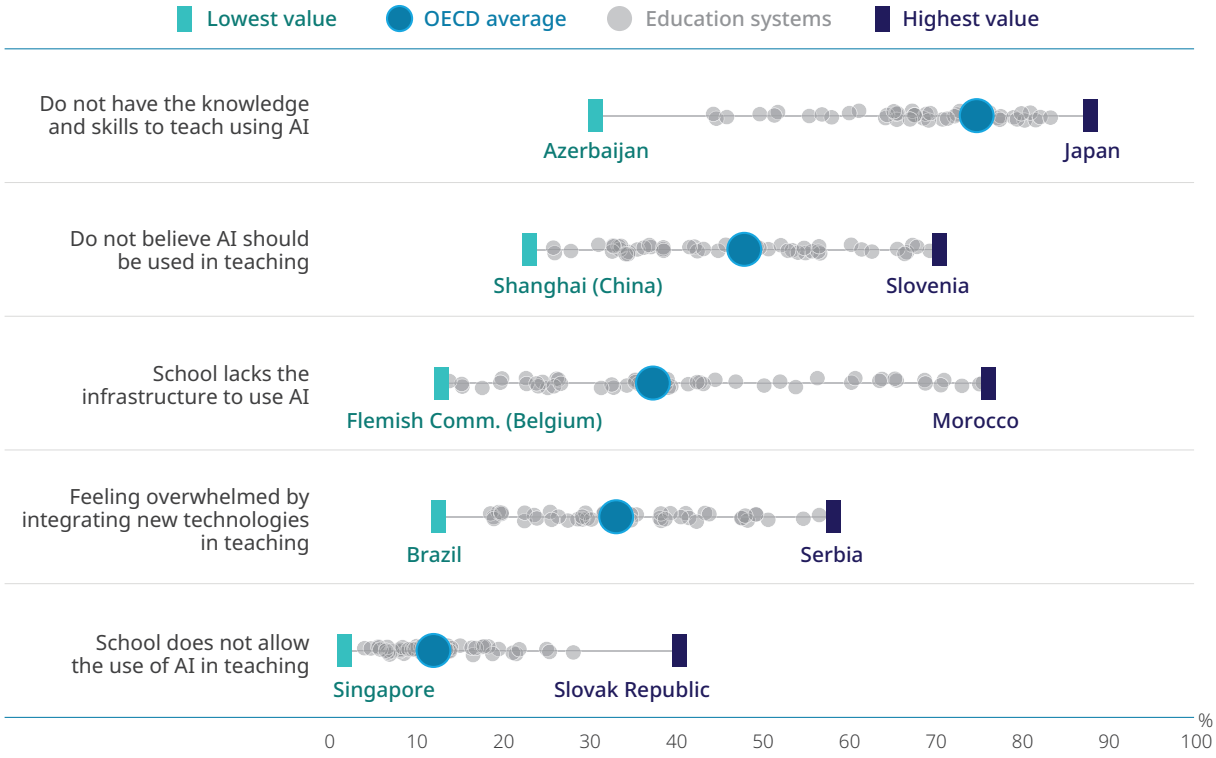
 

These are questions that policymakers should urgently consider answering, particularly in countries where the use of AI in teaching has really taken off in ways other than marking. For example, around three-quarters of teachers in Singapore and the United Arab Emirates report using AI in their general work, according to TALIS data. Training on AI is highest in Singapore (76%) and lowest in France (9%). And among teachers who use AI, some 73% report leveraging it to efficiently learn about and summarise topics, and 69% use it to generate lesson plans, on average, according to TALIS. Given the speed at which AI is racing through classrooms, it is no surprise that policymakers are scrambling to keep up.

It is also important to note that many teachers are less than enthusiastic about AI. TALIS data show that about half of teachers believe AI should not be used in teaching at all. And one in ten report that their schools have policies banning the use of AI in teaching. The data reveal major divides between schools and teachers on the use of AI tools in classrooms. This is reflected by countries policies too, with some nations embracing AI and others urging caution.

## Figure 23. Lack of knowledge and skills is the most common barrier to AI use

Out of teachers who don't use AI, the share who report the following barriers to using AI to teach




**Source**: OECD, TALIS 2024 Database, Table 1.63.

In the end, AI is not a magic power. It is just an amazing accelerator and an incredible amplifier: It will amplify good ideas and good educational practice in the same way it amplifies bad ideas and bad practice. AI can advance education to create a truly level playing field that embraces the diversity of learners so that every learner will succeed. Or it can superempower those with the right resources and dispositions and leave others further behind. AI can empower teachers to become creative designers of innovative learning experiences. Or it can disempower them

to become slaves of scripted lessons plans or algorithms they no longer understand. AI can help reduce human bias through better data, but it can also amplify and entrench bias. AI can connect people across geographic, linguistic or cultural boundaries, but it can also sort us into echo-chambers that amplify certain views and insulate people from divergent thinking. AI is in principle neutral, but it is always in the hands of people who are not neutral – developers and users.

It is clear that AI's role in education is anything but settled, but education leaders must not avoid it or be afraid of it. Instead, schools need to ensure that AI is applied in contexts where it truly enhances learning. Ultimately, students and teachers must understand how AI systems operate in educational contexts, including how they evaluate work, generate feedback, personalise learning pathways and support accessibility. Schools must ensure fairness, so the AI avoids bias and ensures equitable treatment. And while AI can assist with grading, human judgement remains crucial, particularly for creative or subjective work – as well as for motivational purposes. Importantly, countries where teachers are more engaged in professional learning about AI are also the countries where teachers are using it more in their classrooms. This suggests that public policy can make a significant contribution to helping teachers feel prepared and comfortable with these technologies.

