



OECD - PISA 2009 Results: Interesting extracts regarding maths learning

Prepared by **Peoplescience Intelligence Unit** for **Schools Of Unified Learning (SOUL)**

FAO:

- Headteachers and Senior Management Teams
- Maths Teachers and Co-ordinators

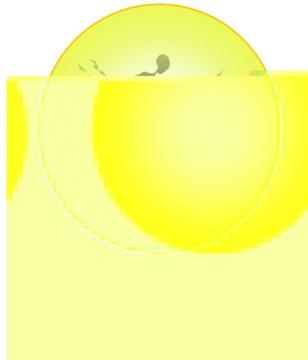
Introduction

December 7th 2010 saw the release of the OECD's **PISA 2009 Results**. This shares the findings from the most recent PISA survey, which focused on reading and also assessed mathematics and science performance.

- The **Organisation for Economic Co-operation and Development (OECD)** provides a setting where governments compare policy experiences, seek answers to common problems, identify good practice and coordinate domestic and international policies.
- The **Programme for International Student Assessment (PISA)** is an internationally standardised assessment that was jointly developed by participating economies and administered to 15-year-olds in schools.

The report comprises six volumes.

ORGANISATION
FOR ECONOMIC
CO-OPERATION
AND DEVELOPMENT



R E S P E C T
H A S H I M A
𐄂 𐄃 𐄄
15 52 25
𐄅 𐄆 𐄇
  
● → ↓
1111:110100:11001
M A T H E M A T I C S

OECD - PISA 2009 Results: Interesting extracts regarding maths learning
Prepared by Peoplescience Intelligence Unit for Schools Of Unified Learning (SOUL)

Why have we compiled these interesting extracts for you and your colleagues?

As the Principal Teacher for *Schools Of Unified Learning (SOUL)* I have commissioned *Peoplescience* to review this very important educational study and extract from it key highlights that pertain to the learning of mathematics both internationally and locally here in the United Kingdom. We expect these highlights will be of interest to you and perhaps our choice selection may serve as a strategic gateway into this rather immense body of information.

SOUL represents a creative and culturally diversifying approach to education that is about cross curricula excellence. This approach is called **yeht'mr urwuk'eh** and is more commonly known as **unifiedknowledge Practice**. As an integral we value the universally underpinning principles of maths in all areas of learning and have pioneered a range of services for schools presented through our **abundance in Schools** programme, where we are famed for **teaching maths through dance** (movements). We are about the art of mathematics.

You may have seen in recent press the generally downbeat views of the findings for the United Kingdom. In our report of interesting extracts we are not presenting information to add to the downer. We are optimistic and see that we at SOUL can and must be of greater service to the national interest of education, education & education. You will find out more about what we do and how we do it by [visiting our website](#): www.unifiedknowledge.org. Please note that you may find full details of this report at the [OECD website](#) (www.oecd.org). Regarding the OECD-PISA report, other news and educational agencies do not seem to be covering the deeper issues so we have prepared this concise summary, a few points alarmed us:

- **A fifth of UK students did not reach the assessment's baseline standard.** [This implies a significant levels of "contusion" when tested on matters of mathematical & scientific principle.]
- **1.8% of UK students attain the high-test levels of performance compared to 27% for Shanghai-China.**
- **Academic achievement can be determined by negative self-stereotyping and attitudes / beliefs about self identity.** [This touches on the area of cultural development]
- **Higher student scores have a relationship to pre-primary school learning in maths (and science).** [For us, at SOUL, this issue extends into home education in its broadest sense and indicates value in our community services for parents who know themselves to be the primary educators.]
- **Countries with high scores in mathematics devoted more learning time to maths (and science). The difference between the average and the best was 4-5 hours per week.**

Now, before all of our eyes we see the day to day transformation of the British education system and the general logistics of government, it's a reformation. SOUL is a stake-holder in this national (and international) process, and so we are ready to be of wholistic service to your school's whole learning community. We know the issues well and over our decade of successful educational service provision we have proven the effectiveness of our programmes for children, parents and teaching professionals. In short, we are feeling it, as a 'developed' country 1.8% compared to 27% is a shame that we must learn and grow through. From our experiential insight we know that embracing the country's internal diversity is a part of the great learning curve before us.

