

INSIGHTS FROM THE TALIS-PISA LINK DATA

TEACHING STRATEGIES FOR INSTRUCTIONAL QUALITY



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What is the TALIS-PISA Link?

The OECD study “Teaching Strategies for Instructional Quality” is based on the analysis of the TALIS-PISA Link database.

The Teaching and Learning International Student Survey (TALIS) is an international survey that examines teaching and learning environments in schools in countries and economies around the world, while the Programme for International Student Assessment (PISA) assesses the extent to which children near the end of compulsory education have acquired the knowledge and skills needed for full participation in modern societies.

In TALIS 2013, participating countries and economies had the option of applying TALIS questionnaires to a PISA 2012 subsample with the purpose of linking data on schools, teachers and students.

This option is called the “TALIS-PISA Link” database. The TALIS-PISA Link provides us with valuable information about teaching strategies and their relationship with the characteristics of the school, the classroom and students’ outcomes. A better understanding of these relationships can help teachers, schools and education policy makers to design more effective policies with the aim of improving the learning achievements of all students.

What are the key features of the study, “Teaching Strategies for Instructional Quality”?

8 Participating countries

Australia, Finland, Latvia, Mexico, Portugal, Romania, Singapore and Spain.

Who are the teachers?

- Teachers who were working in the school at the time of the PISA 2012 study: for at least a year in the surveyed school in the southern hemisphere countries and for at least two years in the northern hemisphere countries.
- Teachers instructing mathematics to 15-year-old students.
- Teachers whose target class falls into mathematics.
- Teachers who answered the TALIS mathematics module¹.
- Teachers who responded to the 24 items about classroom practices considered for this study.

Across the eight participating countries, the resulting sample comprises 3 390 teachers from 1 111 schools.

The survey

The TALIS-PISA Link database consists of two surveys:

- TALIS questionnaires for teachers and school principals, with a special, additional questionnaire for mathematics teachers (i.e. the mathematics module), were available on paper and online.
- PISA questionnaires, in particular, student and school questionnaires, as well as student assessments in mathematics, reading and science. As mathematics is the main domain of the PISA 2012 assessment – measures for mathematics are more accurate and reliable than for other domains – this report on the TALIS-PISA Link data focuses on teachers teaching mathematics.

It is important to take into account that this study was based on the findings of only eight countries and, thus, inferences regarding frequencies and associations to other national contexts should be made carefully. These findings should be considered as tentative correlations that should be explored further in larger scale studies.

1. The goal of the mathematics module is gathering more detailed information on teaching practices from those countries that participated in the TALIS-PISA Link option.

Teachers are the most important ingredient of quality education. Although this is deeply ingrained in the policy debate, policy makers need to identify what goes into high-quality teaching in order to take action to improve policies, teacher training and professional development programmes for teachers with the aim of improving the achievement of all students.

This research aims to provide insight into the strategies that lead to better student outcomes and the characteristics of teachers, students and schools associated with the regular use of good teaching practices. **This brochure highlights the main findings of this research, which is developed further in the paper by Le Donne, Fraser and Bousquet (2016).**

Research and policy questions

For the eight countries that participated in the TALIS-PISA Link option, the study first identifies mathematics teachers' main instructional strategies based on their self-reported classroom practices. It then measures the frequency with which teachers adopt each of the teaching strategies and analyses the relationships between each strategy and key student outcomes. Cross-country differences in the relationships between teaching strategies and student outcomes, as well as school socio-economic composition, are also looked at, as they are likely to affect these associations. The report goes on to examine several factors that may enable the use of teaching strategies found to be positively linked with student learning.

Questions guiding our research

- What are the most common teaching strategies used by mathematics teachers? To what extent do these strategies vary within and between schools?
- How do teachers' instructional strategies contribute to students' mathematics performance and their attitudes towards learning?
- How do characteristics of the school, the classroom and the teacher affect the implementation of teaching strategies?



What are the most common teaching strategies used today?

The analysis of mathematics teachers' classroom practices has highlighted the existence of three underlying teaching strategies: these are referred to as active learning, cognitive activation and teacher-directed instruction.

Active learning

- Consists of promoting the engagement of students in their own learning.
- Under this strategy, students' discussions, group work, co-operation, reflection and the necessary support to foster these activities play a central role.
- Furthermore, the inclusion and use of information and communication technologies (ICT) in the classroom can help to foster an interactive and individual learning environment.

Cognitive activation

- Refers to the use of practices capable of challenging students in order to motivate them and stimulate higher-order skills, such as critical thinking, problem solving and decision making.
- This strategy not only encourages students to find creative and alternative ways to solve problems, but enables them to communicate their thinking processes and results with their peers and teachers.

Teacher-directed instruction

- Refers to teaching practices that rely, to a great extent, on a teacher's ability to deliver orderly and clear lessons.
- Making explicit the learning goals, providing a summary of previous lessons or asking short, fact-based questions are examples of practices that help to structure lessons.

It is important to keep in mind that these teaching strategies are not mutually exclusive; a teacher can present a summary of recently learned content (teacher directed-strategies), encourage students to work in small groups to come up with a joint solution to a problem or task (active learning strategies) and expect students to explain their thinking on complex problems (cognitive-activation strategies) with different frequencies.

Analysis of the TALIS-PISA Link data: Which teaching strategies are teachers using?

It is generally recognised that teaching strategies are multidimensional – how well they work depends on the context in which they are applied. There is no single strategy that can guarantee better student outcomes. However, research has highlighted a number of practices that enable learning among students (Hattie, 2009; Marzano et al., 2001;

Wayne and Young, 2003). These include techniques such as strong classroom management, clear instructions, helping students engage meaningfully with the learning content, applying formative assessment and providing constructive, supportive feedback.

The study classified practices into strategies through a statistical empirical approach by using an exploratory factor analysis (EFA). Box 1 lists the practices that best characterise each teaching strategy.

■ Box 1.

TALIS-PISA Link: three teaching strategies²

The active learning strategy

- Students work on projects that require at least one week to complete.
- Students use ICT (information and communication technology) for projects or class work.
- I require students to work on mathematics projects that take more than a single class period to complete.
- I let students evaluate their own progress.
- Students work in small groups to come up with a joint solution to a problem or task.

The cognitive activation strategy

- I expect students to explain their thinking on complex problems.
- I encourage students to solve problems in more than one way.
- I require students to provide written explanations of how they solve problems.
- I encourage students to work together to solve problems.

- I connect mathematics concepts I teach to uses of those concepts outside of school.
- I go over homework problems that students were not able to solve.

The teacher-directed instruction strategy

- I explicitly state learning goals.
- I let students practice similar tasks until I know that every student has understood the subject matter.
- I observe students when working on particular tasks and provide immediate feedback.
- I ask short, fact-based questions.
- I present a summary of recently learned content.
- I give different work to the students who have difficulties learning and/or to those who can advance faster.
- I refer to a problem from everyday life or work to demonstrate why new knowledge is useful.