## Guidance to seize GenAI Opportunities

The pace at which AI technologies are developing makes it increasingly difficult to say, with confidence, what works, in which context, and with what effect. For teachers and policymakers alike, this is unfamiliar terrain. AI is evolving faster than our typical traditional evidence-gathering cycles can accommodate.

As a result, we must look outward across systems, countries and experiences, to understand what may work best in the future. In this context, comparative insight becomes a necessity, not a luxury.

To that end, the OECD Secretariat has undertaken extensive cross-country analysis of how GenAI is already being adopted and used in education systems around the world, through its Smart Data and Digital Technology in Education project.

The insights that follow reflect the OECD Secretariat's current thinking on how GenAI can be developed, deployed and assessed in ways that serve education's core mission: to support pedagogy, deepen meaningful learning, foster equal opportunities, and promote human knowledge, skills and well-being.

These insights, drawn from the *OECD Digital Education Outlook 2026: Exploring Effective Uses of Generative AI in Education*, are organised into five sections, each addressing a key dimension of how GenAI can be harnessed responsibly and effectively in education systems today.

- Human-centred teaching and learning with GenAI;
- Investment in GenAI-related educational R&D;
- Enabling policy environment for trustworthy GenAI in education;
- Effective GenAI infrastructure for all;
- Human agency and human in the loop.

### 1. Human-centred teaching, learning and assessment with GenAI

> *Learning and teaching primarily aim to develop valued human knowledge and skills such as independent thinking and foundational skills across subjects, while fostering well-being and student agency. This may start without GenAI, then with educational GenAI, before incorporating general-purpose GenAI. Used selectively and purposefully for pedagogical reasons, GenAI can enrich learning and not replace cognitive effort or weaken the human relationships at the heart of education.*

For teachers, GenAI offers a powerful set of supports. It can help prepare lessons, personalise curricula, design assignments and exams, draft feedback, and even assist with grading. It can also support administrative work such as documentation and routine reporting. In the best-case scenario, GenAI buys teachers time to build relationships, give richer feedback, and focus on the human judgement and care that no machine can replicate. In some contexts, it may even support less experienced tutors in real time, raising the overall quality of instruction.

Students are already using GenAI as a cognitive companion. Large language models have become a kind of supercharged search engine. They explain concepts, answer follow-up questions, brainstorm ideas, polish drafts, debug code and suggest solutions. When designed specifically for learning, educational GenAI tools can scaffold understanding much like intelligent tutoring systems, guiding students step by step rather than simply delivering finished answers. At the system level, GenAI can help develop assessments, expand automated evaluation to oral tasks, tag learning resources, and provide administrative support across institutions.

But here's the catch: Learning does not happen when the machine does the thinking for you. Writing, problem-solving, and teaching are not just tasks; they are cognitive workouts. Outsource them to GenAI, you may get a polished product, but you lose the learning that comes from struggle. This is the risk of skill atrophy: when tools designed to help us think end up thinking for us instead. The danger is especially acute with general-purpose GenAI, which is built to perform tasks efficiently, not to support learning.

This raises thorny questions. When is it appropriate to use GenAI, and for what? Should young children use general-purpose GenAI for homework? Probably not, unless teachers expect this use. But educational AI tools are a different story. They can be purpose-built, safe and effective, such as tutoring systems for math or reading, which have long been used successfully in primary education and are now becoming more conversational through GenAI interfaces. However, to learn with GenAI, students need enough foundational knowledge to judge its outputs critically. Without that, the tool can lead to be harmful.

There is another risk that matters just as much: the erosion of human relationships. Education is not only about acquiring knowledge; it is about learning how to interact with others, such as receiving feedback, earning approval and navigating disagreement. If teachers stop giving personal feedback, or if students increasingly interact with bots instead of peers and adults, education risks becoming efficient academically but meaningless.

The lesson is simple and urgent. GenAI can elevate human learning, but not act as a replacement. It should strengthen human connection, judgement and understanding - not quietly take their place. If we use GenAI with intention and care, it can become a tool that reinforces what makes education profoundly human rather than eroding it.

### *Doing a task with GenAI isn't the same as learning from it*

The use of (general-purpose) GenAI may enhance performance in a study task without leading to knowledge acquisition. Learning requires the active and often social work of students' mind. Much of the art of curriculum design and pedagogy is to create tasks that will elicit student reasoning and give them opportunities to advance it. None of this can happen if the student avoids cognitive effort or thinking. For example, translating a text into a foreign language with an LLM is unlikely to correlate with improved mastery of the foreign language. This has also been shown with the use of general-purpose GenAI as an adaptive learning system in mathematics or for improving one's written text. What is in principle the product of learning (the proficient achievement of a task) may no longer reflect actual learning if GenAI is involved. This does not imply that one cannot learn by using general-purpose GenAI tools, or that educational GenAI tools have the same effect, but the use of GenAI tools should be guided by clear pedagogical objectives or educational purposes. Jurisdictions should consider informing and sensitising parents and caretakers to this risk of using general-purpose generative AI tools when supporting their children.

### *As machines get smarter, human skills matter more*

Education institutions aim to develop skills that are socially valued for humans, whether these skills become GenAI capabilities or not. The OECD has developed "AI capability indicators" designed to assess and compare AI advancements against human abilities. They include creativity, critical thinking and metacognition, and show that AI capabilities are progressing in these valued human skills. Even if GenAI could outperform humans on these skills, it would not imply that humans should stop valuing and developing them. For example, GenAI can be used to support the creative process and the acquisition of creative skills. However, it has been shown to also reduce collective originality, probably because GenAI "averages" what is publicly available on a topic in its training data set and will tend to make different but similar suggestions in response to similar requests. Nurturing individual creativity with no use of GenAI may thus remain socially beneficial.

Similarly, because GenAI can generate incorrect or biased answers, and also help identify different perspectives on a subject, teachers may use GenAI outputs to help develop their students' critical thinking. However, students must also develop critical thinking with no GenAI and learn to think like scientists and navigate uncertainty and ambiguity, make and test assumptions, and learn to weigh the strength of evidence.

