The Mismeasure of Teaching Time

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Few matters of international education policy have achieved as much consensus as the claim that teachers in U.S. public schools spend nearly twice as much time leading classes as their counterparts in such high-performing nations as Finland, Japan, and many other nations belonging to the Organization for Economic Cooperation and Development (OECD). Yet this claim is far from true.

Teachers in U.S. public schools work hard, for relatively low pay, and under increasingly stressful conditions because of federally mandated high-stakes tests tying assessment of teachers to student performance on these tests.[1] But they do not, as reported in detailed tables published by the OECD every year since 2000, spend so much more time instructing students than teachers in other OECD nations.[2] Through regular repetition by academics and journalists, this misinformation has become conventional wisdom.[3]

In reality, U.S. primary teachers spend about 12 percent more time leading classes than their OECD counterparts, not 50 percent; U.S. lower-secondary teachers spend about 14 percent more time, not 65 percent; and U.S. upper-secondary teachers spend about 11 percent more time, not 73 percent. In the case of Finland and Japan, in particular, the alleged differences, as will be explained, reach 110 percent.

This myth has precluded legitimate comparative analysis of staffing practices. This myth has moreover obscured telling differences between the structure of the school day in the United States and other OECD nations. Finally, this myth has overshadowed the critical issue of inferior pay of U.S. teachers in comparison to that of their OECD counterparts.

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For the purposes of comparative analysis, the OECD publishes data on teaching time (or "net statutory contact time," as the OECD terms it) and myriad other matters in an annual volume of statistics and analysis called *Education at a Glance* (*EAG*).[4] To anyone who has taught and/or worked as a scheduler in a typical U.S. public school, the OECD numbers for U.S. teaching hours should appear greatly inflated.[5] These numbers, as will be explained, reflect the length of the school day (minus lunch), not contact time.

This myth about teaching time in the United States ultimately derives from erroneous reportage to the OECD by the U.S. Department of Education (DOE) and, more specifically, its National Center for Education Statistics (NCES). While the OECD spells out in detail how teaching time and many other metrics should be reported by representatives of its 34 member nations, it does not have the staff to assess submitted data. If questioned about data in *EAG*, OECD staff refer concerns to national representatives and defer to their judgment.[6]

Data in *EAG* must accordingly be read with these qualifications in mind. In aggregating, organizing, and disseminating data, the OECD performs an invaluable service. But the information is only as good as the quality of collection at the national level. The NCES likewise performs an invaluable service in aggregating, organizing, and disseminating data from surveys of teachers, principals, and superintendents.[7] But the information is only as good as the quality of these surveys.

The latest edition of *EAG*, published in September 2014, reports that U.S. teachers, on average, spend 1,131 hours per year in leading classes at the primary level; 1,085 hours at the lower-secondary level; and 1,076 hours at the upper-secondary level. By contrast, *EAG* reports that teachers in other OECD nations (with the exclusion of Chile and Mexico, for reasons to be explained) spend, on average, 759 hours per year in leading classes at the primary level; 657 hours per year at the lower-secondary level; and 621 hours per year at the upper-secondary level.[8]

This difference between U.S. teachers and their OECD counterparts has remained fairly constant, but for an inexplicable spike of 19 percent for primary and upper-secondary teachers and 17 percent for lower-secondary teachers in the United States in 2002, which indicates a shift in method of data collection rather than a jump in teaching time (see Table 1 and Chart 1).

The method of data collection in the United States has been the very problem. The OECD allows national representatives to draw their data from statistical databases, administrative registers, or sample surveys.[9] Of the 23 OECD nations whose procedures for data collection are described in the *EAG* annex on sources, methods, and technical notes, 21 use statistical databases or administrative registers. Only two use sample surveys: Japan and the United States. But Japan and the United

States employ significantly different approaches. Japanese authorities survey teachers about the number of standard-length lessons they teach per week. U.S. authorities survey teachers about the number of hours they teach per week.[10] The first method is shielded from interpretation, the second is not.

Through the NCES, the United States gathers its data from a sample survey conducted every few years since 1987 called the Schools and Staffing Survey (SASS).[11] When presented with the evidence in this study, Thomas D. Snyder, the NCES program director for Annual Reports and Information and the U.S. representative to the OECD, undertook with his staff a detailed analysis of SASS data.[12] Snyder reported a week later both that the numbers generated by SASS have indeed been substantially overstated and that SASS would have to be revised. "There has clearly been a systematic misinterpretation of the question regarding teaching hours in SASS," Snyder said.[13]