2. For more information about the teaching strategies in the eight countries participating in the TALIS-PISA Link study, please see the country profiles at the end of this brochure.

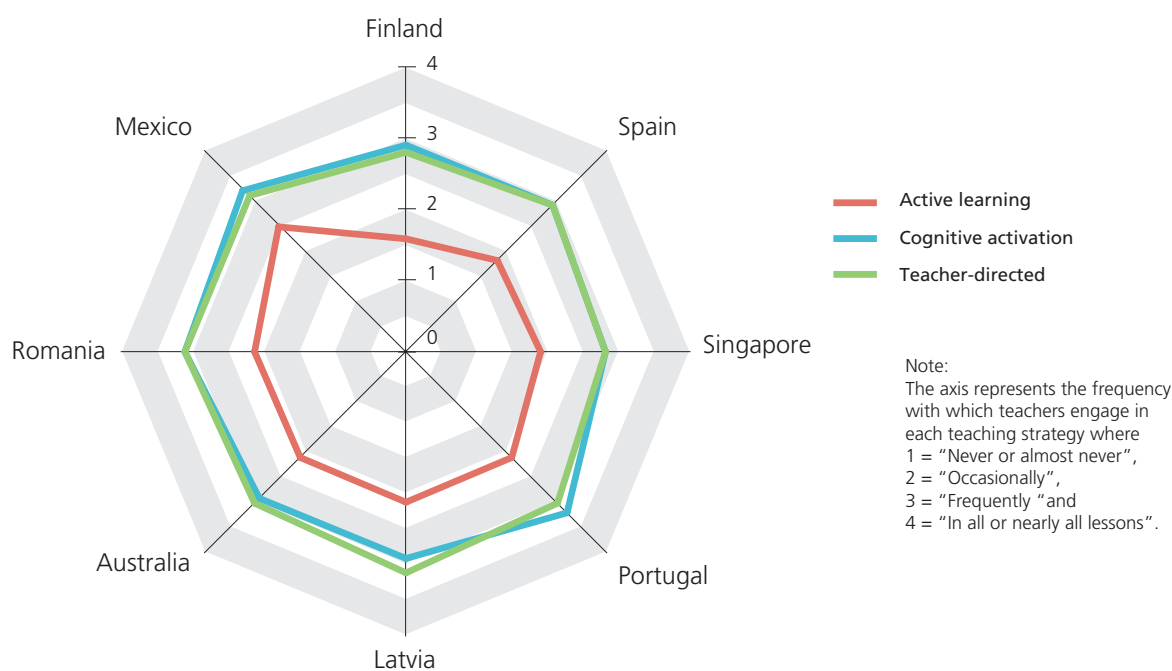
Figure 1 graphs the frequency with which the mathematics teachers employ, on average, each strategy. The figure shows that, in every country, the active learning strategy is used less often than the other two teaching strategies (cognitive activation and teacher-directed instruction). Indeed, while most mathematics teachers report that they use active learning practices only occasionally (which corresponds to a value of 2 on the circular axis), they usually report using cognitive activation and teacher-directed practices frequently (which corresponds to a value of 3 [see Figure 1 note]).

The cognitive activation strategy is widely used by teachers in all participating countries, and is more

frequently used in Portugal, Mexico and Romania. Teacher-directed instruction is also a widespread teaching strategy among teachers in every country, and particularly strong in Australia, Latvia and Romania.

Teachers from top performing countries, such as Finland and Singapore, engage in each of these types of strategies less often than teachers from other countries participating in the study. This may be explained by the self-reporting nature of the TALIS survey, where teachers may tend to over- or understate their engagement in particular teaching practices based on a notion of social desirability. In other words, teachers may tend to answer following cultural patterns of what is desirable or expected of them.

Figure 1. Frequency with which teachers use active learning, cognitive activation and teacher-directed instruction strategies



Source: OECD (2012), *Programme for International Survey Assessment (PISA): 2012 complete database*, www.oecd.org/pisa/pisaproducts/pisa2012database-downloadabledata.htm; OECD (2013a), *Teaching and Learning International Survey (TALIS): 2013 complete database*, http://stats.oecd.org/index.aspx?datasetcode=talis_2013%20.

The teaching culture in schools

Teachers who work in the same schools tend to adopt more similar teaching approaches than teachers from different schools and this "teaching culture" is observed for each teaching strategy. However, there are important cross-country differences regarding the size and significance of this school teaching culture. Of the eight participating countries, Latvia and Mexico show the strongest school "teaching culture", while Singapore is the only country where there is no clearly observable school teaching culture for any strategy. Singapore's results seem to indicate that the school does not exert a great influence on teaching strategies. In this case, individual teacher attributes, such as certification or years of experience, could explain the differences in teaching strategies. For more information, see Le Donne, Fraser and Bousquet (2016).

Does the link between teaching strategies and students' achievement vary according to the background of the students?

Figure 2 shows the association between teachers' instructional strategies and students' mathematics performance. The findings show that, overall, a frequent use of the cognitive activation strategy, which stimulates students' critical thinking, problem-solving and decision-making skills, is linked with higher mathematics performance. The association is particularly strong in Australia, Latvia, Portugal and Romania.

The relationship between the use of an active learning strategy and student mathematics performance presents a mixed pattern across countries. In addition, it is not possible to observe an overall positive association between teacher-directed strategies and students' maths outcomes. Evidence from previous studies using PISA data has shown these types of strategies are mostly used with students who score at the lowest level of proficiency. These situations may be playing a role in some national contexts, but more research is needed to understand how these strategies take place in the classroom. In sum, the results showed that, depending on the country, each teaching strategy presents mixed results regarding their association with students' maths achievement.