Requesting students to provide personal insights on a subject, to research and work on topics they are personally interested in or to try to understand how they and others feel (empathy) can help mitigate the risk of overreliance on GenAI tools as well as nurture personal expression, independent thinking, appreciation of learning and of the world, and make educational tasks less standardised and more engaging for students.

### *Students must learn to think (without GenAI) before they learn to prompt*

As experts using general-purpose GenAI tools know, their outputs vary from excellent to irrelevant – and the reason they know is that they are expert. Students are not experts yet, and they should reach a certain level of expertise in what they are studying to know when GenAI outputs should be discarded, improved or used. Expertise is correlated with age, especially so when students are younger, but proficiency in what one is supposed to learn trumps age when it come to the use of GenAI. In some instances, teachers may ask students to use GenAI as a scaffold to help them with aspects of the task they do not master yet and to focus their attention on the acquisition of skills or knowledge that they are closer to mastering. Foundational knowledge that must be mastered for a given field should be assessed with no GenAI support. For aspects of the educational task that are peripheral to the key learning objectives, the use of general-purpose GenAI as a performance-enhancing tool is not necessarily a problem though. Assessment will also have to pay more attention to learning processes rather than just student products.

Assessing student knowledge with or without GenAI can be done in a controlled environment, either by having supervised paper and pencil exams or by using digital tools that block or document student use of GenAI tools. It is more difficult for tasks that are not meant to be supervised. Beyond the design of assignments that cannot easily be performed by GenAI, several models are possible, such as oral examination, the request of short videos rather than, say, short essays, a focus on conceptual understanding rather than practical performances. Alternatively, non-supervised assignments can also be used to develop students' skills in creating or engaging with GenAI tools.

### *GenAI works best when teachers design the task.*

It is a new responsibility for teachers to guide students in using GenAI from time to time as part of their studies. They should design some learning activities that involve the use of GenAI, whether general-purpose or educational. The younger and less proficient students are, the more appropriate educational (as opposed to general-purpose) GenAI tools are. Teachers should design tasks that require cognitive effort and work despite the use of GenAI tools. Teachers should also support students on how to use GenAI tools: they may request intermediate outputs, prompts, or have access to learning analytics documenting the student use of GenAI.

A productive collaboration with GenAI tools can take different forms. It could be about receiving feedback on one's work, but also about evaluating GenAI tools' outputs in a mindful and critical way. While education systems value students' ability to answer questions and provide solutions, they may now emphasise more students' ability to ask good questions and elicit good answers, by refining their questioning, identifying incorrect or misleading information, knowledge gaps or missing perspectives in answers, so as to get to balanced and satisfactory answers from GenAI tools (and also humans). They may also put more emphasis on the metacognitive skills they are developing.

While the appropriate use of GenAI tools may support the learning of academic knowledge and skills in any subject, students also need to develop a certain level of literacy in GenAI itself as part of their digital literacy. The OECD AI literacy framework describes AI literacy as four competences: engaging, creating, managing and designing AI. This literacy includes engagement with a variety of GenAI tools, including for non-academic purposes, but also encompasses understanding the basics of how GenAI works.

Preparing students to use GenAI does of course not imply that they should use GenAI all the time. As for any other tool for learning, teachers should provide students with a variety of learning activities, experiences and scenarios, including some with no use of GenAI tools (or technology), and ensure diversity and balance in learning activities. This is essential for student wellbeing and engagement.

### *No GenAI lesson plan replaces professional judgement*

Like their students, teachers should exercise their evaluative judgement and critical thinking on what GenAI tools produce and ensure the produced contents are appropriate for their students in their given context. These time-saving tools are useful to provide teaching ideas, to contextualise courses or personalise them to specific classes, but they may also include inaccurate knowledge, misunderstandings of the specific learning contexts, etc. For example, while teachers should mobilise their knowledge of how students have and have not been progressing in the classroom to decide which topics need revisiting as a priority and which do not, they could use a GenAI tool to generate warm-up activities bringing these topics together. Ideally, if available, teachers should use educational GenAI tools that are aligned with their course contents and curriculum rather than general-purpose GenAI tools.

### *Algorithms may suggest; teachers must decide. Teachers should not outsource assessment to AI*

Providing feedback and assessing the quality of student work is time-consuming and sometimes considered a "burden". However, assessment is not an administrative task but an essential part of teaching and learning. While technological support can help, especially when teaching many students, teachers' ability to provide personal feedback and motivate their students is bound to their personal knowledge of students' work, their strengths and weaknesses, and a good understanding of their classes.

GenAI tools open new perspectives for student work assessment. For example, they ease the assessment of assignments and exams with rubrics that include multiple explicit assessment dimensions and proficiency descriptions. They also allow for the generation of more detailed feedback, which is sometimes found more useful than human feedback (at least when the recipient does not know the source). While teachers can take advantage of those new possibilities, and occasionally automate assessment tasks or subtasks, they should continue to regularly and primarily assess their student work themselves and always check and take responsibility for any mark that could have a stake for students' future. The design of GenAI assessment tools could for example ensure that feedback or marks are actively validated and thus facilitate teacher agency. GenAI can also be used by students to receive immediate feedback on their work when instructors are unavailable, but this cannot replace the professional human feedback of teachers. The social dimension of feedback, that is, the knowledge that another person is engaging with the student work, may change the way students react, feel, and behave when they produce it. The authenticity of feedback is not only important from the student perspective, it is also a professional and moral imperative for teachers.

