How are school performance and school climate related to teachers' experience?



PISA in Focus #88

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- Students in the best-performing schools achieve significantly higher PISA scores on average than students in the lowest-performing schools. Some aspects of school climate, such as the disciplinary climate in science lessons, also vary greatly between schools.
- These between-school differences in school performance and climate are strongly related to differences in the socio-economic status of students attending the schools.
- In addition, schools with more experienced teachers tend to perform better in PISA and also have a classroom climate that is more conducive to learning (on average across 18 countries and economies that administered the optional teacher questionnaire in 2015).

Six cycles of PISA have shown that, in most countries, school performance within a country varies as much as the mean performance of countries. Every country has some schools that perform significantly better than the average school; and other schools that perform significantly worse.

With so much variability observed between schools within countries, it is clear that knowing what the characteristics of the best-performing schools are, and how they differ from average- or low-performing schools, may be at least as important to help improve the overall performance of an education system as knowing what policies and practices are common, and unique, among high-performing education systems.

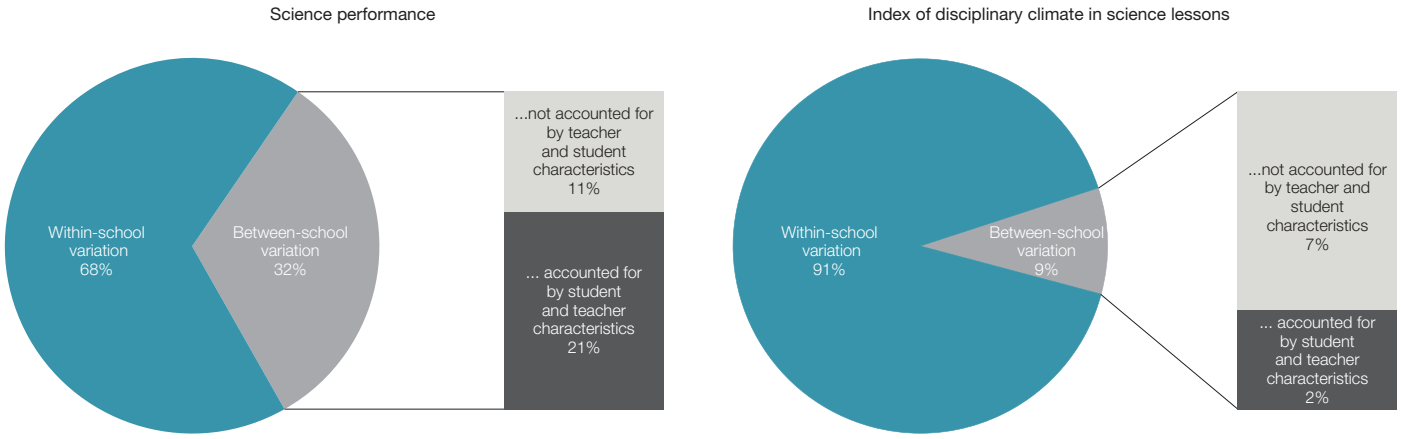
PISA 2015 integrated a questionnaire for teachers into the assessment for the first time. This made it possible to expand the data on schools beyond the characteristics reported by students and principals. For the first time, for example, PISA data can be used to describe the composition of the teaching force in each school in some detail as well as teachers' working environment, e.g. in terms of the support they receive from the principal. The following countries and economies that participated in PISA collected data from teachers: Australia, Beijing-Shanghai-Jiangsu-Guangdong (China) (hereafter, B-S-J-G [China]), Brazil, Chile, Colombia, the Czech Republic, the Dominican Republic, Germany, Hong Kong (China), Italy, Korea, Macao (China), Malaysia, Peru, Portugal, Spain, Chinese Taipei, the United Arab Emirates and the United States.