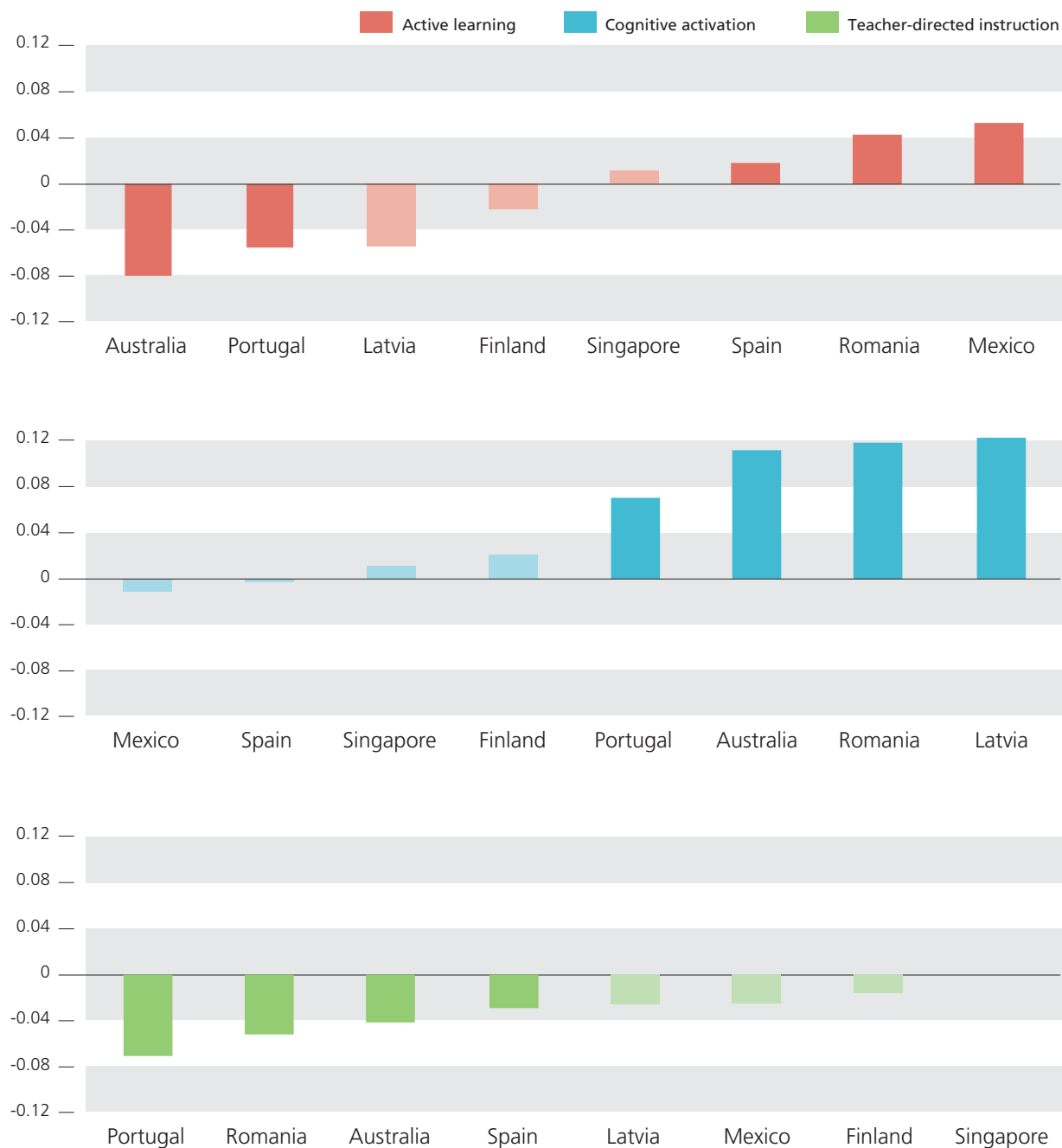
A preliminary explanation concerns the limitations of a self-reporting survey. Although teachers attest to the frequency with which they engage in a particular practice, the TALIS-PISA Link study does not have data on "how" teachers engage in these practices. This study is lacking the data that only capturing practices through classroom observations would allow and this could explain why, depending on the context, the same type of practices have different outcomes.

Figure 3 shows the relationship between teaching strategies and teacher practices in advantaged and in disadvantaged schools.³ The contributions of the three teaching strategies to students' mathematics performance seem more pronounced in socio-economically advantaged schools than in disadvantaged ones. For example, the positive association found between the cognitive activation strategy and student achievement in mathematics is stronger in socio-economically advantaged schools than in disadvantaged ones. A possible explanation for this is that teachers working in schools with a higher proportion of disadvantaged students usually have less training and are operating under more difficult circumstances; for example, they may have fewer resources, more second-language learners and more disruptive behaviour. Consequently they do not reap as many benefits from implementing cognitive activation practices as teachers working in advantaged schools (OECD, 2014).

Similar conclusions are reached regarding teacher-directed instruction. While no positive relationship between the use of teacher-directed instruction and students' mathematics performance was previously found, the bottom part of Figure 3 also shows that this relationship is negative at a significant level only for students enrolled in advantaged schools. It is, however, non-significant for students in disadvantaged schools. This finding could imply that a too-frequent use of teacher-directed strategies is only detrimental to the performance of advantaged students, while it does not negatively affect skills acquisition among disadvantaged students. The main message from this result is that different strategies help different student groups and facilitate the learning of different types of tasks. See Box 2 for a more in-depth discussion.

3. Advantaged schools are those located in the superior 50% of the distribution of the PISA school index of economic, social and cultural status. Disadvantaged schools are those located in the inferior 50% of the distribution of the of PISA school index of economic, social and cultural status.

Figure 2. Associations between teachers' teaching strategies and students' mathematics performance