## 2. Investment in GenAI-related educational R&D

> *As general-purpose GenAI tools are not designed specifically for learning, education systems may consider supporting the development of tools that aim to enhance teaching and learning. Investing in educational GenAI grounded in educational research, co-created with teachers and students, and supported by rigorous research on their effectiveness can open new possibilities for educational improvement.*

The OECD AI Principles promote use of AI that is innovative and trustworthy and that respects human rights and democratic values. Adopted in May 2019, and updated in May 2022, they set standards for AI that are practical and flexible enough to stand the test of time. If there is one lesson the OECD AI Principles made unmistakably clear, it is this: you don't stumble into good AI by accident. You build it deliberately, collaboratively and with the long view in mind. It is the same lesson for GenAI. To make GenAI work *for* education rather than merely *in* education, the people who live in classrooms every day must be involved from the start.

Too often, teachers and students are invited into the process only at the end - when the code is written, the architecture fixed, and the purpose already decided. They are asked to "pilot" or "test" tools whose fundamental design choices are no longer up for debate. The same pattern is now repeating itself with generative AI.

Yet teachers and students are not just users; they are repositories of practical wisdom. Their insights rarely appear in academic papers or engineering specifications, but they are precisely what will determine whether a GenAI tool becomes transformative or forgotten. That is why genuine co-creation matters. Not consultation as an afterthought, but partnership at the design table, when goals, safeguards and pedagogical assumptions are still fluid.

This is also where responsibility enters the picture. As GenAI becomes more powerful and more embedded in education, EdTech companies are no longer just software vendors; they are shaping learning environments. With that influence comes an obligation: to design tools that respect the complexity of teaching and learning, that support human judgement rather than replace it, and that align with educational values.

At the same time, there are still major gaps in educational research on GenAI, including about what works, under what conditions and at what cost. These are not questions any one country, company or discipline can answer alone. Instead, they call for international co-operation, shared evidence and a genuine willingness to learn across systems. Only then can we be certain that GenAI will strengthen education rather than distort it.

### *EdTech should build GenAI for classrooms, not just consumer markets*

Because general-purpose GenAI tools are performance- rather than learning-enhancers, GenAI developers and technology companies should develop GenAI tools meant for student learning. Those tools can be designed to be used by students, by teachers, or other education stakeholders. Their big difference when compared to general-purpose GenAI tools is that they are designed to improve specific aspects of learning. Student-facing learning tools should start from and incorporate insights from educational research and pedagogical knowledge while those for teachers should allow them to use them to support their pedagogical choices, either before or during teaching. For example, teachers may be allowed to easily increase the level of hallucinations of a GenAI system used by their students to support their critical thinking. The educational orientation of GenAI cannot be limited to educational intentions or be merely declarative though: ideally, it should undergo impact (or other) evaluations demonstrating their educational value. International co-operation on educational efficacy would help advance this agenda. Governments can support companies by making some datasets based on their curriculum and education research available, as is the case in England (United Kingdom) with the development of a "content store" allowing companies to finetune their GenAI models.

### *If it isn't tested for safety, bias, and impact, it isn't ready for schools*

Because of their generative nature, GenAI tools bring more safety risks when it comes to age-inappropriate content, content not aligned with the curriculum, with educational research or pedagogical knowledge, etc. As key actors in the advancement of trustworthy GenAI, developers, and EdTech companies are responsible for the quality, safety, and law-enforcement of their tools. While existing datasets reflect past and current societal perspectives and do not reflect all different voices across the globe, technology companies and governments should collaborate to remedy to the extent possible this legacy and curate AI training datasets that include a greater variety of perspectives and cultures. This was, for example, the ambition of Apertus, an open-source language model developed in Switzerland. Relevant communities should be involved as appropriate in how their languages and cultures are represented in these new datasets. As some forms of algorithmic bias are impossible to remove, a regular audit and benchmark of educational LLMs could help identify and mitigate those biases.

### *The strongest GenAI will be co-designed with teachers and learners*

A few countries have launched new initiatives to get end users involved before the late stages of the AI tool development process. The objective is to ensure the utility of these tools for education and their subsequent adoption. In the Netherlands, the government-funded National Laboratory on AI (NOLAI), which brings together teachers and school representatives with academics, EdTech companies and policy makers to design AI tools in a co-creation process. The French ministry of education also made it a requirement of its multi-step public procurement process of AI tools that companies co-create their products with teachers and students through its AI Innovation partnership (P2IA).

### *We need global yardsticks - and serious research - to measure what GenAI actually changes in learning*

On the research side, there is still a dearth of information about what students and teachers do with GenAI tools for educational purposes, what types of tools they use, how they feel when using them, as well as what jurisdictions and schools make available to them. Governments should co-operate to develop international metrics of availability and use of these tools. Research on the effectiveness of GenAI for learning and for productivity gain is emerging, but most available experimental research currently lacks statistical power and is focused on short interventions that are hardly generalisable to a repeated use of GenAI. Moreover, many research studies on GenAI tools do not provide enough specificity about the pedagogical purpose and context of their use, making it difficult to replicate or scale studies showing promising effects. While educational GenAI tools are being developed, robust research on their effectiveness is needed. All these efforts should contribute to the international knowledge base and provide enough information about context. Internationally coordinated educational research studies may also allow one to better understand how to adapt the use of GenAI to educational contexts.

Emerging research on the use of (mainly general-purpose) GenAI tools points to the need to change learning and assessment tasks so they are adapted to the availability of these tools. Educational GenAI tools may mitigate those risks and enhance learning, but still need to be meaningfully integrated in teachers' pedagogical practices. Teachers should be encouraged and given the possibility to initiate or participate in research projects about the educational use of GenAI tools. This does not imply that all research projects have to be practice-engaged though. International sharing of educational practices and evidence on how to adapt educational tasks and pedagogies so that their use enhances (or at least does not hamper) learning will help to more quickly understand and adjust to the digital transformation and seize the opportunities brought by GenAI in education.