Year	Primary				Lower-Secondary				Upper-Secondary			
	U.S.	OECD	U.S./OECD	OECD/U.S.	U.S.	OECD	U.S./OECD	OECD/U.S.	U.S.	OECD	U.S./OECD	OECD/U.S.
	Hours	Hours	Ratio	Ratio	Hours	Hours	Ratio	Ratio	Hours	Hours	Ratio	Ratio
1998	958	781	1.23	0.82	964	686	1.41	0.71	942	616	1.53	0.65
2000	958	781	1.23	0.82	964	689	1.40	0.71	943	628	1.50	0.67
2001	958	795	1.21	0.83	964	706	1.37	0.73	943	649	1.45	0.69
2002	1,139	789	1.44	0.69	1,127	707	1.59	0.63	1,121	648	1.73	0.58
2003	1,139	778	1.46	0.68	1,127	697	1.62	0.62	1,121	637	1.76	0.57
2004	1,139	789	1.44	0.69	1,127	679	1.66	0.60	1,121	641	1.75	0.57
2005	1,139	781	1.46	0.69	1,127	670	1.68	0.59	1,121	636	1.76	0.57
2006	1,080	794	1.36	0.74	1,080	674	1.60	0.62	1,080	639	1.69	0.59
2007	1,080	792	1.36	0.73	1,080	672	1.61	0.62	1,080	635	1.70	0.59
2008	1,080	801	1.35	0.74	1,080	686	1.57	0.64	1,080	641	1.68	0.59
2009	1,080	787	1.37	0.73	1,080	677	1.60	0.63	1,080	626	1.73	0.58
2010	1,097	773	1.42	0.70	1,068	675	1.58	0.63	1,051	638	1.65	0.61
2011	1,097	752	1.46	0.69	1,068	656	1.63	0.61	1,051	616	1.71	0.59
2012	1,097	761	1.44	0.69	1,068	667	1.60	0.62	1,051	626	1.68	0.60
2013	1,097	769	1.43	0.70	1,068	672	1.59	0.63	1,051	631	1.67	0.60
2014	1,131	759	1.49	0.67	1,085	657	1.65	0.61	1,076	621	1.73	0.58

Table 1: Average number of teaching hours per year for teachers at the primary, lower-secondary, and upper-secondary levels in schools in the United States and OECD nations, according to *Education at a Glance*. The year corresponds to the publication year of *Education at a Glance*; the source year precedes the publication year by two years. The OECD numbers are adjusted means (excluding hours for Chile, whose data were included in *Education at a Glance* from 2011 onward, as well as Mexico and the United States). The ratios reflect comparative teaching loads according to reported data.[14]

The most recent SASS was conducted in 2011-12. However, the most recent survey with sampling information available was conducted in 2007-08. According to this sampling information, surveys were returned by 47,600 public school teachers, representing a unit response rate of 84 percent.[15]

The survey for 2007-08 ran 44 pages and comprised 75 questions. Respondents were asked in the fiftieth question to list the number of hours spent per week delivering instruction, with the following qualification: "If your base contract requires you to work 40 hours a week, with 30 of those hours for delivering instruction and 10 hours for planning, monitoring students outside of class, etc., you would report 30 hours." In addition, SASS included another qualification: "Report to the nearest whole hour; do not record fractions of an hour or minutes."[16]

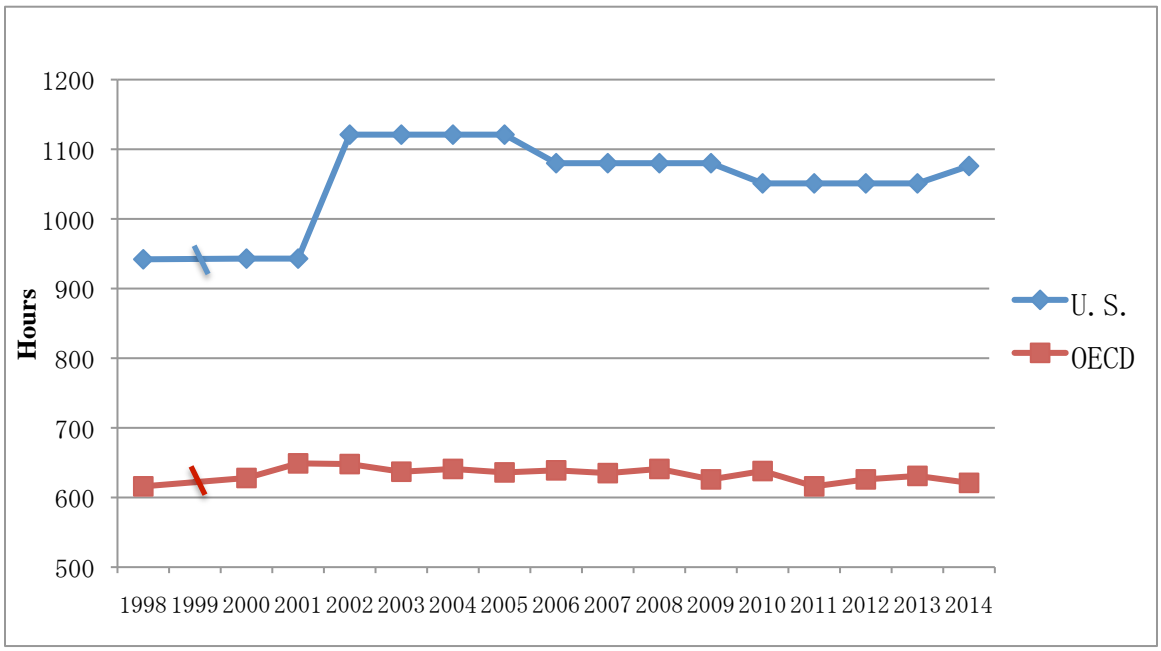

Chart 1: Average number of hours teachers at the upper-secondary level lead classes per year in the United States in comparison to their OECD counterparts, according to *Education at a Glance*. The year corresponds to the publication year of *Education at a Glance*; the source year precedes the publication year by two years. The OECD numbers are adjusted means (excluding hours for Chile, whose data were included in *Education at a Glance* from 2011 onward, as well as Mexico and the United States). The break for 1999 reflects a gap in publication of *Education at a Glance*.[17]

