

# NOTES

## 1. EDUCATION, THROUGH THE EYES OF A SCIENTIST

<sup>1</sup> These students did not reach Level 2 on at least one of the PISA reading, mathematics or science scales, where students demonstrate elementary skills to read and understand simple texts, and master basic mathematical and scientific concepts and procedures. At Level 1, students can answer questions involving familiar contexts where all relevant information is present and the questions are clearly defined. They are able to identify information and carry out routine procedures according to direct instructions in explicit situations. They can perform actions that are almost always obvious and follow immediately from the given stimuli. At the next higher Level 2, students can interpret and recognise situations in contexts that require no more than direct inference. They can extract relevant information from a single source and make use of a single representational mode. Students at this level can use basic algorithms, formulae, procedures, or conventions to solve problems involving whole numbers. They are capable of making literal interpretations of the results. For more details and examples, see OECD 2016a.

<sup>2</sup> See Adams, 2002.

<sup>3</sup> See Chu, 2017.

<sup>4</sup> See <https://www.ccsso.org/>.

<sup>5</sup> <https://www2.ed.gov/programs/racetothetop/index.html>.

<sup>6</sup> <http://www.corestandards.org/>.

<sup>7</sup> PISA – Der Ländertest, <http://www.imdb.com/title/tt1110892/>.

<sup>8</sup> As at May 2018, the 35 countries that are members of the OECD are: Australia, Austria, Belgium, Canada, Chile, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Israel, Italy, Japan, Latvia, Luxembourg, Mexico, the Netherlands, New Zealand, Norway, Poland, Portugal, the Slovak Republic, Slovenia, South Korea, Spain, Sweden, Switzerland, Turkey, the United Kingdom and the United States.

<sup>9</sup> See Hanushek, 2015a, 2015b.

<sup>10</sup> See Leadbeater, 2016.

<sup>11</sup> See also Griffin and Care, 2015.

<sup>12</sup> See OECD, 2017h.

<sup>13</sup> For data on historical attainment rates, see Barro and Lee, 2013.

<sup>14</sup> For data on current educational attainment, see OECD 2017a.

<sup>15</sup> Measured in terms of first-time upper secondary graduation rate; for data, see OECD 2017a.

## 2. DEBUNKING SOME MYTHS

<sup>1</sup>For data, see Chapter 6 in OECD, 2016a.

<sup>2</sup>For data, see OECD, 2013d.

<sup>3</sup>For data, see OECD, 2016a.

<sup>4</sup>See OECD, 2017a.

<sup>5</sup>The ratios of teachers' salaries to earnings for full-time, full-year workers with tertiary education aged 25-64 are calculated using the annual average salaries (including bonuses and allowances) for teachers aged 25-64. For data and methodology, see OECD, 2017a.

<sup>6</sup>An analysis of PISA 2006 data shows that, across OECD countries, students who spend less than two hours per week in regular school lessons in science tend to score 15 points higher in science than students who do not spend any time learning science in regular school lessons; students who spend two to less than four hours per week tend to score 59 points higher; students who spend four to less than six hours per week tend to score 89 points higher; and students who spend six or more hours per week tend to score 104 points higher (Table 4.2a in OECD, 2011a).

<sup>7</sup>For data, see OECD, 2013b.

<sup>8</sup>The PISA assessment tested students but also asked them to report their school marks. In many countries and economies, marks tend to be higher for girls and socio-economically advantaged students, and are also sensitive to the academic context of the school, even after accounting for individual students' performance, attitudes and behaviours towards learning. The fact that marks are sensitive to factors that are unrelated to students' performance, engagement and learning habits signals that teachers may reward aspects that they feel are important but are not measured directly by PISA and that are strongly related to students' backgrounds. Teachers may also reward behaviours that are valued in the labour market and in other social environments. As marks constitute one of the most reliable and consistent indicators of students' own performance and potential, systematic inequalities in the allocation of marks may contribute to systematic inequalities in educational expectations, as discussed in the following chapter. For data and methodology, see OECD, 2012a.