While research access to educational administrative datasets is possible, it entails privacy risks. The creation of synthetic datasets keeping the characteristics of the real datasets without retaining any personal information has now become possible, largely thanks to GenAI. This possibility should be more systematically exploited by educational jurisdictions to broaden datasets for education research. Initiatives from other sectors could be examined for inspiration. The creation of these privacy-preserving synthetic datasets should not be limited to administrative data but also encompass learning data that are typically collected by private companies, at least partly through public contracts.

### *Universities should train GenAI builders, not just GenAI users*

GenAI is also transforming scientific research: specialised GenAI tools are increasingly available and used to support almost all the stages of research, from literature reviews to experimentation through hypothesis generation. Higher education institutions should prepare future researchers to use these specialised scientific GenAI tools. Governments are expected to also encourage the development of GenAI tools that support educational research specifically and explore the new avenues they may open for education research.

## 3. Enabling policy environment for trustworthy GenAI in education

> *Policy and regulatory frameworks are designed to protect students and support learning while enabling innovation. Combined with ongoing stakeholder dialogue, clear expectations on privacy, safety, bias testing, age-appropriateness, transparency and alignment with educational objectives can create an enabling environment for the trustworthy and meaningful use of GenAI in education.*

The challenges GenAI poses are largely the same ones we already know from non-generative AI, and they line up squarely with the OECD AI Principles: transparency and explainability so systems don't become black boxes; robustness, security, and safety so they don't fail at scale; and accountability so responsibility never evaporates into the cloud. Add to that the OECD's long-standing standards on privacy, data protection, and digital security risk management, and the foundations are already in place.

But principles alone do not govern technologies - policies do. That is why the OECD AI Principles call on governments to do two things at once that are often seen as opposites: *to shape an enabling environment for AI and to continually review and adapt regulatory frameworks* so innovation and competition can flourish, without compromising trust. In other words, the goal is not to slow AI down, but to steer it in the right direction.

All the guardrails laid out in the 2023 OECD-EI Guidelines (Opportunities, guidelines and guardrails for effective and equitable use of AI in education) remain fully relevant in the age of GenAI: ethics, safety, privacy, transparency, explainability, and the capacity for human negotiation and oversight. What differs is how countries choose to enforce them. Some embed expectations in public procurement rules, while others issue guidance, standards or regulatory requirements.

Across the OECD, most countries have already built strong data protection and privacy regimes into their digital education governance, often with heightened safeguards for minors and age-specific thresholds for different kinds of data. In the European Union, new legislation now sets clear obligations for the development and deployment of AI systems, including those used in education. Developers of educational GenAI tools are no longer operating in a regulatory vacuum.

Yet education is not just another market. Learning objectives must come first. Regulatory frameworks need to protect learners while also creating the right incentives for EdTech companies to build tools that are affordable, effective and equitable, rather than flashy and exclusive. Get this balance wrong, and you either stifle innovation or open the door to systems that undermine trust and widen gaps.

This is where international co-operation becomes a force multiplier. A more harmonised global approach can reduce market fragmentation, lower costs and give educators and learners access to better tools. This approach also ensures that developers are not forced to navigate a maze of incompatible rules.

### *Black-box AI has no place in education*

The first, basic level of transparency is for users to know that they interact with a GenAI tool rather than with a human, unless it is self-evident. A second aspect lies in how they protect the privacy, data and intellectual property of their users. While GenAI tools do usually protect the privacy of the data provided by users in their queries when used for a fee, this is often not the

case for their free versions which may typically be used by students, teachers, and education staff (unless GenAI tools are provided by their educational institution). GenAI providers should ensure transparent information on whether the user data and queries are collected or used to further train their models. They should also aim to be as transparent as possible about how the tools operate, the criteria they use to generate their content as well as the datasets on which they were trained. Educational institutions or jurisdictions running privacy audits on cloud applications for education could consider doing the same for GenAI on cloud.

Jurisdictions and educational institutions that provide GenAI tools to education stakeholders should also have the same level of transparency with the end users and be transparent about their own uses. To the extent possible, if they use them to make or inform decisions, they should explain how the tools are used, and also the methods and criteria used to inform their decision. Transparency may also require social dialogue and negotiation of those criteria with teachers and their representative organisations, students (and their representative organisations when they exist), parents and families, and all other stakeholders. Transparency alone does indeed not guarantee social acceptance of the social tools.

Explainability is difficult to fully achieve with GenAI, even more so than with non-generative AI. Most GenAI systems are proprietary and trained on datasets that are not disclosed, making it challenging to understand the factors that shape their outputs. Educational GenAI tools are built on these underlying models and therefore inherit this opacity. Nevertheless, explainability remains possible at certain levels: some educational GenAI tools are designed to provide information about why and how specific content was generated, including the features considered or the steps taken. Such approaches can help strengthen trust and support responsible use, even if they only offer partial explainability.

### *AI safety and standards demand global cooperation*

Governments share a series of common challenges to ensure the quality, safety and education quality of GenAI tools: safety, data protection, alignment with pedagogy, bias, etc. They could for example work internationally, in collaboration with GenAI companies, to develop international safety expectations for GenAI tools used in education, as is for example the case in England, partially in EU countries through the AI act, or in other countries through their procurement process. They may ask GenAI companies to comply or at least be transparent about their degree of compliance with these expectations.

Used for educational purposes by education institutions, GenAI tools should generate safe and age-appropriate content. This risk is usually much lower with non-generative AI given its "rules-based" nature. Beyond GenAI tools used in or for education, non-educational GenAI tools can pose safety risks for students and other stakeholders, for example through new forms of cyber-bullying using their generative affordances in offensive ways. Jurisdictions and education institutions should monitor those risks and adapt education systems' and institutions' regulations and codes of ethics accordingly.