This question was phrased and qualified the same way for the 2011-12 survey. For the three previous surveys used for reporting data to the OECD, the question was phrased and qualified differently. For both the 1993-94 and 1999-2000 surveys, respondents were told to report approximately how many hours they spent teaching the last full week and to round to the nearest hour. For the 2003-04 survey, respondents were merely asked to report the number of hours they spent per week "delivering instruction to a class of students."[18]

The response to this question has repeatedly approximated 30 hours per week, leading to a total of about 1,080 hours per year for a school year of 36 weeks. This sum corresponds to the length of the school day, according to the latest NCES data available, minus lunch. The average school day across the country, the NCES reported for the 2007-08 academic year, ran 6 hours and 38 minutes while the average amount of time each teacher taught per day tallied 6 hours. In some states, according to NCES data, there was almost no difference between teaching time and the length of the school day: for example, in Utah, teachers allegedly had 3 minutes per day of non-teaching time; in California, 15 minutes; and in Arizona, 16 minutes (see Table 2).[19]

Some teachers at intensive charter schools run by organizations like KIPP do teach six hours per day, but such schools constitute outliers. There are nearly 100,000 schools across the United States.[20] KIPP runs 162 schools. And several charter organizations similar to KIPP, in sum, run another 242: Achievement First, 29; Aspire, 38; Democracy Prep, 13; IDEA, 30; Mastery, 17; Noble, 17; Rocketship, 11; Success Academy, 32; Uncommon Schools, 42; and YES Prep, 13. [21]

In their analysis of SASS data prompted by evidence in this study, Snyder and his staff linked teachers (through coding of the SASS questionnaires) to their specific schools and found that about 25 percent of respondents reported teaching longer than the school day itself and another 8 percent of respondents reported teaching the full length of the school day.[22]

	School Day	Teaching Time	Difference
Alabama	7:02	6:26	0:36
Alaska	6:29	6:08	0:21
Arizona	6:26	6:10	0:16
Arkansas	6:53	6:16	0:37
California	6:14	5:59	0:15
Colorado	7:01	6:00	1:01
Connecticut	6:28	5:36	0:52
Delaware	6:41	6:05	0:36
District of Columbia	6:55	6:26	0:29
Florida	6:26	6:05	0:21
Georgia	6:47	6:11	0:36
Hawaii	6:16	5:59	0:17
Idaho	6:38	6:01	0:37
Illinois	6:30	5:49	0:41
Indiana	6:46	6:01	0:45
Iowa	6:51	6:11	0:40
Kansas	6:59	6:17	0:42
Kentucky	6:41	6:16	0:25
Louisiana	7:05	6:25	0:40
Maine	6:28	5:47	0:41
Maryland	6:35	5:53	0:42

	School Day	Teaching Time	Difference
Massachusetts	6:27	5:31	0:56
Michigan	6:34	6:01	0:33
Minnesota	6:27	5:50	0:37
Mississippi	6:59	6:34	0:25
Missouri	6:42	6:06	0:36
Montana	6:47	6:11	0:36
Nebraska	6:55	6:17	0:38
Nevada	6:18	5:58	0:20
New Hampshire	6:32	5:32	1:00
New Jersey	6:26	5:41	0:45
New Mexico	6:51	6:14	0:37
New York	6:35	5:50	0:45
North Carolina	6:45	6:13	0:32
North Dakota	6:35	6:08	0:27
Ohio	6:37	5:55	0:42
Oklahoma	6:38	6:13	0:25
Oregon	6:34	5:52	0:42
Pennsylvania	6:26	5:53	0:33
Rhode Island	6:16	5:26	0:50
South Carolina	6:55	6:05	0:50
South Dakota	6:50	6:07	0:43
Tennessee	7:02	6:06	0:56
Texas	7:10	6:28	0:42
Utah	6:17	6:14	0:03
Vermont	6:40	5:41	0:59
Virginia	6:37	5:56	0:41
Washington	6:13	5:54	0:19
West Virginia	6:52	6:14	0:38
Wisconsin	6:55	5:59	0:56
Wyoming	6:52	6:10	0:42
United States	**6:38**	**6:00**	**0:38**

Table 2: Length of school day and teaching time reported by the National Center for Education Statistics (NCES) for 2007-08.[23]

From the pattern of replies for the 2007-08 survey, it may be the case that respondents rounded up for each lesson, not for the week as a whole: five 45-minute classes per day, for example, may have been rounded up to five hours of instruction per day and thus 25 hours per week, rather than three hours and 45 minutes per day and thus 19 hours per week, rounded up from 18 hours and 45 minutes. A frequency chart, in this regard, exhibits spikes at intervals of five hours rather than a smooth distribution (see Chart 2). Given the length of the surveys, it may furthermore be the case that respondents spent less time than necessary on this question and others requiring careful computation.

