Seeing US education through the prism of international comparisons

The OECD Programme for International Student Assessment (PISA)
PISA in brief

Every three years since 2000, over half a million students...
- representing 15-year-olds in now over 80 countries

... take an internationally agreed 2-hour test...
- that goes beyond whether students can reproduce what they were taught to assess students’ capacity to extrapolate from what they know and creatively use and apply their knowledge
- Focus on mathematics, science and reading
- Problem-solving, collaborative problem-solving, creative thinking, financial literacy

... and respond to questions on...
- their personal background, their schools, their well-being and their motivation

Teachers, principals, parents and system leaders provide data on:
- school policies, practices, resources and institutional factors that help explain performance differences
Trends in science performance (PISA)
Trends in science performance (PISA)
Poverty is not destiny – Learning outcomes by international deciles of the PISA index of economic, social and cultural status (ESCS)
The global pool of top performers: A PISA perspective

Figure I.2.18

Share of top performers among 15-year-old students:

- Less than 1%
- 1 to 2.5%
- 2.5 to 5%
- 5% to 7.5%
- 7.5% to 10%
- 10% to 12.5%
- 12.5% to 15%
- More than 15%

United States (8.5%); 300k
B-S-J-G (China) (13.6%); 181k
Japan (15.3%); 174k
Viet Nam (8.3%); 72k
United Kingdom (10.9%); 68k
Korea (10.6%); 60k
France (8.0%); 59k
Canada (12.4%); 41k
Russia (3.7%); 42k
Poland (7.3%);
Switzerland (9.8%)
Belgium (9.0%)
Singapore (24.2%)
Finland (14.3%)
Sweden (8.5%)
Portugal (7.4%)
New Zealand (12.8%)
Israel (5.9%)
Others
Understanding performance differences

Triangulating data from students, parents, teachers, schools and systems
Spending per student from the age of 6 to 15 and science performance

Figure II.6.2

The scatter plot shows the relationship between average spending per student from the age of 6 to 15 (in thousands USD, PPP) and science performance (score points). The regression line $R^2 = 0.41$ indicates a moderate positive correlation, while the line $R^2 = 0.01$ shows a weak positive correlation.
Differences in educational resources between advantaged and disadvantaged schools

Disadvantaged schools have more resources than advantaged schools

Disadvantaged schools have fewer resources than advantaged schools
Attendance at pre-primary school
by schools’ socio-economic profile

Number of years in pre-primary education among students attending socio-economically ...

Disadvantaged schools

Advantaged schools

OECD average

Table II.6.51
Science performance in public and private schools

Figure II.4.14

Students in public schools perform better

Students in private schools perform better
Countries that invest more public funds in privately managed schools tend to have less of a difference between the socio-economic profiles of publicly and privately managed schools.
Low expenses as a reason for choosing school, by schools’ socio-economic status

Figure II.4.17

Percentage-point difference

Low expenses are more important for parents whose children attend **advantaged** schools

Low expenses are more important for parents whose children attend **disadvantaged** schools
Schools’ low expenses as a reason for choosing school and students’ science performance

Figure II.4.17

Students whose parents consider schools’ low expenses "important" or "very important" perform higher.

Students whose parents consider schools’ low expenses "important" or "very important" perform lower.
Learning time and science performance

Figure II.6.23

Total learning time in and outside of school vs. PISA science score.

- OECD average
- Countries and respective learning times and PISA scores are plotted.

R² = 0.21
Learning time and science performance

Figure II.6.23

Hours

- Intended learning time at school (hours)
- Study time after school (hours)
- Score points in science per hour of total learning time

Score points in science per hour of total learning time

Countries included in the chart:
- Finland
- Germany
- Switzerland
- Japan
- Estonia
- Sweden
- New Zealand
- Australia
- Macao (China)
- United Kingdom
- Canada
- Belgium
- France
- Norway
- Slovenia
- Iceland
- Luxembourg
- Ireland
- Latvia
- Singapore
- Denmark
- Hungary
- Poland
- Slovak Republic
- U.S.
- Costa Rica
- Mexico
- Brazil
- Colombia
- Chile
- China
- Russia
- Italy
- Greece
- Bulgaria
- Korea
- Portugal
- Uruguay
- Lithuania
- Nigeria
- Denmark
- Sweden
- Austria
- Spain
- Croatia
- United States
- Israel
- Korea
- Turkey
- Montenegro
- Qatar
- United Arab Emirates
- Tunisia
- Dominican Republic