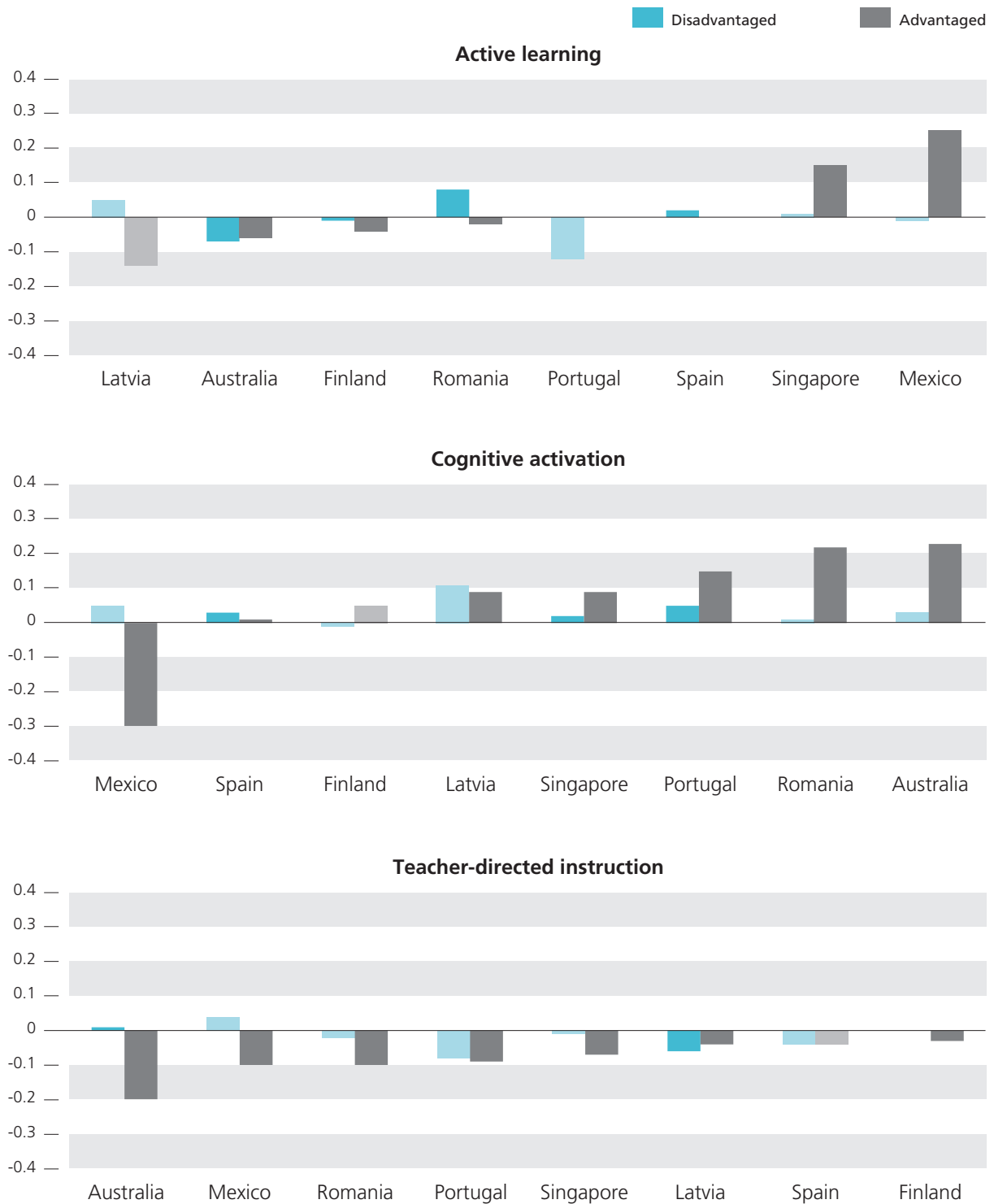


Note: The bars represent the regression coefficients associated with the school index of a given teaching strategy. The darker bars indicate regression coefficients that are significant at the 5% threshold, while controlling for a number of other teacher and school characteristics that might influence this relationship. For more information, see Le Donne, Fraser and Bousquet (2016).

Countries are ranked in ascending order of the standardised regression coefficient associated with the teaching strategy of interest.

Source: OECD (2012), *Programme for International Survey Assessment (PISA): 2012 complete database*, www.oecd.org/pisa/pisaproducts/pisa2012database-downloadabledata.htm; OECD (2013), *Teaching and Learning International Survey (TALIS): 2013 complete database*, http://stats.oecd.org/index.aspx?datasetcode=talis_2013%20.

Figure 3. Associations between teachers' instructional strategies and students' performance in mathematics by school socio-economic composition



Note: The bars represent the regression coefficients associated with the school index of a given teaching strategy. The darker bars indicate regression coefficients that are significant at the 5% threshold, while controlling for a number of other teacher and school characteristics that might influence this relationship. For more information, see Le Donné, Fraser and Bousquet (2016).

Countries are ranked in ascending order of the standardised regression coefficient associated with the teaching strategy of interest, estimated on the data of students enrolled in the most socio-economically advantaged half of schools.

Source: OECD (2012), *Programme for International Survey Assessment (PISA): 2012 complete database*, www.oecd.org/pisa/pisaproducts/pisa2012database-downloadabledata.htm; OECD (2013), *Teaching and Learning International Survey (TALIS): 2013 complete database*, http://stats.oecd.org/index.aspx?datasetcode=talis_2013%20.

■ Box 2.

Understanding the role of teaching-directed practices on students' learning: a dialogue between PISA and TALIS

The recent PISA publication, *Ten Questions for Mathematics Teachers ... and How PISA Can Help Answer Them* (OECD, 2016a), explores the association of "teacher-directed" practices, as identified by student accounts, with the likelihood of correctly answering mathematics items of differing ranges of difficulty. The results show that students exposed to teacher-directed instruction are slightly more likely to solve the easiest mathematics problems in PISA. However as the difficulty of the item increases, this association becomes non-significant. Although the overall association is moderate, the evidence suggests that teacher-directed strategies seem to be more conducive to solving easier tasks than more complex ones.

The report also looks at the overall association between cognitive activation practices, as identified by student accounts, and mathematics achievement. Similarly to the results presented in this brochure, the results showed that cognitive activation practices are positively associated with student performance.

Thus, teacher-directed strategies can help students succeed on easier tasks, but they may not be the best strategy in the long run to prepare students for more complex tasks.

How to better support the teacher instruction strategies that lead to improved student outcomes?

Now that it is known that cognitive activation strategies and, to a lesser extent, active learning strategies, showed the strongest association with raising students' achievement, it is important to understand the factors that determine the adoption of these strategies.

Tables 1 and 2 show the association of a range of school and teacher factors with cognitive activation and active learning strategies, respectively. Teacher self-efficacy is the only factor that is associated with a more frequent use of both strategies in all participating countries. Teacher self-efficacy refers to the confidence teachers have in teaching and

managing their classroom. Results from TALIS 2013 showed that the level of self-efficacy among teachers in a country is highly correlated with teachers' participation rate in professional development. Teachers who have confidence in their own abilities are more likely to engage in active teaching strategies.

Also, for both strategies and in almost all participating countries, the results show that the more a teacher co-operates with other teachers in the school, the more he or she tends to regularly use cognitive activation and active learning strategies. This suggests that exchanging ideas and experience about teaching with other teachers in the school, observing each other's classrooms and providing mutual support increases the likelihood of implementing of good teaching strategies.

Table 1. Factors most significantly related to teachers' use of cognitive activation

| Block | Factor | Australia | Finland | Latvia | Mexico | Portugal | Romania | Singapore | Spain |
|--|---|-----------|---------|--------|--------|----------|---------|-----------|-------|
| Teacher perceptions of work and work environment | Constructivist beliefs | ++ | | | | ++ | ++ | ++ | ++ |
| | Teacher self-efficacy | ++ | ++ | ++ | ++ | ++ | ++ | ++ | ++ |
| Teacher relations with other school stakeholders | Co-operation with other teachers | ++ | | ++ | | ++ | | ++ | ++ |
| Classroom composition and climate | Classroom disciplinary climate | | | ++ | | | ++ | ++ | ++ |
| School socio-demographic composition and mathematics achievement | Heterogeneity of students with respect to their mathematics performances | | ++ | - | | | -- | | ++ |
| | Proportion of immigrant students in the school | | | ++ | | | -- | ++ | ++ |
| School climate and student attitudes towards mathematics | Heterogeneity of students with respect to their attitudes towards learning activities | | -- | -- | | ++ | -- | | ++ |

Note: “++” and “--” indicate a significant association at the 5% threshold; “+” and “-” indicate a significant association at the 10% threshold, while controlling for a number of other teacher and school characteristics that might influence this relationship. For more information, see Le Donné, Fraser and Bousquet (2016).

Source: OECD (2012), *Programme for International Survey Assessment (PISA): 2012 complete database*, www.oecd.org/pisa/pisaproducts/pisa2012database-downloadabledata.htm; OECD (2013), *Teaching and Learning International Survey (TALIS): 2013 complete database*, http://stats.oecd.org/index.aspx?datasetcode=talis_2013%20.