<sup>9</sup>See Schleicher, 2017.

<sup>10</sup>See Hanushek, Piopiunik and Wiederhold, 2014.

<sup>11</sup>OECD, PISA 2015 Database, Tables II.5.9, II.5.18, II.5.22 and II.5.27.

<sup>12</sup>See Slavin, 1987.

## 3. WHAT MAKES HIGH-PERFORMING SCHOOL SYSTEMS DIFFERENT

<sup>1</sup><http://ncee.org/>.

<sup>2</sup>See also <http://ncee.org/what-we-do/center-on-international-education-benchmarking/> and OECD, 2011b.

<sup>3</sup>For data, see question ST111Q01TA in the PISA 2015 database.

<sup>4</sup>See Martin and Mullis, 2013.

<sup>5</sup>See Chen and Stevenson, 1995.

<sup>6</sup>See Good and Lavigne, 2018.

<sup>7</sup>See Bandura, 2012.

<sup>8</sup>See Weiner, 2004.

<sup>9</sup>See Carroll, 1963.

<sup>10</sup>See OECD, 2011b.

<sup>11</sup>The reform of the structure of the school system in the state of Hamburg was agreed between the governing coalition between Christian Democrats (CDU) and Greens (GAL) in their coalition contract of 17 April 2008. It was agreed by the parliament of Hamburg on 7 October 2009. It was significantly changed by a popular vote on 18 July 2010.

<sup>12</sup>See Figure IV.2.6a. in OECD, 2013b.

<sup>13</sup><http://www.phenomenaleducation.info/phenomenon-based-learning.html>.

<sup>14</sup>See Table C6.1a in OECD, 2017a.

<sup>15</sup>See OECD, 2013a.

<sup>16</sup>See OECD, 2017i.

<sup>17</sup>It is possible, of course, that test anxiety is triggered by aspects of the tests other than their frequency that are not captured by the PISA questionnaires.

<sup>18</sup>See <https://asiasociety.org/global-cities-education-network/japan-recent-trends-education-reform>.

<sup>19</sup>See OECD, 2014b and OECD, 2017e.

<sup>20</sup>See Fadel, Trilling and Bialik, 2015.

<sup>21</sup>See Tan, 2017.

<sup>22</sup>See Barber, 2008.

<sup>23</sup><http://www.globalteacherprize.org/about/>.

<sup>24</sup>See Good, 2018.

<sup>25</sup>See Hung, 2006.

<sup>26</sup>See OECD, 2014c.

<sup>27</sup>See OECD, 2009.

<sup>28</sup>See OECD, 2014c.

<sup>29</sup>See OECD, 2014c.

<sup>30</sup>See OECD, 2013c.

<sup>31</sup><https://www.gov.uk/government/news/network-of-32-maths-hubs-across-england-aims-to-raise-standards>.

<sup>32</sup>See also <http://www.bbc.co.uk/programmes/b06565zm> and <https://m.youtube.com/watch?v=DYGxAwRUpaI>

<sup>33</sup>See OECD, 2016b.

<sup>34</sup>See OECD, 2016b.

<sup>35</sup>See <http://ncee.org/what-we-do/center-on-international-education-benchmarking/top-performing-countries/shanghai-china/shanghai-china-instructional-systems/>.

<sup>36</sup>For the data underlying this section, see OECD 2017f.

<sup>37</sup>See <http://www.sici-inspectorates.eu/>.

<sup>38</sup>See Pont, Nusche and Moorman, 2008.

<sup>39</sup>See OECD, 2014c.

<sup>40</sup>See OECD, 2013b.

<sup>41</sup>See Fullan, 2011.

<sup>42</sup>See OECD, 2013b.

<sup>43</sup>See OECD, 2014a.

<sup>44</sup>See OECD, 2015f.