Score points in science per hour of total learning time:
- China
- United States
- Brazil
- Colombia
- Chile
- Mexico
- Russia
- Italy
- Greece
- Bulgaria
- Korea
- Portugal
- Uruguay
- Lithuania
- Nigeria
- Denmark
- Sweden
- Austria
- Spain
- Croatia
- United States
- Israel
- Korea
- Turkey
- Montenegro
- Qatar
- United Arab Emirates
- Tunisia
- Dominican Republic

Overview of data:
- Intended learning time at school (hours)
- Study time after school (hours)
- Score points in science per hour of total learning time

Countries are ranked based on their performance in science, considering both learning time and science performance.
What teachers say and what teachers do
95% of teachers: My role as a teacher is to facilitate students own inquiry
82%: Students learn best by finding solutions on their own.
85%: Thinking and reasoning is more important than curriculum content.
Prevalence of **memorisation** rehearsal, routine exercises, drill and practice and/or repetition

Prevalence of **elaboration** reasoning, deep learning, intrinsic motivation, critical thinking, creativity, non-routine problems

- United Kingdom
- Netherlands
- Spain
- Norway
- United States
- Singapore
- Canada
- Shanghai-China
- Sweden
- France
- Korea
- Japan
- Germany
- Poland
- Switzerland

**High**

**Low**
Memorisation is less useful as problems become more difficult (OECD average)

R² = 0.81

Source: Figure 4.3
Control strategies are always helpful but less so as problems become more difficult (OECD average).

Source: Figure 5.2
Elaboration strategies are more useful as problems become more difficult (OECD average).

R² = 0.82

Source: Figure 6.2
Building a high quality teaching force

- Improve the societal view of teaching as a profession
- Recruit top candidates into the profession
- Developing Teaching as a profession
- Retain and recognise effective teachers – path for growth
- Support teachers in continued development of practice
Countries spend their money differently
Contribution of various factors to salary cost of teachers per student in public institutions, lower secondary education (2015)
Student-teacher ratios and class size

![Graph showing student-teacher ratios and class size for various countries, with a trend line indicating a positive correlation. The graph includes data points for countries such as CABA (Argentina), Jordan, Viet Nam, Poland, United States, Chile, Denmark, Hungary, B-S-G-J (China), Turkey, Georgia, Chinese Taipei, Mexico, Algeria, Jordan, Chinese Taipei, Colombia, Brazil, Thailand, Viet Nam, B-S-G-J (China), Turkey, and others. The graph also includes a linear regression line with an R² value of 0.25.](image-url)
Professionalism

- Public confidence in profession and professionals
- Professional preparation and learning
- Collective ownership of professional practice
- Decisions made in accordance with the body of knowledge of the profession
- Acceptance of professional responsibility in the name of the profession and accountability towards the profession
Policy levers to teacher professionalism

Autonomy: Teachers’ decision-making power over their work (teaching content, course offerings, discipline practices)

Peer networks: Opportunities for exchange and support needed to maintain high standards of teaching (participation in induction, mentoring, networks, feedback from direct observations)

Knowledge base for teaching (initial education and incentives for professional development)
Teacher professionalism

Autonomy: Teachers’ decision-making power over their work (teaching content, course offerings, discipline practices)

Knowledge base for teaching (initial education and incentives for professional development)

Peer networks: Opportunities for exchange and support needed to maintain high standards of teaching (participation in induction, mentoring, networks, feedback from direct observations)
Mean mathematics performance, by school location, after accounting for socio-economic status.