GenAI tools also pose greater risks of algorithmic bias. For non-generative AI, the risks often materialise as AI tools not performing equally well for different subpopulations (and thus discriminating against some). GenAI tools amplify the risks of presentational bias: images, texts or other content that reproduce views now considered as inaccurate or inappropriate (or locally considered as such). Governments and companies may work together to identify different layers of agreement on these so that educational GenAI is aligned with their curriculum and what they consider acceptable views within the education sphere. Higher education institutions may fine-tune GenAI systems so they align with the course content and knowledge base suggested by their academic staff.

Similarly, while all countries may not agree on what "good pedagogy" is, given the variety of contexts, they may still agree on some basics anchored in educational research, including learning science and all its other sub-disciplines, and develop and share expectations for GenAI tools. This could lead to a multi-layered set of expectations that different countries and jurisdictions could choose from.

### *Responsible GenAI use requires continuous guidance*

Students and teachers need to receive clear guidelines about how GenAI tools can and should be used in the learning process. Jurisdictions and educational institutions should consider having a public position about the appropriate and inappropriate uses of GenAI, following a dialogue with their students, teachers, staff and their representative organisations. Education technology is a socio-technical system, and a public position based on social dialogue will also facilitate further agreement on the responsible uses of GenAI by students as well as teachers. This echoes the OECD AI Principles recommendation to "work closely with stakeholders to promote the responsible use of AI". These public positions should be updated regularly given the evolution of these technologies.

This includes providing clear and plain-language information and supports to parents and caregivers, recognising their crucial role in guiding children's use of GenAI outside of school. These supports may include glossaries, guidance documents, and practical examples to help families understand the possibilities and limitations of GenAI tools, the associated risks of overreliance, hallucinations or biased outputs, and the importance of balancing independent learning with (hopefully teacher-guided) GenAI-assisted tasks. Engaging parents in this dialogue can contribute to more coherent expectations across school and home environments, and support more equitable and responsible use of GenAI among students. Some countries such as India also provided parents with GenAI applications that support them in reading and inventing new stories to their children, which is typically associated with stronger learning outcomes.

Many countries provide such guidance, which should be regularly updated based on emerging evidence on the actual use of and research on GenAI in education.

### *Every AI decision must be open to human challenge*

The principle of having a human alternative or final resort is as important for GenAI as for non-generative AI. GenAI tools should play a limited and clearly defined role in decision-making, especially in situations where their use may affect individual's rights (for example, assessment, certification, admissions, disciplinary matters, or comparable tasks). While GenAI tools could be the first source of information for some questions or problems, providing the convenience of being available at any time of the day while humans may not be, users should be able to ask humans to provide those answers when they feel GenAI answers are unsatisfactory. In the (rare) event that GenAI tools are used to make decisions, those affected by those decisions or recommendations should be able to challenge them and get humans back in the loop, as noted by the OECD AI Principles.

## 4. Effective GenAI infrastructure for all

> *Jurisdictions typically ensure that all students and teachers can benefit from GenAI thanks to digital infrastructure and support accessible to all (devices, connectivity, digital resources and professional learning opportunities). Providing curriculum-aligned GenAI resources, alternative solutions where divides persist, and sustained professional learning enables effective and meaningful uses of GenAI in education.*

The promise of generative AI in education does not begin with algorithms. It begins with plumbing. Without reliable, affordable digital infrastructure, which includes devices, connectivity, platforms and skilled teachers, GenAI will remain a luxury good rather than a learning tool.

GenAI needs high-quality connectivity with enough speed and low enough latency to allow students and teachers to interact, ask follow-up questions and explore ideas without friction. Yet in many countries, universal access to such connectivity remains more aspiration than reality. Broadband divides between urban and rural areas, rich and poor households, and connected and disconnected schools, still shape who gets to learn with this new technology.

Closing these divides is an educational imperative. Ensuring affordable, high-quality digital infrastructure everywhere is the first step toward equal opportunity in the age of GenAI. That is why the OECD Recommendation on Broadband Connectivity emphasises the importance of access to networks and the need for digital skills to make meaningful use of applications like GenAI tools.

But infrastructure alone is not enough. This new phase of AI challenges earlier assumptions in education. Earlier, non-generative educational AI tools, such as intelligent tutoring systems, were typically institution-owned and tightly controlled. General-purpose GenAI is different. It is freely available to anyone with an internet connection, while its most powerful versions are increasingly paywalled. That reality raises uncomfortable questions about equal opportunities for all, oversight and who benefits first from the most capable tools.

Education systems therefore need to think in two lanes at once. The first is supervised, intentional use: GenAI integrated into teacher-designed learning activities, aligned with educational goals and supported by professional judgement. The second is unsupervised, organic use: students and teachers engaging with GenAI outside institutional planning, often invisibly, but with real consequences for learning, assessment and equity.

To navigate both, skills matter as much as access. Students and teachers need the capacity to use GenAI thoughtfully for learning. That capacity grows through skilled teachers, knowledgeable administrators and peers who model effective practice. It also requires investment in support structures like coaches, mentors and technical staff, who can help translate powerful tools into sound pedagogy and responsible administration.

Professional learning must evolve accordingly. Teacher education, ongoing professional development and communities of practice all have a role to play in building confidence, judgement and shared norms around GenAI use. The goal is not to turn educators into engineers, but to empower them as designers of learning in a world where AI is always on.

In the end, GenAI will only be as equitable and effective as the foundations beneath it. Build the infrastructure, invest in people, and the technology can amplify learning. Skip those steps, and GenAI risks becoming just another force that widens the gap between those who do and don't have access.