Whether respondents rounded up in this manner or spent less time than necessary to compute teaching time, what is certain is that none of the surveys accounted for

hours per year set aside for proctoring exams, which, according to the OECD, do not count as "contact time." Snyder confirmed that the NCES has not factored in time for proctoring exams in its reports of teaching time to the OECD.[24] The OECD, however, does spell out in its annual instructions to national representatives that time used for proctoring exams, among other things, should be excluded. For example, the 2010 instructions sent by the OECD to national representatives read as follows, with boldfaced and italicized text appearing as printed in the instructions: "Teaching time is calculated as the ***net contact time for instruction***, i.e., *excluding* both time allocated for lunch breaks or short morning or afternoon breaks of ten minutes or more…. An exception to the use of this formula is the calculation of teaching time at the pre-primary and primary level, where short morning or afternoon breaks are to be *included* if the classroom teacher is responsible for the class during these breaks…. Activities such as professional development days, student examination days, attendance at conferences, and out of school excursions should not be counted as teaching time."[25]

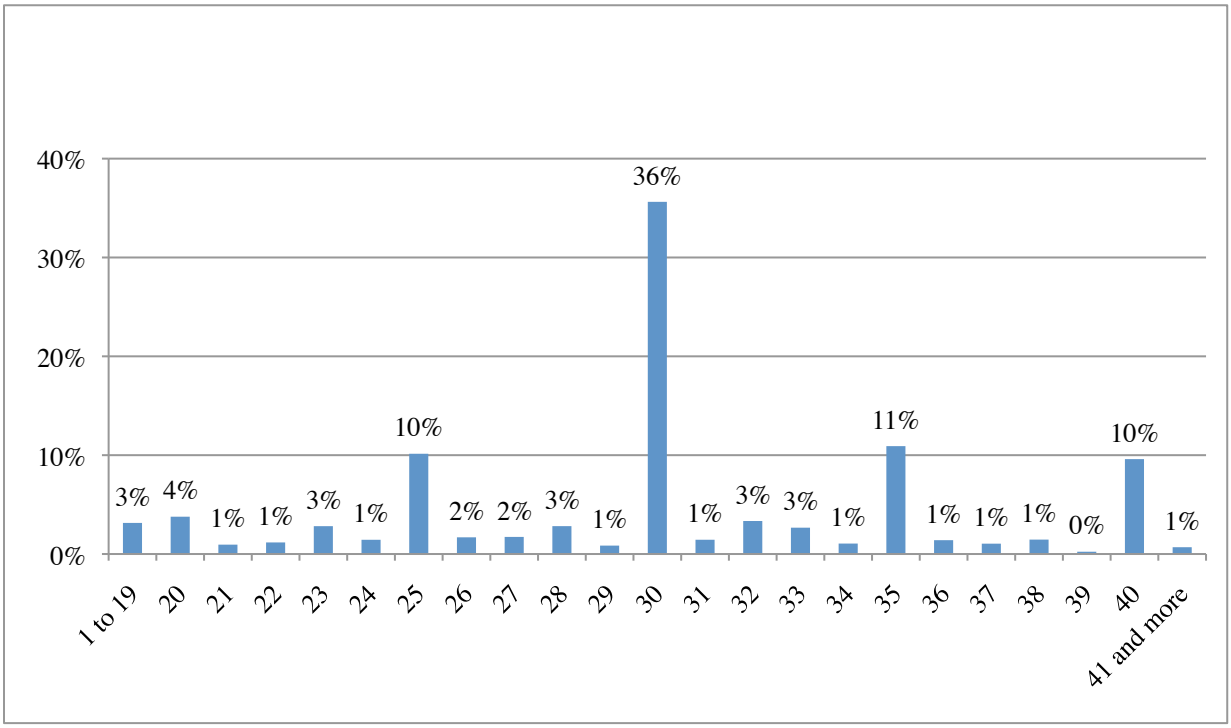

Chart 2: Percentage distribution of teachers in U.S. public schools by number of hours per week spent leading classes, according to the Schools and Staffing Survey (SASS), 2011-12.[26]

This matter of time allocated for proctoring exams is ultimately of marginal relevance. Even if such time is included as instructional time—on the grounds that representatives of other OECD nations also included exam time as instructional time in their reports to the OECD for *EAG*—U.S. teachers, as will be explained, teach about 14, 17, and 15 percent more than their OECD counterparts at the primary, lower-secondary, and upper-secondary levels, respectively. The real problem is the mismeasurement of time in class as a teacher.

Three factors led to this conclusion: first, there is a logistical contradiction within *EAG* regarding time spent by students and teachers in the classroom; second, there is another logistical contradiction within *EAG* regarding student-to-teacher ratios and average class size; and third, there is empirical evidence from a survey of teacher contracts and schedules from a cross-section of rural, suburban, and urban school districts.