The importance of school effects

When considering only countries/economies that collected teacher-questionnaire data, about one-third of the variation in performance among students within each country lies between schools, and two-thirds lie within schools – a similar proportion as observed across all PISA-participating countries, on average. The proportion of the overall variation in performance that lies between schools is larger in B-S-J-G (China), the Czech Republic, Germany and Italy – countries where 15-year-old students are sorted into different grades and/or school tracks, depending on their prior performance, and often with large regional differences. On average, about one out of six schools scores more than 50 points above the country mean, and one out of six schools scores more than 50 points below the mean. The between-school standard deviation varies from over 70 score points in B-S-J-G (China) to only about 31 score points in Spain.

That schools differ within a given country is also apparent from PISA variables measuring whether the classroom disciplinary climate is conducive to learning. The index of disciplinary climate was constructed from students' reports on how often ("every lesson", "most lessons", "some lessons", "never or hardly ever") the following happened in their science lessons: Students don't listen to what the teacher says; There is noise and disorder; The teacher has to wait a long time for students to quiet down; Students cannot work well; Students don't start working for a long time after the lesson begins. Higher values of the index correspond to reports of a better classroom climate in science lessons.

How performance and classroom climate vary between schools



Notes: Results based on multi-level models. Distinct models are estimated for performance in science and disciplinary climate. Only countries/economies that distributed the optional teacher questionnaire are included in the analysis. The charts report average results across these 18 countries/economies for the proportion of the overall variation that lies between schools and for the proportion of between-school variance explained by student and teacher characteristics. The following characteristics were included at the student level: gender, socio-economic status, gender, immigrant status, language spoken at home; the following characteristics were included at the school level: share of female students, average socio-economic status of students, share of fully certified teachers, average years of experience among teachers.

Source: OECD (2018), *Effective Teacher Policies: Insights from PISA*, Tables 2.18, 2.20, 2.21 and 2.23, http://dx.doi.org/10.1787/888933740934.

On average, about one tenth (9%) of the overall variation in students' reports of disciplinary climate lies between schools, with the remaining variation reflecting different reports by students from the same school (but perhaps from different classes). Interestingly, countries where reports of the classroom climate in science lessons vary the most across schools are not necessarily the same countries where performance varies the most. In Australia and Spain, for example, student performance varied relatively little across schools, reflecting the absence of student sorting by ability prior to the age of 15; but students' reports about the disciplinary climate in class varied as much as on average across countries.

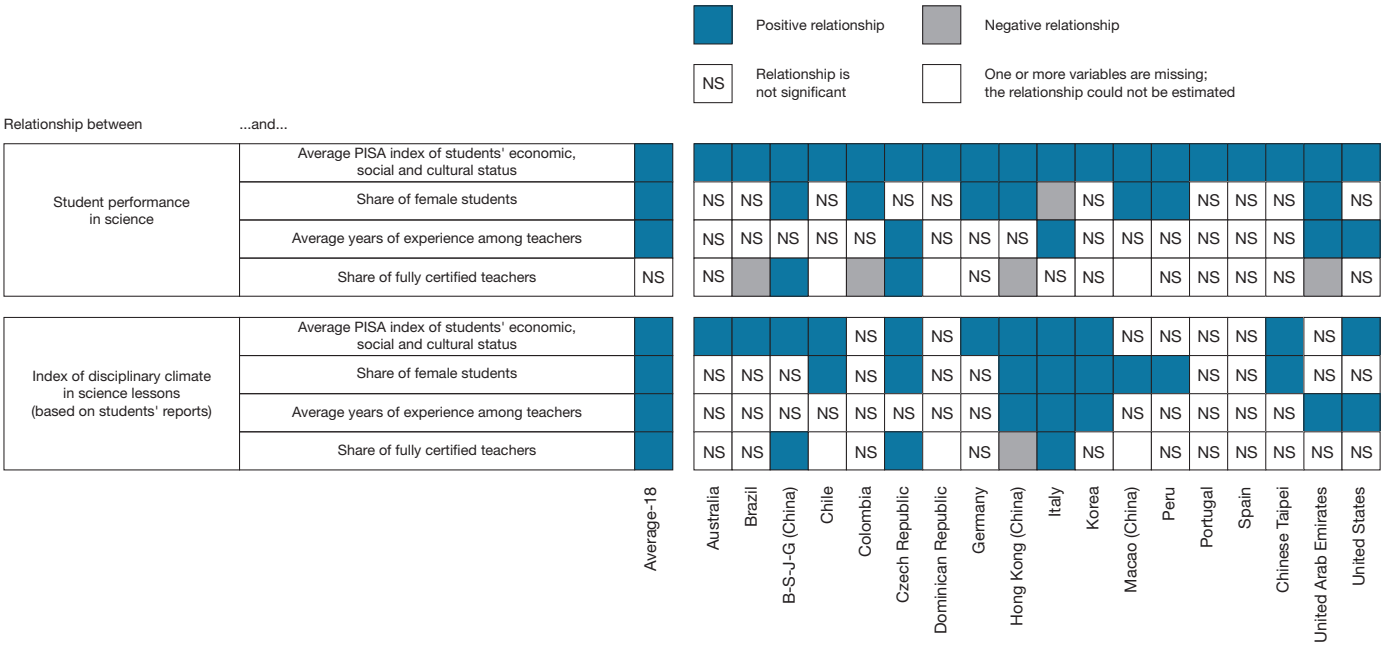
How student and teacher composition relate to school success