Fig II.3. TALIS Teacher professionalism index

Networks | Autonomy | Knowledge
Professional collaboration among teachers

Percentage of lower secondary teachers who report doing the following activities at least once per month

Discuss individual students
Share resources
Team conferences
Collaborate for common standards
Team teaching
Collaborative PD
Joint activities
Classroom observations

Average (OECD countries)
Teachers Self-Efficacy and Professional Collaboration

Teacher self-efficacy (level)

- Teach jointly as a team in the same class
- Observe other teachers’ classes and provide feedback
- Engage in joint activities across different classes
- Take part in collaborative professional learning

Less frequently

More frequently
Teachers feedback: *Classroom observations*

- England (UK)
- Estonia
- Singapore
- Netherlands
- Shanghai (China)
- New Zealand
- Brazil
- Japan
- United States
- Australia
- Norway
- Israel
- Alberta (Canada)
- Poland
- Spain
- Korea
- Flanders (Belgium)
- Italy
- Sweden
- Denmark
- France
- Finland

Percentage of teachers feedback:
- School Management
- Principals
- Other teachers

Classroom observations
Not everywhere where principals say mentoring is available do teachers have mentors.
Work experience of teachers

- Average years of working experience as a teacher in total
- Average years of working experience in other education roles
- Average years of working experience in other jobs
- Average years of working experience as a teacher at this school

Years:
- Latvia
- Estonia
- Bulgaria
- Italy
- Portugal
- Spain
- Slovak Republic
- Czech Republic
- Japan
- Poland
- France
- Australia
- Romania
- Sweden
- Korea
- Average
- Denmark
- Israel
- Mexico
- Croatia
- Netherlands
- Finland
- Norway
- Flanders
- Chile
- Serbia
- Iceland
- United States
- Brazil
- Malaysia
- Abu Dhabi (UAE)
- England (UK)
- Singapore
Teacher outcomes

Status of the profession
Teachers’ perception of the extent to which teaching is valued as a profession.

Satisfaction with the profession
Teachers’ report on the extent to which teachers are happy with their decision to become a teacher.

Satisfaction with work environment
Teachers’ report on the extent to which teachers are happy with their current schools.

Self-efficacy
Teachers’ perception of their capabilities (e.g. controlling disruptive behaviour, using a variety of assessment strategies, etc.).
Teacher professionalism index and teacher outcomes

- Perceptions of teachers’ status
- Satisfaction with the profession
- Satisfaction with the work environment
- Teachers’ self-efficacy

Predicted percentile

- Low professionalism
- High professionalism
Technology can amplify innovative teaching

- Well beyond textbooks, in multiple formats, with little time and space constraints
- Collaborative platforms for teachers to share and enrich teaching materials
- As tools for inquiry-based pedagogies with learners as active participants
- Make it faster and more granular

Expand access to content
Support new pedagogy
Collaboration for knowledge creation
Feedback
Technology in schools and digital skills still don’t square

Source: Figure 6.5

Relationship between students’ skills in reading and computer use at school (average across OECD countries)
Teachers’ skills and readiness to use information and communication technologies (ICT) for problem solving (2012)

Chart D5.4

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<thead>
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<th>Group 0</th>
<th>Group 1</th>
<th>Group 2</th>
<th>Group 3</th>
<th>Group 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>(No computer experience)</td>
<td>(Opted out of the computer-based assessment)</td>
<td>(Failed ICT core stage 1 or minimal problem-solving skills)</td>
<td>(Moderate ICT and problem-solving skills)</td>
<td>(Good ICT and problem-solving skills)</td>
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<table>
<thead>
<tr>
<th>Country</th>
<th>Group 0</th>
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If I am more innovative in my teaching I will be rewarded (country average)
System transformations

**The old bureaucratic system**

- Some students learn at high levels (sorting)
- Routine cognitive skills
- Standardisation and compliance
- ‘Tayloristic’, hierarchical
- Primarily to authorities

**The modern enabling system**

- All students need to learn at high levels
- Complex ways of thinking, complex ways of doing, collective capacity
- Curriculum, instruction and assessment
- Teacher quality
- Work organisation
- Accountability
- Primarily to peers and stakeholders

Other terms:
- High-level professional knowledge workers
- Flat, collegial
- Tayloristic, hierarchical
- Primarily to authorities
Thank you

Find out more about our work at www.oecd.org/pisa
- All publications
- The complete micro-level database

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