The internal contradictions apply in different ways to data from Chile and Mexico, as well, suggesting that Chilean and Mexican representatives may have also over-reported teaching time: for Chile, teaching time exceeds learning time; for Mexico, student-to-teacher ratios exceed average class size, whereas the opposite is the case for all other OECD nations.[27] If teachers teach additional lessons at more than one school or teach students in separate or overlapping shifts at the same school, these aberrations would make sense, but the details of staffing in Chilean and Mexican schools are beyond the scope of this analysis.

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The first logistical contradiction for U.S. data on teaching time may be seen in comparing instructional time for students to teaching time for teachers at both the lower- and upper-secondary levels. One must compare tables from different sections of *EAG* to see this contradiction. In all OECD nations but Chile and the United States, the former surpasses the latter at the lower-secondary level and, in most cases, to a considerable degree. According to the 2014 edition of *EAG*, on average, students in OECD nations (excluding Chile, Mexico, and the United States) spent 231 more hours per year in the classroom than teachers. By contrast, teachers in Chile spent 42 hours more per year in the classroom than students; teachers in the United States spent 74 hours more per year in the classroom than students (see Table 3).[28]

At the upper-secondary level, in all OECD nations but the United States, learning time surpassed teaching time and, again, to a considerable degree, though only 18 nations provided data for both learning and teaching time.[29] On average, students in OECD nations (excluding Chile, Mexico, and the United States) spent 270 hours more per year in the classroom than teachers. By contrast, teachers in the United States spent 38 hours more per year in the classroom than students.

This reverse scenario makes sense for teachers at the primary level, as the OECD instructions sent to national representatives, as noted above, specify that supervision of children during non-instructional time, such as "short morning or afternoon breaks," should count as teaching time if teachers are "responsible for the class during these breaks." Of the 32 nations reporting both learning and teaching time at the primary level in *EAG* in 2014, 10 exhibit this reverse scenario, from Finland, with teachers spending 41 hours more per year teaching or supervising students than students spend in class learning, to the United States, where the difference is 164

hours.[30] But this reverse scenario for teachers at the lower- and upper-secondary levels is only possible if teachers spend a portion of their day teaching to empty classrooms, have no lunch period, team teach, or teach students showing up in separate or overlapping shifts. Of these four possibilities, the first is illogical, the second is in violation of every teacher contract reviewed by the author, the third is too rare to have a noticeable effect, and the fourth occurs but far too infrequently to be the rule rather than the exception.

By extension, if it is the case that teaching time exceeds learning time, then average class size can not exceed the student-to-teacher ratio. Yet, according to *EAG*, average class size in both U.S. primary and lower-secondary schools far exceeds the student-to-teacher ratio (*EAG* does not provide data on class size at the upper-secondary level). The average class size for U.S. primary schools is 22 while the student-to-teacher ratio is 15:1; the average class size for U.S. lower-secondary schools is 28 while the student-to-teacher ratio is 15:1, which holds, as well, for the student-to-teacher ratio at the upper-secondary level. These numbers correspond to OECD averages at the primary level of 21 for class size and a student-to-teacher ratio of 15:1; and at the lower-secondary level of 24 for class size and a student-to-teacher ratio of 14:1.[31]

In practical terms, what these numbers mean is that at a typical U.S. lower-secondary school with 1,000 students, for example, there are 67 teachers, given the reported student-to-teacher ratio of 15:1. While this number of teachers may seem high, *EAG* specifies that the student-to-teacher ratio is determined by the division of full-time students by full-time teachers.[32] Some of this magnitude may be explained by the presence on staff of special education teachers who serve as co-teachers in classes with a wide range of academic proficiency, pull students out of their classes on a regular basis for individual tutoring, or lead small cohorts in such areas as study skills, bilingual assistance, or reading comprehension; and some of this magnitude may be explained by the number of full-time teachers who have reduced teaching loads because they chair a department, serve as the union representative for the faculty, work part-time in the library, run peer-tutoring programs, schedule the school, provide tech support, or serve in some other ancillary capacity.

Given average class size of 28, at a school with 1,000 students and a conventional seven-period day, there would be at most 36 classes taught during five periods of the day and 18 classes taught during two, one of which, in typical practice, would be a lunch period for half the students and teachers while the other would be a lunch period for the other half of students and teachers.