The PISA findings are presented in six volumes, five of which are now released. Here we have extracted just a few key points (tasters) for your interest and ease of information. As mentioned before the full reports may be obtained via the [OECD website](#). We welcome any comments or enquiries regarding our highlights or our services in general.

Together we will rise above the average.

Hashima (respect & kind regards),



Astehmari Batekun

Principal Teacher
Schools Of Unified Learning (SOUL)

OECD - PISA 2009 Results: Interesting extracts regarding maths learning

Prepared by Peoplescience Intelligence Unit for Schools Of Unified Learning (SOUL)

VIEWING THE UNITED KINGDOM SCHOOL SYSTEM THROUGH THE PRISM OF PISA

Learning outcomes:

Mean performance of United Kingdom 15-year-olds in the middle of the rankings

Point 3:

In the 2009 PISA assessment of 15-year-olds, the United Kingdom performs around the average in reading (rank 20 2) and mathematics (rank 22 3) and above the average in science (rank 11 4) among the 34 OECD countries (see Figures I.2.15, I.3.10 and I.3.20). The average reading score of students in the United Kingdom stands at 494 – not statistically significantly different from the OECD average and comparable with France, Germany, Sweden and the United States but well below the highest-performing countries examined by PISA. Average scores for mathematics and science are 492 and 514 respectively.

Point 5:

Performance also varies by gender but less so than in many OECD countries. Girls outscore boys in reading in all countries in PISA 2009 and by more than 25 score points in all OECD countries except Chile, Mexico, the Netherlands, the United Kingdom and the United States (OECD average 39 score points). Thus, the gap in reading performance in favour of girls in the United Kingdom is relatively low when compared internationally. In mathematics, however, boys outscore girls in 21 out of 34 OECD countries and at 20 score points, the gap in favour of boys in the United Kingdom, is second highest after Chile among OECD countries (OECD average gap is 12 score points). In science, boys outscore girls in 9 OECD countries and the opposite is true in 5 OECD countries. In the United Kingdom, boys outscore girls in science by 9 score points, the third largest gap among OECD countries after the United States (with 14 score points) and Denmark (with 12 score points).

Point 10:

In mathematics, 20.2% of students do not reach the baseline of Level 2 and are thus only capable of answering questions involving familiar contexts and where all relevant information is present and the questions are clearly defined (OECD average is 22.0%). In science, the proportion of students below Level 2 on the PISA science scale is at, 15%, below the OECD average of 18% and in fact has declined slightly from 17% in 2006 (Table V.3.5 in the PISA 2009 report). To reach Level 2 requires competencies such as identifying key features of a scientific investigation, recalling single scientific concepts and information relating to a situation, and using results of a scientific experiment represented in a data table as they support a personal decision. In contrast, students not reaching Level 2 in science often confuse key features of an investigation, apply incorrect scientific information, and mix personal beliefs with scientific facts in support of a decision.

Point 11:

At the other end of the performance scale, the United Kingdom has an average proportion of performers at the very highest levels of reading proficiency (Levels 5 and 6), while in mathematics there is a below average share of top performers and in science an above average share of top performers (Figures I.2.14, I.3.9 and I.3.20 in the PISA 2009 report).