A main determinant of a school's performance in science, and of the average school climate reported by students, is the demographic and socio-economic makeup of the student population. For example, in all countries schools with more advantaged students (as indicated by higher average levels of the PISA index of economic, social and cultural status) tend to perform better than schools with more disadvantaged students.

In many countries, and on average across countries, schools with larger proportions of girls also tend to perform better in science – despite the fact that overall, boys score slightly better than girls in science. Students in schools with larger proportions of girls also generally report a better classroom climate.

But teacher characteristics are also significantly associated with better performance and school climate. In particular, schools with more experienced teachers tend to have better results in the PISA science test and a better school climate, as reported by students, even after accounting for student demographic characteristics. In 2015, the average number of years of experience among teachers had a significant, positive association with a school's science performance in the Czech Republic, Italy, the United Arab Emirates and the United States, as well as across countries, on average; and a significant, positive association with classroom disciplinary climate in Hong Kong (China), Italy, Korea, the United Arab Emirates and the United States, as well as across countries, on average.

How the student and teacher composition of a school relate to its performance and classroom climate



Notes: Results based on multi-level models. Two distinct models were estimated for performance in science and disciplinary climate. Only countries/economies that distributed the optional teacher questionnaire are included in the analysis. The following additional student-level variables were included in the model: student gender, socio-economic status, immigrant status and language spoken at home.
The Average-18 reports the average relationship observed across the 18 countries and economies.
Countries and economies are listed in alphabetical order.

Source: OECD (2018), *Effective Teacher Policies: Insights from PISA*, Tables 2.21 and 2.23, http://dx.doi.org/10.1787/888933740934.

Together, student and teacher demography explain about 66% of the variation in science performance between schools, and about 25% of the between-school variation in students' reports of disciplinary climate.

Some of the positive associations between teachers' average years of experience and performance might reflect the fact that in many countries inexperienced teachers are more likely to teach in the most challenging schools while seniority-based rules for teacher mobility and promotion help experienced teachers move to better-performing schools. However, the positive association is also consistent with research studies indicating that teacher quality and effectiveness are indeed higher among more experienced teachers.

The bottom line

Research studies indicate that experienced teachers are more effective, but also suggest multiple explanations why this might be the case – whether because teachers gain valuable skills on the job and through formal professional development opportunities, or because the least effective teachers tend to quit teaching earlier, while more effective teachers remain in the profession. Each of these possible reasons has distinct implications for policy: from increasing hiring standards, improving teacher training and raising the attractiveness of the teaching profession, to ensuring that novice teachers receive the necessary support to quickly learn the tools of the trade and taking measures to prevent good teachers from dropping out of the profession.

For more information

Contact: Francesco Avvisati (francesco.avvisati@oecd.org)

See: OECD (2018), *Effective Teacher Policies: Insights from PISA,* PISA, OECD Publishing Paris, http://dx.doi.org/10.1787/9789264301603-en

Coming next month: How is Equity in Education Related to Social Mobility?

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