Nation	Lower-Secondary Instructional Time for Students	Lower-Secondary Teaching Time for Teachers	Difference between Learning and Teaching Time	Ratio of Teaching to Learning Time
Australia	1,015	809	206	0.80
Austria	900	607	293	0.67
Belgium (Fl.)	928	652	276	0.70
Belgium (Fr.)	971	661	310	0.68
Canada	921	747	175	0.81
Czech Republic	874	620	253	0.71
Denmark	930	659	271	0.71
England	912	692	220	0.76
Estonia	823	619	203	0.75
Finland*	844	589	255	0.70
France	991	648	343	0.65
Germany	866	755	111	0.87
Greece	785	415	370	0.53
Hungary*	710	604	106	0.85
Iceland	839	624	215	0.74
Ireland	935	735	200	0.79
Israel	1,004	629	374	0.63
Italy	990	616	374	0.62
Japan	895	602	293	0.67
Korea*	842	568	273	0.68
Luxembourg	845	739	106	0.87
Netherlands	1,000	750	250	0.75
New Zealand	N/A	848	N/A	N/A
Norway	868	663	205	0.76
Poland	810	561	249	0.69
Portugal	877	616	261	0.70
Scotland	N/A	855	N/A	N/A
Slovak Republic	828	635	193	0.77
Slovenia	767	627	140	0.82
Spain	1,061	713	348	0.67
Sweden	754	N/A	N/A	N/A
Switzerland	N/A	N/A	N/A	N/A
Turkey	840	504	336	0.60
OECD average	**887**	**657**	**231**	**0.74**
Mexico	1,167	1,047	120	0.90
Chile	1,062	1,103	-42	1.04
United States	**1,011**	**1,085**	**-74**	**1.07**

Table 3: Learning and teaching time at the lower-secondary level for OECD nations, according to *Education at Glance 2014*. For nations with an asterisk, hours are contractual minimums.[33]

This necessarily provides another logistical contradiction to the claim that U.S. teachers spend more time in class teaching, as the *EAG* figures convey, than students spend in class learning. Even if several of the 67 teachers on staff at this fictional school are not truly full-time teachers on account of other responsibilities such as those mentioned, the number of truly full-time teachers, with full teaching loads, would substantially exceed 36, as any online school directory will confirm. There would otherwise be no teachers in the faculty room in the course of the school day grading papers, prepping for class, or collaborating with colleagues. At the lower-secondary level, such modified teaching loads apply to a small percentage of the faculty. This is true, as well, at the upper-secondary level.

In the erstwhile mill town of Holyoke, Massachusetts, for example, the high school's faculty of 93 full-time teachers in the 2013-14 school year comprised nine teachers who had reduced teaching loads (from five courses a day to four) because they were department heads and 11 special education teachers working with small groups of students (six who provided supplementary help to students with weaknesses in particular subjects and five who worked with severely handicapped students in self-contained environments). Student enrollment was 1,309. The student-to-teacher ratio was 14:1, nearly the same as the national average of 15:1 and identical to the OECD average.[34]

The daily schedule at this high school comprises seven 49-minute academic periods. The standard teacher load is five periods of instruction per day while the standard student load is seven periods a day. The fifth period of the day is prefaced, followed, or split by a 22-minute lunch period. For three periods a week, teachers are scheduled for hall- or lunch-monitoring duty; for two periods a week, teachers are scheduled for collaboration with colleagues; and for five periods a week, teachers are scheduled for preparation time they may use independently or with colleagues.[35]

Of the 180 days in the school calendar at this high school in 2014-15, seven days are early-release days (with periods compressed from 49 to 35 minutes) to allow for professional development, eight days are set aside for school exams (four at the end of each semester), seven mornings (comprising 21 periods in total) are set aside for the Massachusetts Comprehensive Assessment System (MCAS) exams, and the final day of the year is an early-release day; though the MCAS exams are administered to only tenth-graders, no classes are held for other students during the exam period.[36]

As the OECD stipulates that "net statutory contact time" excludes non-instructional time, the total teaching time for a teacher at this school drops from 727 hours per year to 682. Given that seniors finish the school year 12 days early, this reduces teaching time, on average, to 666 hours per year, equivalent to 410 hours—or 38 percent—below the 1,076 hours reported by the OECD in *EAG*. Even if adjustments are not made for midyear and final exams as well as MCAS exams, the average amount of teaching time is 714 hours per year—or 34 percent below the sum reported by the OECD in *EAG* (see Table 4).[37]

The toll of MCAS exams at primary and lower-secondary schools in this school district are even greater. Only four hours a day for four days a year are lost to administering the MCAS exams in English Language Arts (ELA) and math to students in grades three through eight, another four hours are lost to administering the MCAS exams in ELA composition to students in grades four and seven, and another four hours a day for two days are lost to administering the MCAS exams in science to students in grades five and eight. However, interim assessments tied to these state exams are given two hours a day in ELA, math, and science eight times a year to all students in grades two through eight.