<sup>45</sup>See Canadian Language and Literacy Research Network (2009), Evaluation Report: The Impact of the Literacy and Numeracy Secretariat, [http://www.edu.gov.on.ca/eng/document/reports/OME\\_Report09\\_EN.pdf](http://www.edu.gov.on.ca/eng/document/reports/OME_Report09_EN.pdf)

<sup>46</sup>Singapore's vision of "Thinking Schools, Learning Nation" was first announced by then-Prime Minister Goh Chok Tong in 1997. This vision describes a nation of thinking and committed citizens capable of meeting future challenges, and an education system geared to the needs of the 21st century. See also <https://www.moe.gov.sg/about>.

<sup>47</sup>See OECD, 2016a.

<sup>48</sup>See OECD, 2016b.

<sup>49</sup>See OECD, 2013e for more details on teacher evaluation.

<sup>50</sup>See OECD, 2014c.

<sup>51</sup><https://www.cmec.ca/en/>.

<sup>52</sup><https://www.kmk.org/>.

<sup>53</sup>See OECD, 2017a.

<sup>54</sup>See OECD, 2017a.

#### **4. WHY EQUITY IN EDUCATION IS SO ELUSIVE**

<sup>1</sup>Hanushek and Woessmann, 2015b.

<sup>2</sup><http://www.nytimes.com/2012/03/11/opinion/sunday/friedman-pass-the-books-hold-the-oil.html>.

<sup>3</sup>See OECD, 2013a.

<sup>4</sup>See OECD, 2017a.

<sup>5</sup>See Paccagnella, 2015.

<sup>6</sup>See OECD, 2017a.

<sup>7</sup>Author of <https://www.oecd.org/china/Education-in-China-a-snapshot.pdf>.

<sup>8</sup>See OECD, 2016a.

<sup>9</sup>See Schleicher, 2014 <http://oecdeducationtoday.blogspot.fr/2014/07/poverty-and-perception-of-poverty-how.html>.

<sup>10</sup>See OECD, 2016a.

<sup>11</sup>See Prensky, 2016.

<sup>12</sup><https://surveys.quagliainstitute.org/>.

<sup>13</sup>See OECD, 2017b.

<sup>14</sup>See Figure I.6.14 in OECD, 2016a.

<sup>15</sup>See OECD, 2011b.

<sup>16</sup>See Figure I.6.14 in OECD, 2016a.

<sup>17</sup>See OECD, 2016c.

<sup>18</sup><http://www.legislation.gov.uk/ukpga/2010/32/section/1>.

<sup>19</sup>See Chapter 4 and <https://www.gov.uk/education/pupil-premium-and-other-school-premiums>.

<sup>20</sup>See <http://www.oecd.org/edu/School-choice-and-school-vouchers-an-OECD-perspective.pdf>.

<sup>21</sup>See OECD, 2016d.

<sup>22</sup>See OECD, 2015b.

<sup>23</sup>See OECD, 2016b.

<sup>24</sup>See OECD, 2016b.

<sup>25</sup>See OECD, 2016b.

<sup>26</sup>See OECD, 2012b.

<sup>27</sup>See OECD, 2017b

<sup>28</sup>See OECD, 2017b.

<sup>29</sup>See Epple, Romano and Urquiola, 2015.

<sup>30</sup>See OECD, 2016a.

<sup>31</sup>See OECD, 2016a.

<sup>32</sup>The Zuwanderungskommission was established in 2000 by the German Parliament.

<sup>33</sup>See Figure I.7.13 in OECD, 2016a.

<sup>34</sup>See OECD, 2016a.

<sup>35</sup>See OECD, 2016a.

<sup>36</sup>See OECD, 2016a.

<sup>37</sup>See OECD, 2015g.

<sup>38</sup>See OECD, 2017j.

<sup>39</sup>See OECD, 2015e.

<sup>40</sup><https://www.educationandemployers.org/wp-content/uploads/2018/01/Drawing-the-Future-FINAL-REPORT.pdf>.

<sup>41</sup>[https://m.youtube.com/watch?v=kJP1zPOfq\\_0](https://m.youtube.com/watch?v=kJP1zPOfq_0).