Table 2. Factors most significantly related to teachers' use of active learning

| Block | Factor | Australia | Finland | Latvia | Mexico | Portugal | Romania | Singapore | Spain |
|---|--|-----------|---------|--------|--------|----------|---------|-----------|-------|
| Teacher perception of work and work environment | Teacher self-efficacy | ++ | ++ | ++ | ++ | ++ | ++ | ++ | ++ |
| Teacher relations with other school stakeholders | Co-operation with other teachers | ++ | | ++ | ++ | ++ | ++ | + | ++ |
| Classroom composition and climate | Proportion of low academic achievers | ++ | - | - | | | -- | -- | |
| | Proportion of academically gifted students | ++ | | | | | ++ | ++ | + |
| | Classroom disciplinary climate | + | ++ | + | | | | | ++ |
| School climate and student attitudes toward mathematics | Heterogeneity of students with respect to their confidence towards mathematics | - | + | | -- | - | | | |

Note: “++” and “--” indicate a significant association at the 5% threshold; “+” and “-” indicate a significant association at the 10% threshold, while controlling for a number of other teacher and school characteristics that might influence this relationship. For more information, see Le Donné, Fraser and Bousquet (2016).

Source: OECD (2012), *Programme for International Survey Assessment (PISA): 2012 complete database*, www.oecd.org/pisa/pisaproducts/pisa2012database-downloadabledata.htm; OECD (2013), *Teaching and Learning International Survey (TALIS): 2013 complete database*, http://stats.oecd.org/index.aspx?datasetcode=talis_2013%20.

What can schools do to promote good teaching practices?

1) Allow teachers time to develop teaching strategies

A possible explanation for teacher-directed instruction being so common across participating countries is that this type of strategy is less time-consuming than active learning and cognitive activation strategies, and requires less commitment from disengaged students. Both active learning and cognitive activation instruction strategies necessitate more planning and student dedication than teacher-directed instruction. Teachers who need to cover a lengthy curriculum or focus on preparing for standardised tests may not have sufficient time to prepare for these lessons (Boardman and Woodruff, 2004). It is, thus, likely that not many teachers have been adequately trained to manage and implement the practices related to both of these strategies.

Therefore, increasing the number of planning hours for teachers can provide them with more time to develop more complex teaching strategies. Providing support and advice on dealing with disruptive classrooms would lead to fewer interruptions, better time management and potential innovation in the lessons. Likewise, professional development activities that focus on the implementation of active learning or cognitive activation can be helpful to introduce these strategies to teachers.

2) Support teachers' efforts to find the best teaching strategy

On the other hand, in most countries in this study, no positive association was found between teacher-directed instruction and student achievement in mathematics in four out of the eight countries. A possible explanation for this lack of association is that teacher-directed strategies are more often used with low-performer students (Echazarra et al., 2016). However, it is important to note that the implementation of teacher-directed strategies should not necessarily be interpreted as negative. Presenting clear instructions, or providing a summary of previous lessons, are an important component of a successful learning climate. Indeed, a previous study conducted by the OECD has shown that teacher-directed practices are positively associated with the likelihood of answering easy items on the PISA 2012 mathematics test (Echazarra et al., 2016). Since this study shows that, when teacher-directed instruction becomes the most frequently used type of instruction it may have unfavourable consequences on student learning, the issue may be for the teacher to find the right balance: when, in what way, and with whom is it appropriate to use this type of practice?

Teacher training programmes seeking to foster good teaching practices must, therefore, take into account the social context in which the teacher performs and provide support in managing challenging classroom environments. Box 3 briefly describes how this takes place in the Finnish system.

■ Box 3.

Finland: Identifying student needs

Finland's special teachers fulfil a role of early diagnosis and support, working closely with the class teachers to identify students in need of extra help and to work individually or in small groups to give them the support they need to keep up with their classmates. It is not left solely to the discretion of the regular class teacher to identify a problem and alert the special teacher; every comprehensive school

has a "pupils' multi-professional care group" that meets at least twice a month for two hours and which consists of the principal, the special education teacher, the school nurse, the school psychologist, a social worker, and the teachers whose students are being discussed. The parents of any child being discussed are contacted prior to the meeting and are sometimes asked to be present.

Source: OECD (2011), "Finland: Slow and Steady Reform for Consistently High Results", in *Lessons from PISA for the United States*, OECD Publishing, Paris, <http://dx.doi.org/10.1787/9789264096660-6-en>.

3) Support school-embedded professional development and professional learning communities

As the results show, it is essential for teaching strategies to be in tune with the context in which they are applied. Teachers have reported that professional development involving the participation in learning communities, co-operation and peer observation has a positive impact on their practices (Opfer, 2016).

Teachers collaborate and discuss their teaching practices with each other, so it is not uncommon to observe that teachers from the same school "share" the same practices. Since strategies seem to be more similar among teachers within the same school than with teachers from different schools,

a school-embedded approach to professional development is recommended. This would include for example participating in professional networks, undertaking collaborative research, and engaging in peer observation in their school. Attempts to inculcate good teaching strategies in one teacher in a single school are less likely to be successful unless his or her school colleagues also engage in these strategies. Teachers who have participated in training in classroom practices could work as mentors to other teachers and share their experience. Box 4 shows an interesting example from New South Wales, where professional development is used to promote professional learning communities.

■ Box 4.

Australia: New South Wales – Great Teaching, Inspired Learning

The Great Teaching, Inspired Learning education reforms underway in New South Wales (NSW) span the whole career cycle of a teacher from initial teacher education and induction for all beginning teachers, through to recognising and valuing experienced teachers and supporting aspiring school leaders. This series of initiatives aims to set a new direction for improving teacher quality and student learning outcomes in NSW schools.

A new model of support for beginning teachers is also being implemented, including strengthening the support for permanent, temporary and casual beginning teachers through improved induction models, online professional learning resources and streamlined probation and accreditation processes. There is also increased support for beginning teachers in their first two years of teaching by resourcing schools to increase

release time for them to participate in a range of development activities, such as formal mentoring from an experienced teaching colleague.

Another element of the reforms aims to support teachers to build their professional capabilities through building communities of practice. The NSW Department of Education has partnered with the University of Newcastle to conduct research on the impact of teacher professional learning on teacher quality and student outcomes, using a Quality Teaching Rounds model. This model is based on objective observations of school and classroom practice by a Professional Learning Community, comprised of four or more teaching staff, to facilitate a common understanding and language of productive teaching and learning practices across school contexts.

Source: NSW Government (2016), Great Teaching Inspired Learning, www.dec.nsw.gov.au/our-services/schools/great-teaching-inspired-learning.

These types of initiatives require a supporting structure from the school. A recent OECD report has shown that instructional leadership can foster professional networks and teacher co-operation that enable teachers to share and discuss their practice

(OECD, 2016b). As such, within this structure of support, the principal or school leader role is a crucial component. Box 5 presents some advice for teachers and school leaders based on results from TALIS 2013 on how to build professional learning communities.

■ Box 5.