In sum, for students in grade two, 48 hours are lost to interim assessments tied to the state exams; for students in grades three and six, 48 hours are lost to interim assessments and 16 hours are lost to state exams in ELA and math; for students in grades four and seven, 48 hours are lost to interim assessments and 20 hours are lost to state exams in ELA, ELA composition, and math; and for students in grades five and eight, 48 hours are lost to interim assessments and 24 hours are lost to state exams in ELA, math, and science.[38]

One casualty of all this attention to testing is play, as school district officials have cut back recess to integrate more academic instruction into the day in order to prepare students for state exams.[39] Students in kindergarten through grade five in this school district get one 10-minute period of recess a day, cut from two 15-minute periods of recess in 2007. Students in grades six through eight get no recess. Their one 15-minute period of recess was cut in 2007.[40]

Of the 180 days in the school calendar for the seven primary and lower-secondary schools in this district, four are half-days for parent-teacher conferences, the final day is a half-day, seven are early-release days (ending 90 minutes early) for professional development, four mornings are lost to MCAS exams for students in grades three and six, five mornings are lost to MCAS exams for students in grades four and seven, and six mornings are lost to MCAS exams for students in grades five and eight.[41]

Accounting for the half-days, early-release days, and mornings lost to MCAS exams (while excluding time allocated for interim assessments), total contact time for teachers in this district is as follows (kindergarten is excluded, as *EAG* does not classify the primary level as comprising kindergarten): for teachers of grades one and two, 818 hours per year; for teachers of grade three, 805; grade four, 802; grade five, 799; grade six, 859; grade seven, 855; and grade eight, 852.[42]

* * *

It is the allocation of time for state exams and interim assessments as well as the associated pressure on teachers and students alike that distinguishes U.S. pedagogical practice, not teaching time. In fact, teaching time in the one OECD nation that stands as the polar opposite of the United States, Finland, is far closer to teaching time in the United States than repeatedly described.[43] But the structure of the day and the absence of standardized testing in Finnish schools render the learning and teaching environments utterly different.

In its table for teaching time, *EAG* lists actual teaching time for most nations. In the case of Finland, Hungary, and Korea, *EAG* qualifies the reported hours as contractual minimums. In reality, according to 2014 data obtained from officials of the Finnish teachers union, Opetusalan Ammattijärjestö (OAJ), Finnish primary teachers teach 7 percent more than the contractual minimum (or 719 hours per year, not 673), lower-secondary teachers teach 12 percent more (or 657 hours, not 589), and upper-secondary teachers teach 18 percent more (or 647 hours, not 547).[44] With U.S. teachers spending much less time leading classes than reported by *EAG*, the major difference in U.S. and Finnish pedagogical practice is accordingly not about teaching hours.[45]

The difference concerns the tenor and tempo of the day. Without standardized testing in Finnish schools, Finnish teachers function as trusted evaluators of their students. And without standardized testing, the school day is not packed with academic lessons. Teachers and students alike have time to regroup between classes. While typical U.S. lower- and upper-secondary schools have only three or four minutes of pass time between classes, Finnish lower- and upper-secondary schools all schedule 15 minutes between classes. In contrast to an assembly-line rhythm in U.S. schools—with students racing to their next class, often in large labyrinthian buildings with designated up and down staircases, and teachers hurriedly transitioning from one lesson to the next and frequently moving to another classroom—the pace in schools in Finland is slow and calm, allowing time for fresh air, recreation, conversation, and reflection. Likewise, while many primary schools, like those in Holyoke, Massachusetts, have marginal amounts of recess or none, Finnish primary schools have 15 minutes of play for every 45 minutes of instruction, for a total of 75 minutes per day.[46]

While Holyoke, Massachusetts, is clearly not the United States, a survey of school districts in Massachusetts implies that it is close to the state average for teaching hours, which, according to the NCES, is, in turn, close to the national average and thus concrete evidence of the logistical contradictions of the data in *EAG*. Across the Connecticut River from Holyoke, teachers in the town of South Hadley have similar teaching loads, as do teachers in Boston and a sample of seven more school districts, small, large, rich, and poor, across the state (see Table 4). While a more sizable

survey of the state's 408 school districts should be done to ascertain the statewide average, this sample suffices for the purposes of this analysis.

District	Teachers of grades 1-6	... 7-9	... 10-12	Students	Low-Income	Teachers	Schools
Berkshire Hills	811/802	670/652	604/578	1,340	27%	116	3
Boston	775/766	712/696	697/677	54,300	81%	4,001	120
Holyoke	827/817	824/796	714/666	5,573	87%	500	11
Lowell	799/790	592/578	582/561	14,243	74%	984	24
Northampton	811/801	750/729	731/699	2,778	32%	206	6
Pittsfield	851/841	726/705	699/662	5,894	59%	482	12
Sharon	834/823	676/657	589/572	3,511	8%	256	5
South Hadley	869/859	788/770	707/694	1,957	32%	146	4
Tewksbury	736/728	753/735	715/689	3,762	19%	250	7
Walpole	794/785	727/711	686/646	4,001	16%	284	8
Sample Mean	811/801	722/702	672/644	9,736	44%	723	20
Sample Totals	N/A	N/A	N/A	97,359	N/A	7,225	200

Table 4: Teaching hours per year in 10 Massachusetts school districts, with demographic data, for 2013-14. Hours are listed with time included for proctoring exams over time excluded. The representation of low-income students in this sample of school districts slightly exceeds the state average of 39 percent. Total enrollment in the state was 955,844. The total number of teachers was 70,489. The total number of districts was 408 and of schools, 1,860.[47]