<sup>42</sup>See OECD, 2016e.

<sup>43</sup>*PISA is using a two-part assessment consisting of a cognitive test and a background questionnaire. The cognitive assessment taps students' capacities to critically examine news articles about global issues; recognise outside influences on perspectives and world views; understand how to communicate with others in intercultural contexts; and identify and compare different courses of action to address global and intercultural issues. In a background questionnaire, students are asked to report how familiar they are with global issues; how developed their linguistic and communication skills are; to what extent they hold certain attitudes, such as respect for people from different cultural backgrounds; and what opportunities they have at school to develop global competence. In addition, school principals and teachers are asked to describe how education systems are integrating international and intercultural perspectives throughout the curriculum and in classroom activities.*

<sup>44</sup>See <https://www.oecd.org/education/Global-competency-for-an-inclusive-world.pdf>.

## **5. MAKING EDUCATION REFORM HAPPEN**

<sup>1</sup>See OECD, 2010a.

<sup>2</sup>See OECD, 2015a.

<sup>3</sup><http://www.corestandards.org/>.

<sup>4</sup>[https://www.bmbf.de/pub/Bildungsforschung\\_Band\\_1.pdf](https://www.bmbf.de/pub/Bildungsforschung_Band_1.pdf).

<sup>5</sup>See <http://www.oecd.org/skills/nationalskillsstrategies/Diagnostic-report-Portugal.pdf>.

<sup>6</sup>See OECD, 2013c.

<sup>7</sup>See OECD, 2005.

<sup>8</sup>See OECD, 2005.

<sup>9</sup>See OECD, 2013c.

<sup>10</sup>Their efforts were documented in “The Folkeskole’s response to the OECD”.

<sup>11</sup>Danish Ministry of Education and Rambøll, 2011.

<sup>12</sup>See Alberta Education, 2014, and Hargreaves and Shirley, 2012.

<sup>13</sup>See OECD, 2014c.

<sup>14</sup>See Barber, 2010.

<sup>15</sup>Data provided by Education International and the Trade Union Advisory Committee to the OECD (2013), “Survey of Trade Unions’ Engagement with Governments on Education and Training”, in OECD, 2015a.

## 6. WHAT TO DO NOW

<sup>1</sup>Tom Bentley in “The responsibility to lead: Education at a global crossroads”, Patron’s Oration on 21 August 2017 at the Australian Council of Education Leadership.

<sup>2</sup>See <http://www.un.org/sustainabledevelopment/sustainable-development-goals/>.

<sup>3</sup>See Putnam, 2007.

<sup>4</sup>See OECD, 2017c.

<sup>5</sup>See OECD, 2016e.

<sup>6</sup>Brundtland Commission, 1987.

<sup>7</sup>See <http://www.oecd.org/social/income-distribution-database.htm>.

<sup>8</sup>See Harari, 2016.

<sup>9</sup>See Goldin and Katz, 2007.

<sup>10</sup>See OECD, 2017k.

<sup>11</sup>See Autor and Dorn, 2013.

<sup>12</sup>See Echazarra et al., 2016.

<sup>13</sup>Using memorisation instead of control and elaboration strategies results in a lower likelihood of answering correctly 78 of the 84 PISA mathematics items analysed. More important, the rate of success decreases as the difficulty of the item increases. While using memorisation appears to make little difference when answering the easiest items, a one-unit increase in the index of memorisation strategies is associated with a 10% decrease in the probability of answering problems of intermediate difficulty correctly (compared to using one of the other learning strategies), and with a more than 20% decrease in the probability of answering the most challenging items correctly. This implies that students who agreed with the statements related to elaboration or control strategies in all four questions on learning strategies are three times more likely to succeed in the five most challenging items in the PISA mathematics test than students who only agreed with the statements related to memorisation strategies.