Fostering opportunities for teachers to expand their teaching practices

What can teachers do?

- Be open to working together with colleagues and school leaders. If formal collaborative activities aren't already established, take the initiative to create them.
- Work with other teachers to develop a system of peer feedback on all aspects of teaching, from lesson planning and classroom practice to student evaluation.
- Participate in induction programmes, mentoring programmes and other professional development activities when they're offered.

What can school leaders do?

- If professional development programmes are not available at school, try to make

them available. These activities do not have to be costly or involve external experts. For example, collaboration among teachers within a school can result in effective mentoring systems.

- Provide opportunities and support to build relationships within the school. This support could be in the form of a physical space where teachers can meet or by setting aside time away from administrative work to allow teachers to meet and develop relationships with students or colleagues.
- Encourage collaboration among teachers. While collaboration may require adjustments to teachers' schedules, the benefits to teachers' practices – and to teachers' morale – are likely to outweigh any administrative inconveniences.

Source: OECD (2014b), *A Teachers' Guide to TALIS 2013: Teaching and Learning International Survey*, TALIS, OECD Publishing, Paris, <http://dx.doi.org/10.1787/9789264216075-en>.

Final thoughts⁴

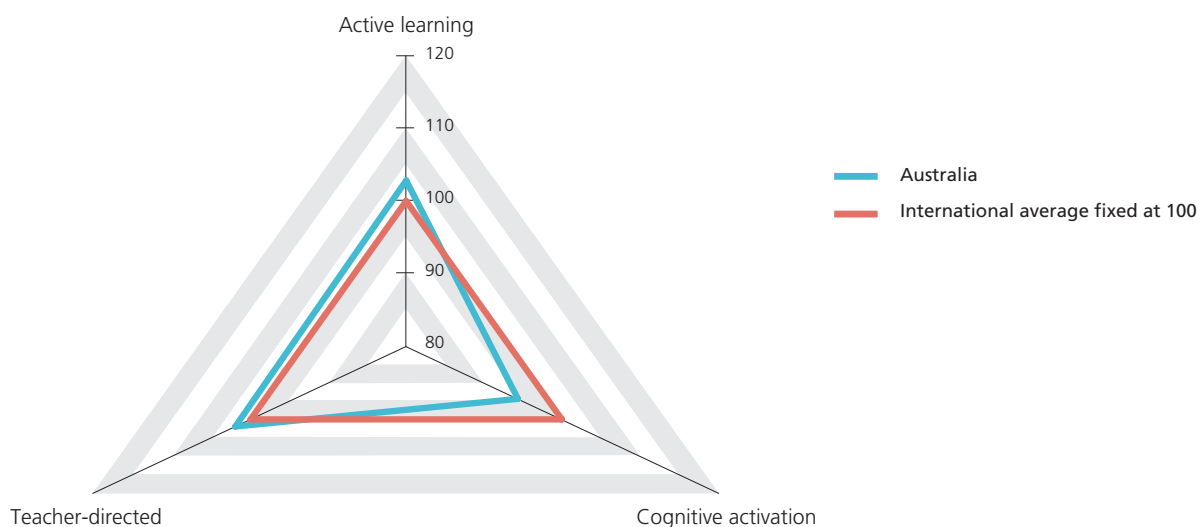
Teachers everywhere are committed to helping their students achieve the best they can. The TALIS-PISA Link data show that teaching and learning is a complex process involving a wide variety of behaviours, attitudes and practices. The study findings can inspire teachers and school leaders to co-operate using a wider palette

of techniques to meet the needs of students with varying abilities, motivation and interests. Meanwhile, the insights provided here can inspire education policy makers to design teaching policies that are well suited to teachers' teaching environments so that all students, whatever their background, can flourish.

4. In order to access more detailed analysis and conclusions, please see Le Donné, Fraser and Bousquet (2016).

Teaching strategies profiles

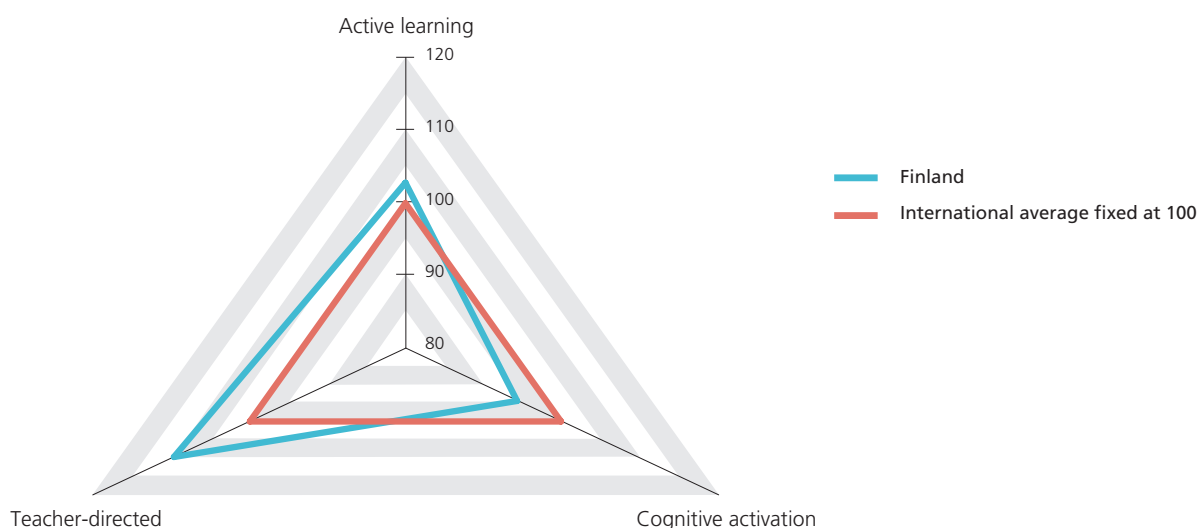
Australia



Note: The international average for teaching strategies was fixed at 100. All values above 100 are above the international average and all values below 100 are below the international average. Every 10 units represent a standard deviation away from the average.

How to interpret the graph: Australian teachers report engaging less often (around half a standard deviation less) in cognitive strategies than the average international teacher.