### *No devices, no connectivity - no AI learning*

This is a pre-condition for any use of AI for educational purposes. Closing broadband connectivity divides, as well as broader digital divides is a challenge that goes beyond education, but remains an important priority to ensure the adoption and effective use of GenAI in education. The OECD Recommendation on Broadband Connectivity provides recommendations to help bridge these digital divides, promote widespread broadband deployment and foster competition and investment in broadband development. The quality and reliability of connectivity is a key element of access. In education, quality devices need to be adequate for learning applications and have sufficient performance, including long enough battery life, be long lasting and abide by sustainability standards. This does not imply that public authorities should pay for devices and connectivity for all students. Leases, loans, zero-rating of specific sites and other solutions have been successfully experienced in the past years in different countries and jurisdictions. If publicly provided, devices should be affordable, measured by the total cost of ownership. Among many possible models, Ceibal in Uruguay has developed a long experience in the provision and support of educational devices for all their public-school students.

### *GenAI belongs alongside other digital resources and textbooks as a core learning tool*

General-purpose LLMs and other tools are usually not educational in purpose. Jurisdictions and institutions should consider providing access to GenAI tools that are aligned with their curriculum, courses, pedagogical preferences and other educational objectives. This provision is also a way to provide tools that respect privacy and data protection. Typically, they should provide a mix of general-purpose and educational GenAI tools. Depending on the task, they may consider whether non-generative educational AI tools would not be more effective or appropriate. One challenge for education lies in the cost of licensing privacy-preserving GenAI tools for students and teachers, but many countries, jurisdictions or education institutions already do so.

Some countries, jurisdictions and higher education institutions have adopted different approaches. England has developed a content store providing EdTech developers resources to align their educational GenAI models to the English curriculum and to research evidence about teaching. France is developing a "sovereign AI" for teachers and students that aligns to its values and curriculum and respects privacy. Korea has introduced AI-powered digital teaching and learning materials that blend traditional resources with pedagogically validated AI digital tools. These materials are designed for targeted use by students and teachers across specific school levels and subject areas. As part of its AI Leap programme, Estonia is working with GenAI companies and licensed general-purpose GenAI tools to teachers and educational version to their high schools students. Some higher education institutions across the world have also either developed their own GenAI tools to support their students and teachers or provided access to commercial models while ensuring their privacy, intellectual property and data protection.

Given the current reality of persistent connectivity and digital divides, jurisdictions and educational institutions can consider the "AI unplugged" model. This approach consists of using AI tools and resources that work with existing digital connectivity infrastructure (usually mobile phone or smartphones) and level of digital skills. Brazil has for example successfully used it in some areas of the country where devices and connectivity are scarcely available. In the case of GenAI, Small Language Models run on mobile phones offline and can provide students and teachers with a first access to AI language models, although with limited capabilities compared to the large ones. GenAI companies should develop small GenAI models for educational purposes, and jurisdictions should make education stakeholders aware of them where appropriate.

### *Teachers need ongoing AI literacy, not one-off training*

Teachers' GenAI pedagogical literacy can come from a variety of professional learning opportunities, in pre-service teacher education as well as during in-service learning opportunities. As for any other professional knowledge, it comes from learning by doing and thus from the access and use of GenAI tools for some professional purposes as well as from different types of real-time human support, which may range from "digital" or "AI" champions and professional learning communities through to innovation projects focused on the use of GenAI for teaching and student learning. Teachers should acquire enough professional knowledge to make informed decisions as to when GenAI tools should and should not be used, and how they can best support student learning.

For teachers, GenAI literacy also encompasses the ability to use GenAI tools in their teaching to support their students' learning and gaining a basic understanding of GenAI as a technology, including its strengths and limitations, and learning how to effectively and ethically use it. The AI literacy framework published by the European Commission and the OECD could support this effort.

Jurisdictions should support teachers and administrators to keep abreast of new developments in the landscape of educational GenAI tools and inform and curate them so they can more easily select and appropriately use them. This curation should take into account non-generative educational AI tools that may be more effective or appropriate than GenAI tools for similar use cases. Teachers also need support to navigate the ethical, legal and pedagogical issues that arise when students and families use generative AI beyond the classroom.

### *GenAI should empower teachers, not just watch them*

AI tools such as classroom analytics provide teachers with feedback about some aspects of their teaching, with no intrusion of a human observer and the possible uncomfortable feeling of being judged, but also with significant risks of unethical use by their employers. For example, these tools can record how much time teachers have spoken during class, what mix of pedagogical activities or learning strategies they have used, etc. GenAI tools can help turn the analysis of these classroom observations into suggestions and recommendations, sometimes in real-time, but most often after class. This feedback would allow teachers to reflect on and improve their practice. While research is still underway, this GenAI feedback may be more impactful when it is discussed with a coach or mentor who has not observed the class (nor made the initial suggestions). Jurisdictions and developers have to ensure these tools do serve professional learning and not surveillance, for example by limiting access to the collected information to the interested teachers only.

### 5. Human agency and humans in the loop

> *Human judgment, relationships and responsibility should not be inadvertently replaced by GenAI, even though some educational tasks can be purposefully automated. Designing educational GenAI tools and practices that preserve human oversight, and fostering dialogue on what may and may not be automated, can support more trustworthy, equitable and educationally meaningful uses of GenAI.*

Both generative and non-generative AI can automate many of the routine tasks that weigh down education systems. It can help grade, schedule, draft, summarise and organise. But while AI can automate tasks, it cannot automate the teaching profession itself. Education is built on judgement, relationships, responsibility and trust - which cannot be safely outsourced to machines.

That is why the OECD-EI Guidelines insist on keeping a "human in the loop" and, whenever possible, a human alternative alongside digital tools. This is not a technical preference. It reflects the human-centred vision at the heart of the OECD AI Principles, and it runs through everything discussed in this report. This final section brings that principle into sharp focus.

As previously mentioned, used wisely, GenAI can take on time-consuming work. This creates time for teachers to focus on learning, mentoring, motivation and relationships. But that promise only holds if humans remain active agents, not passive approvers of machine-generated output.