OECD - PISA 2009 Results: Interesting extracts regarding maths learning

Prepared by *Peoplescience Intelligence Unit for Schools Of Unified Learning (SOUL)*

© Schools Of Unified Learning, Abundance Centre, 186 Peckham High Street, London SE15 5EG v 01

Office: 020 8144 1720 Direct: 078 1702 3073 eMail: learning@unifiedknowledge.org Web: www.unifiedknowledge.org

page: 3 of 6

Point 14:

Only 1.8% of students in the United Kingdom reach the highest level of performance in mathematics, compared with an OECD average of 3.1%, and figures ranging up to 27% in Shanghai-China (Table I.3.1 in the PISA 2009 report). Students proficient at Level 6 on the mathematics scale are capable of advanced mathematical thinking and reasoning. Some 10% of students in the United Kingdom reach at least the PISA mathematics Level 5, compared with 13% on average across OECD countries. In Shanghai-China half of the students reach Level 5 or higher, in Singapore and Hong Kong-China it is still over 30% and in Chinese Taipei, Korea, Switzerland, Finland, Japan and Belgium over 20%.

PISA 2009 Results:
Executive Summary

Page 6:

Korea, with a country mean of 546 score points, performed highest among OECD countries in the PISA 2009 mathematics assessment. The partner countries and economies Shanghai-China, Singapore and Hong Kong-China rank first, second and third, respectively.

In the PISA 2009 mathematics assessment, the OECD countries Finland, Switzerland, Japan, Canada, the Netherlands, New Zealand, Belgium, Australia, Germany, Estonia, Iceland, Denmark, Slovenia and the partner countries and economies Chinese Taipei, Liechtenstein and Macao-China also perform significantly above the OECD average in mathematics.

Page 7:

On average across OECD countries, boys outperform girls in mathematics by 12 score points while gender differences in science performance tend to be small, both in absolute terms and when compared with the large gender gap in reading performance and the more moderate gender gap in mathematics.

Page 20:

Across OECD countries, overall performance in mathematics remained unchanged between 2003 and 2009, as did performance in science between 2006 and 2009.

In mathematics, students in Mexico, Turkey, Greece, Portugal, Italy, Germany and the partner countries Brazil and Tunisia improved their mathematics scores considerably, while students in the Czech Republic, Ireland, Sweden, France, Belgium, the Netherlands, Denmark, Australia and Iceland saw declines in their performance. On average across the 28 OECD countries with comparable results in the 2003 and 2009 assessments, the share of students below mathematics proficiency level 2 remained broadly similar over the period, with a minor decrease from 21.6% to 20.8%. Among the OECD countries in which more than half of students performed below mathematics proficiency level 2 in 2003, Mexico shrunk this proportion by 15 percentage points, from 66% to 51%, by 2009 while Turkey reduced it from 52% to 42% during the same period. Meanwhile, the percentage of top performers in mathematics in those 28 OECD countries decreased slightly, from 14.7% in 2003 to 13.4% in 2009. Portugal showed the largest increase – four percentage points – in top performers in mathematics.

OECD - PISA 2009 Results: Interesting extracts regarding maths learning

Prepared by Peoplescience Intelligence Unit for Schools Of Unified Learning (SOUL)

Page 60:

In terms of the OECD average, mathematics performance remained unchanged between 2003 and 2009 (table V.3.1). However, several countries show marked changes in mathematics performance.

Students in 8 of the 39 countries with comparable results in both the 2003 and 2009 assessments show improvements in mathematics performance. This includes 6 out of the 28 OECD countries with valid data for both assessments. Students in Mexico improved their performance by 33 score points; students in Turkey, Greece and Portugal by more than 20 score points; and students in Italy and Germany by 17 and 10 score points, respectively. Among partner countries and economies, students in Brazil improved their performance by 30 score points, while students in Tunisia scored 13 score points higher (see Box V.G on Brazil).

In nine countries, mathematics performance in 2009 was significantly lower than in 2003. In the Czech Republic, students' scores decreased by 24 score points. In Ireland, Sweden, France, Belgium, the Netherlands and Denmark, students' scores in mathematics decreased by between 11 and 16 score points. In Australia student scores decreased by 10 score points, and in Iceland they decreased by 8 score points.

PISA 2009 Results:

What Students Know and Can Do Student Performance in reading, mathematics and Science (Volume i)

Page 3:

In mathematics, more than a quarter of Shanghai-China's 15-year-olds can conceptualise, generalise, and creatively use information based on their own investigations and modelling of complex problem situations. They can apply insight and understanding and develop new approaches and strategies when addressing novel situations. In the OECD area, just 3% of students reach that level of performance.