<sup>14</sup>Using elaboration strategies more frequently is associated with less success in correctly solving the easiest mathematics problems (those below 480 points in difficulty). More important, for many of these simple items, memorisation is associated with better results than elaboration strategies. However, as

the items become more difficult, students who reported using elaboration strategies more frequently improve their chances of succeeding, especially when the items surpass 600 points in difficulty on the PISA scale. Elaboration strategies are associated with better results than memorisation strategies for items of intermediate difficulty; but they seem to be even better than control strategies for solving the most difficult items, especially those above 700 points on the PISA scale.

<sup>15</sup>European Union Labour Force Survey data; cited in Nathan, Pratt and Rincon-Aznar, 2015.

<sup>16</sup>See OECD, 2016a.

<sup>17</sup>In 1996, when the 15th Central Council for Education (中央教育審議会 Chūō Kyōiku Shingikai) was asked about what the Japanese education of the 21st century should be like, it submitted a report suggesting “the ability to survive” should be the basic principle of education. “The ability to survive” is defined as a principle that tries to keep the balance of intellectual, moral, and physical education. In 1998, the teaching guidelines were revised to reflect the council’s report. Some 30% of the curriculum was cut and “time for integrated study” in elementary and junior high school was established.

<sup>18</sup>For an overview, see [http://www.opf.fi/download/151294\\_ops2016\\_curriculum\\_reform\\_in\\_finland.pdf](http://www.opf.fi/download/151294_ops2016_curriculum_reform_in_finland.pdf).

<sup>19</sup>See <https://www.smh.com.au/lifestyle/health-and-wellness/fat-employee-sues-mcdonalds-wins-20101029-176kx.html>;  
<http://fortune.com/2017/05/19/burned-woman-starbucks-lawsuit/>.

<sup>20</sup>See <https://www.pisa4u.org/>.

<sup>21</sup>See OECD, 2017h.

<sup>22</sup><https://oeb.global/>.

<sup>23</sup>For a profile, see <https://www.triciawang.com/>.

<sup>24</sup>Friedman, 2016.

<sup>25</sup>For an overview, see <http://iasculture.org/>.

<sup>26</sup>For an overview see <https://www.moe.gov.sg/education/secondary/values-in-action>.

<sup>27</sup>See OECD, 2017a.

<sup>28</sup>See OECD, 2015d.

<sup>29</sup>See also OECD, 2013c.

<sup>30</sup>See OECD, 2014a.

<sup>31</sup>OECD, forthcoming.

<sup>32</sup>See <https://www.varkeyfoundation.org/>.

<sup>33</sup>For data, see OECD, 2009.

<sup>34</sup><http://www.oecd.org/pisa/data/2015-technical-report/>.

<sup>35</sup>See OECD, 2015c

<sup>36</sup><http://www.oecd.org/pisa/pisa-based-test-for-schools/>.

<sup>37</sup>See <http://www.oecd.org/pisa/aboutpisa/pisafordevelopment.htm>.



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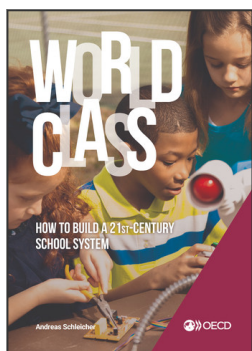
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# ABOUT THE AUTHOR

Andreas Schleicher is Director for Education and Skills at the Organisation for Economic Co-operation and Development (OECD). He initiated and oversees the Programme for International Student Assessment (PISA) and other international instruments that have created a global platform for policy makers, researchers and educators across nations and cultures to innovate and transform education policies and practices. He has worked for over 20 years with ministers and education leaders around the world to improve quality and equity in education. Former US Secretary of Education Arne Duncan said that Schleicher “...understands the global issues and challenges as well as or better than anyone I’ve met, and he tells me the truth” (*The Atlantic*, July 2011). Former UK Secretary of State for Education Michael Gove called Schleicher “the most important man in English education” – even though he is German and lives in France. Schleicher is the recipient of numerous honours and awards, including the Theodor Heuss prize, awarded for “exemplary democratic engagement” in the name of the first president of the Federal Republic of Germany. He holds an honorary professorship at the University of Heidelberg.





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