Students must remain agents of their own learning. Learning does not happen when answers arrive friction-free; it happens when students think, struggle, revise and reflect. Teachers, too, must remain agents of their teaching, and not just consumers of AI-generated content. Otherwise, the risk is skill atrophy. Education institutions might even consider periodic "automation and agency" audits to ask questions like: What have we automated? Why? And where must human judgement remain non-negotiable?

Design matters here. Developers play a crucial role in protecting human agency. GenAI tools should be built to keep teachers in the driver's seat. This approach will allow them to co-design workflows, customise systems, and validate or revise AI outputs. Human agency is not just the ability to override AI; it must be actively supported by design choices that invite reflection, decision-making and responsibility.

The higher the stakes, the more essential this becomes. GenAI's fluency and versatility can create a dangerous illusion of infallibility. Even systems that perform impressively most of the time can hallucinate, make errors or behave inconsistently. When AI-generated outputs affect grades, opportunities or life trajectories, human scrutiny is not optional. It is an ethical necessity.

That is why education systems need an ongoing, honest conversation about what should, and should not, be automated. Keeping humans at the centre is not the job of any single actor. It is a shared responsibility across governments, institutions, teachers, students, researchers and the companies building these tools.

Get this balance right and GenAI can make education more meaningful, effective, equitable and trustworthy. Get it wrong, and we risk replacing a deeply human enterprise with an efficient but empty loop.

## Encouraging innovation inside and outside of school

When other sectors experience flat-lining productivity, they turn to innovation. In education, however, systematic investment in innovation is still rare. Public health research budgets in OECD countries are many times larger than education research budgets. This disparity says a lot about the role we expect knowledge to play in advancing practice. Beyond the volume of innovation, its relevance and quality are also important, alongside how fast ideas translate into positive impact.

GenAI is an innovation that is already beginning to transform how we think, work and learn. But innovation can be more difficult to achieve in hierarchical structures that are geared towards rewarding compliance with rules and regulations. One policy approach to foster innovation in education has been to increase autonomy, diversity and competition among educational institutions. But evidence of the benefits of this approach remains patchy.

Innovation in the instructional system is another challenge. There is a long history of introducing new methods in education - whether it was television, video, digital whiteboards or computers - in the hope of radically improving teaching and the effectiveness of schooling, only to find, at best, incremental change achieved at higher cost and complexity.

But the bigger issue is that, even where good education research and knowledge exists, many practitioners just do not believe that the problems they face can be solved by science and research. Too many teachers believe that good teaching is an individual art based on inspiration and talent, and not a set of skills you can acquire during a career. Yet it would be a mistake to blame just teachers for that. This problem often goes back to policy due to a lack of incentives and resources to codify professional knowledge and knowhow. In many countries, the room for non-teaching working time is far too limited for teachers to engage in knowledge creation. Because education has not been able to build a professional body of practice, or even a common scientific language as other professions have, practice is often not articulated, invisible, isolated and difficult to transfer. Investing in better knowledge - and disseminating that knowledge widely - must become a priority; it promises to deliver huge rewards.

It is also important to create a more level playing field for innovation in schools. Governments can help strengthen professional autonomy and a collaborative culture where great ideas are refined and shared. Governments can also help with funding, and can offer incentives that raise the profile of, and demand for, what works. But governments alone can only do so much. Silicon Valley works because governments created the conditions for innovation, not because governments innovate. Similarly, governments cannot innovate in the classroom; they can only help by opening systems so that there is an innovation-friendly climate where transformative ideas can bloom. That means encouraging innovation within the system and making it open to creative ideas from outside. More of that needs to be happening.

Policymakers often view education industries as providers of goods and services to schools. They tend to underappreciate that innovation in education is also changing the very environment in which schools operate. In particular, technology-based innovations open up schools to the outside world, both the digital world and the social environment. They also bring new actors into the system, including education industries with their own ideas, views and dreams about what a brighter future could hold.

It is difficult for education systems to treat industry as a valuable partner. Fears of a perceived "marketisation" of education, or the displacement of teachers by computers, often endanger what could be a fruitful dialogue. At the same time, we should be more demanding of the education industry. Most of our children would not voluntarily play with the kinds of software that companies are still able to sell to schools. Is innovation in the education industry as dynamic as it should or could be? Can we break the cartel of a few large suppliers of educational resources who use an army of salespeople to sell their services to a fragmented market? Can we overcome the slow sales cycles, where buyers have to deal with layers and layers of people all "in charge"?

Is it possible to create a business culture for managing innovation in school systems? At the moment, it is easier for administrators to buy new tools and systems, as well as use existing staff, because this can appear to be a quicker and more straightforward option. Yet, the treatment of teacher time as a sunk cost means people see no benefit to saving this time. It is worthwhile to explore how industry can help the education sector close the productivity gap with new tools and new practices, organisations and technology.

Finally, education systems need to better identify key agents of change and champion them; and they need to find more effective ways of scaling and disseminating innovations. That is also about finding better ways to recognise, reward and celebrate success, to do whatever is possible to make it easier for innovators to take risks and encourage the emergence of new ideas.

## Note

International Summit on the Teaching Profession

# Reimagining Teaching in an Accelerating World

As global challenges, artificial intelligence (AI) and other technological shifts reshape education, reimagining teaching demands more than incremental change. For policymakers, the central question is whether education systems are actively shaping that transformation or merely reacting to it. This report sets the scene for the 15th International Summit on the Teaching Profession (ISTP), to be held in March 2026. Convened by the Estonian Ministry of Education and Research, the OECD and Education International, the Summit brings together education ministers, union leaders and teacher leaders to engage in evidence-informed dialogue on some of education's most pressing and contested challenges. Drawing on the OECD's internationally comparative analysis, the report explores three interconnected themes: reimagining the teaching profession in a rapidly changing world; strengthening autonomy, trust and collaboration as foundations for innovation; and harnessing AI as an ally for teaching and learning. Together, these themes frame a forward-looking discussion on how to shape the future of education

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