PISA 2009 Results:

Learning to Learn Student engagement, Strategies and Practices (Volume iii)

Page 87:

Recent work has also highlighted how academic achievement can be determined by self-stereotyping and, implicitly, by people's attitudes and beliefs about their own identity. For example, Asian-American women performed better on a mathematics assessment when they were told the reason for doing the test was to identify ethnic differences in performance – because of the stereotype that Asians have higher quantitative skills than other ethnic groups (Steen, 1987) – but worse when they were told that the reason for them taking the assessment was to identify gender differences – because of the common stereotype that women have inferior quantitative skills than men (Benbow, 1988; Hedges and Nowell, 1995), compared with a control group that was not told anything about reasons for taking the assessment (Shih, Pittinsky and Ambady, 1999). Elderly people who had absorbed a negative stereotype of memory abilities also performed worse on a memory task than elderly people who had absorbed positive stereotypes of the elderly (Levy, 1996).

OECD - PISA 2009 Results: Interesting extracts regarding maths learning

Prepared by Peoplescience Intelligence Unit for Schools Of Unified Learning (SOUL)

© Schools Of Unified Learning, Abundance Centre, 186 Peckham High Street, London SE15 5EG v 01

Office: 020 8144 1720 Direct: 078 1702 3073 eMail: learning@unifiedknowledge.org Web: www.unifiedknowledge.org

page: 5 of 6

[PISA 2009 Results: What Makes a School Successful? Resources, Policies and Practices \(Volume iV\)](#)

Page 78:

chapter 2 shows that some high-performing school systems tend to prioritise higher salaries for teachers over smaller classes. At the level of individual schools, higher student scores tend to be related to more learning time in mathematics and science, a higher percentage of students who attended pre-primary schools for more than one year, and better educational resources. chapter 2 also shows that most of the relationship between school resources and schools' performance is also related to schools' socio-economic intake. In other words, school resources are the most important set of mediators through which the socio-economic background of students and schools affects performance.

Page 80:

Although reading was the focus of the 2009 PISA assessment, it is worth considering the time spent learning mathematics and science as well, since learning time in different subjects is related to performance in those subjects in different ways (oec, 2010b). learning time in mathematics and science differs among OECD countries, with the OECD average for both subjects combined at 6 hours and 40 minutes per week. the learning time for both subjects is around 10 hours or more per week in Canada and Chile, but is less than 6 hours per week in Norway, Hungary, Ireland, Turkey, the Netherlands, Austria and Slovenia. Similar levels of variation are seen in instruction in mathematics and science across the partner countries and economies. the average amount of learning time devoted to mathematics and science is highest in Singapore, where the average student is exposed to more than 11 hours of mathematics and science instruction per week. In contrast, in Romania, Montenegro and Croatia, the average student is exposed to less than five hours of mathematics and science classes per week. In general, across OECD countries, students in lower secondary schools tend to spend more time in classes in the language of instruction than students in upper secondary schools, while students in upper secondary schools tend to spend more time in science classes than students in lower secondary schools (table IV.3.16b).



The Abundance Radio Show

[Click here to hear Astehmari's comments on this report.](#)

Hear Astehmari speaking about these interesting extracts regarding the learning of maths internationally.

Also from here you can watch the [Shanghai \(China\) - Strong Performers and Successful Reformers in Education](#) Video.

A video profiling policies and practices of the Shanghai (China) education systems that demonstrated high and improving performance in the PISA tests.



OECD - PISA 2009 Results: Interesting extracts regarding maths learning

Prepared by Peoplescience Intelligence Unit for Schools Of Unified Learning (SOUL)

© Schools Of Unified Learning, Abundance Centre, 186 Peckham High Street, London SE15 5EG v 01

Office: 020 8144 1720 Direct: 078 1702 3073 eMail: learning@unifiedknowledge.org Web: www.unifiedknowledge.org

page: 6 of 6