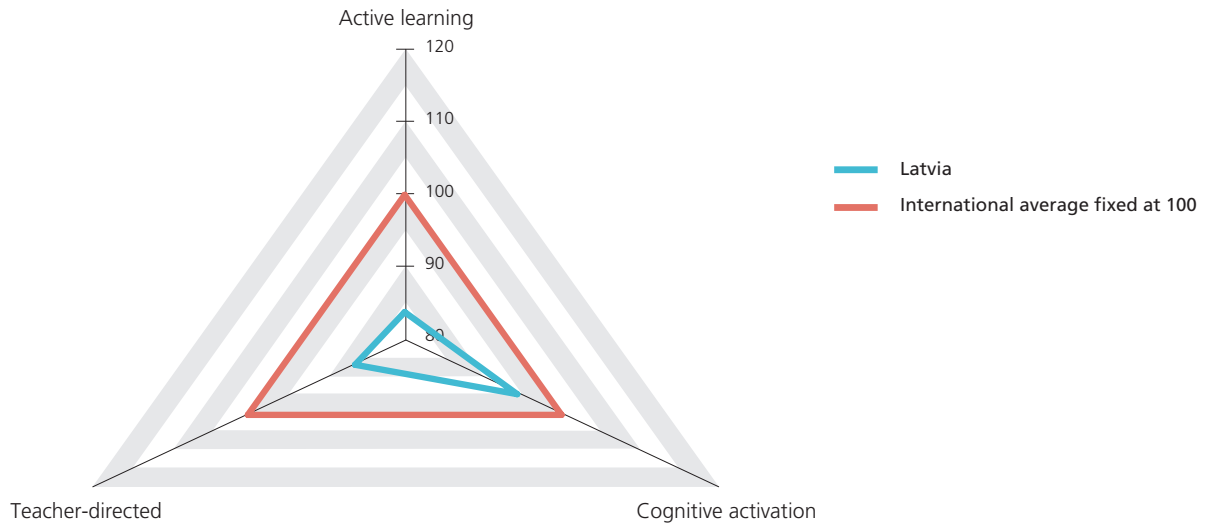
Finland



Note: The international average for teaching strategies was fixed at 100. All values above 100 are above the international average and all values below 100 are below the international average. Every 10 units represent a standard deviation away from the average.

How to interpret the graph: Finnish teachers report engaging less often (almost two standard deviation less) in active learning strategies than the average international teacher.

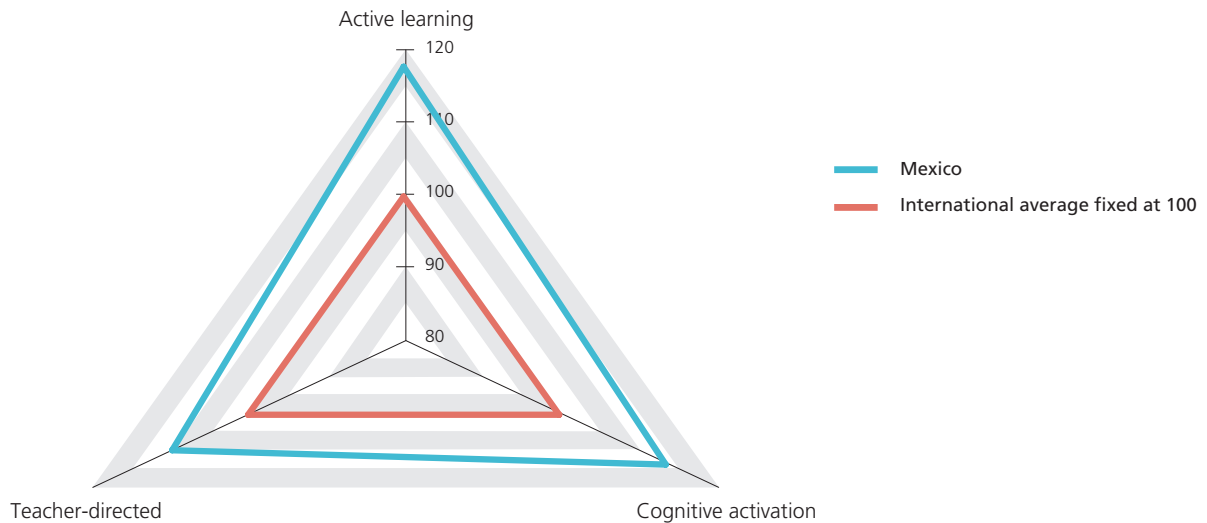
Latvia



Note: The international average for teaching strategies was fixed at 100. All values above 100 are above the international average and all values below 100 are below the international average. Every 10 units represent a standard deviation away from the average.

How to interpret the graph: Latvian teachers report engaging more often (almost one standard deviation more) in teacher directed strategies than the average international teacher.

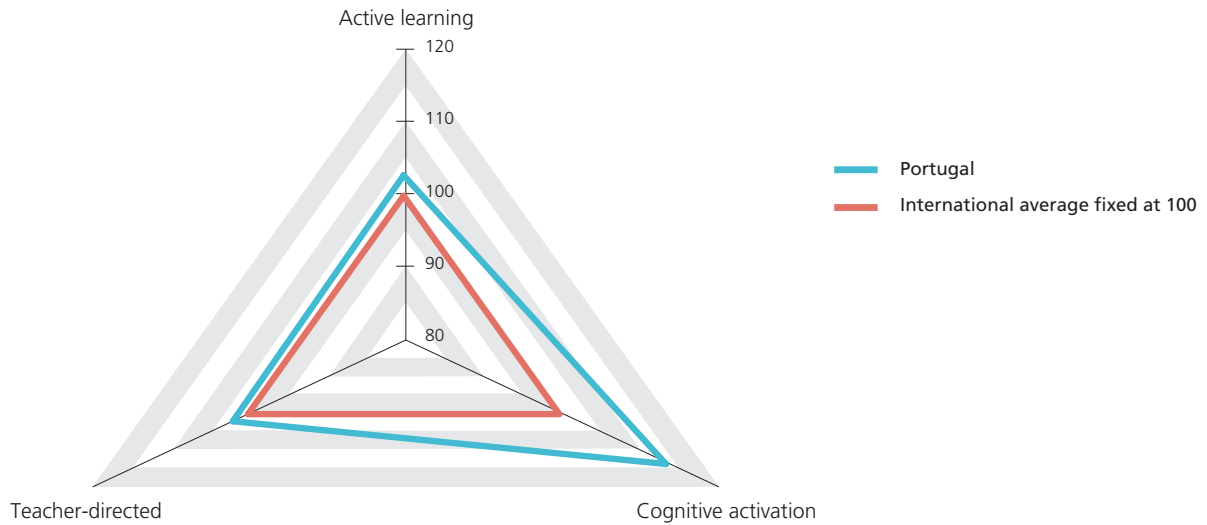
Mexico



Note: The international average for teaching strategies was fixed at 100. All values above 100 are above the international average and all values below 100 are below the international average. Every 10 units represent a standard deviation away from the average.

How to interpret the graph: Mexican teachers report engaging more often (almost two standard deviation more) in active learning strategies than the average international teacher.

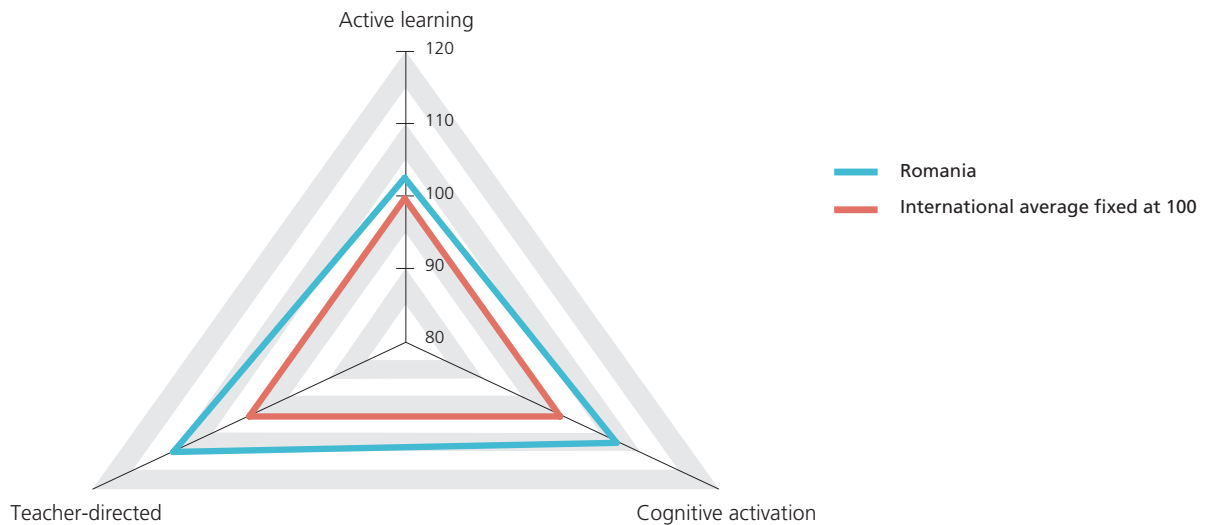
Portugal



Note: The international average for teaching strategies was fixed at 100. All values above 100 are above the international average and all values below 100 are below the international average. Every 10 units represent a standard deviation away from the average.

How to interpret the graph: Portuguese teachers report engaging more often (above one standard deviation more) in cognitive activation strategies than the average international teacher.

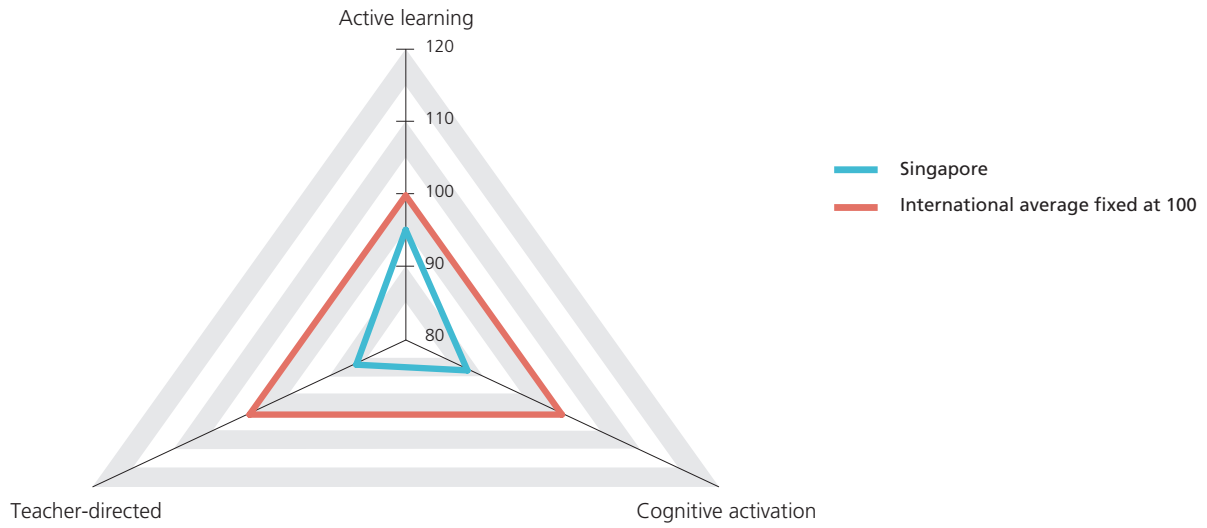
Romania



Note: The international average for teaching strategies was fixed at 100. All values above 100 are above the international average and all values below 100 are below the international average. Every 10 units represent a standard deviation away from the average.

How to interpret the graph: Romanian teachers report engaging more often (almost one standard deviation more) in teacher directed strategies than the average international teacher.

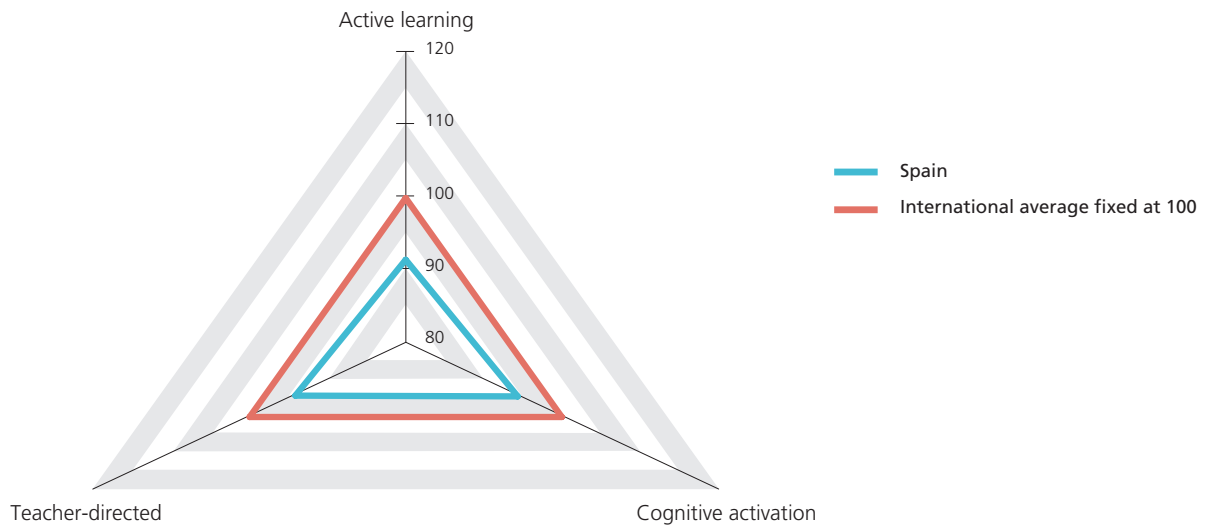
Singapore



Note: The international average for teaching strategies was fixed at 100. All values above 100 are above the international average and all values below 100 are below the international average. Every 10 units represent a standard deviation away from the average.

How to interpret the graph: Singaporean teachers report engaging less often (above one standard deviation less) in teacher directed strategies than the average international teacher.

Spain



Note: The international average for teaching strategies was fixed at 100. All values above 100 are above the international average and all values below 100 are below the international average. Every 10 units represent a standard deviation away from the average.

How to interpret the graph: Spanish teachers report engaging less often (almost one standard deviation less) in active learning strategies than the average international teacher.

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