For Massachusetts, net teaching time, according to the latest data for SASS, coming from the 2011-12 academic year, was 28.9 hours per week, compared to 30.8 hours per week for the nation as a whole.[48] This survey of teacher contracts and school schedules for 10 districts in Massachusetts indicates the state average is rather 20.5 hours per week, or 737 hours per year with a 36-week academic calendar: 22.3 hours per week for primary teachers; 19.5 hours per week for lower-secondary teachers; 17.9 hours per week for upper-secondary teachers; and 20.5 hours per week as the mean, adjusted to reflect the number of teachers at each level.[49]

Projected nationally, 20.5 hours multiplied by the difference between the reported national and state averages (30.8/28.9) becomes 21.8 hours per week , or 787 hours per year with a 36-week calendar. SASS provides only a weekly average for all teachers, not teachers by level of instruction. If this multiplier (30.8/28.9) is applied to each level, it may be concluded that U.S. primary teachers spend approximately 854 hours per year leading classes (or 864 if time for proctoring exams is included as instruction), not 1,131. With the OECD average at the primary level (excluding Chile, Mexico, and the United States) being 759 hours, it may be inferred that U.S. primary teachers teach about 12 percent more than their OECD counterparts (or 14 percent more if time for proctoring exams is included as instruction).

Applied to lower-secondary teachers, this multiplier indicates that U.S. teachers spend approximately 748 hours a year leading classes (or 769 if time for proctoring exams is included as instruction), not 1,085. With the OECD average at the lower-secondary level (excluding Chile, Mexico, and the United States) being 657 hours, it may be inferred that U.S. lower-secondary teachers teach about 14 percent more than their OECD counterparts (or 17 percent more if time for proctoring exams is included as instruction). Given, as already noted, that the hours for three OECD nations—Finland, Hungary, and Korea—are contractual minimums, not actual teaching hours, the averages at each level of teaching for OECD nations stand to be understated by 2 or 3 percent.

Applied to upper-secondary teachers, this multiplier indicates that U.S. teachers spend approximately 688 hours a year leading classes (or 716 if time for proctoring exams is included as instruction), not 1,076. With the OECD average at the upper-secondary level (excluding Chile, Mexico, and the United States) being 621 hours, it may be inferred that U.S. upper-secondary teachers teach about 11 percent more than their OECD counterparts (or 15 percent more if time for proctoring exams is included as instruction).

In comparison to Japan, where upper-secondary teachers teach 510 hours per year, according to *EAG*, U.S. teachers indeed teach much more—nearly 35 percent more—but not 110 percent more, as *EAG* conveys. In comparison to Finland, given the adjustment from the contractual minimum of 547 hours to the actual load of 647 hours, U.S. teachers teach more but nowhere nearly to the degree implied by *EAG*. As Finnish teachers, too, proctor exams—though their own exams, not standardized exams, given approximately five times a year during double-blocks of consecutive 45-minute periods—that sum of 647 hours drops approximately 36 hours.[50]

* * *

Spending 12, 14, or 11 percent more time per day—or, if exam time is included as instructional time, 14, 17, or 15 percent more time per day—as a classroom teacher is substantial. Much as wind resistance for an automobile climbs much more sharply between 60 and 70 miles per hour than it does between 50 and 60 miles per hour and thereby requires disproportionately more fuel,[51] the difference in teaching such additional time per day can feel significant, especially with the assembly-line pace of U.S. schools and the pressure on U.S. teachers of high-stakes testing.

Compounding the challenges U.S. teachers confront is their relatively low pay. The data in *EAG* regarding teacher pay appear solid. The questions in SASS about teacher pay are far more specific than the questions about teaching time.[52] And the difference between the pay of U.S. teachers and their OECD counterparts proves telling: U.S. primary teachers, according to *EAG*, earn 67 percent as much as their college classmates while their OECD counterparts earn 85 percent; U.S. lower-

secondary teachers earn 68 percent compared to 88 percent for their OECD counterparts; and U.S. upper-secondary teachers earn 70 percent in contrast to 92 percent for their OECD counterparts.[53] Relative pay is ultimately about purchasing power. And inadequate purchasing power makes any profession less desirable.

Closing this gap in pay should make it far easier to attract college students to teaching and to retain teachers in the profession. Yet winning the public support to make this happen constitutes a tough battle. Closing the gap in teaching time, however, is within easy reach. Much, if not all, of this gap could be closed by reducing instructional time for students by following the Finnish model, for example, in integrating more free time in the day for students to go outside for 15 minutes following every 45-minute lesson for fresh air and play—or, as is often the case in Finnish schools, for 30 minutes after a double period of 90 minutes. Considerable cognitive research confirms that regular breaks and exercise improve concentration.[54] More instructional time per day can accordingly be counterproductive.

At the lower-secondary level, U.S. students are in class, according to *EAG*, for 1,011 hours per year in comparison to 887 hours per year for their OECD counterparts, or 14 percent more time. In Finland, students are in class for 844 hours per year at the lower-secondary level, meaning their U.S. counterparts are in class 20 percent more time (see Table 3). The difference between the Finnish and U.S. school day is, in sum, determined by the difference in break time.

A typical schedule for a Finnish student in lower-secondary school involves 30 45-minute lessons per week over a 187-day academic year, yielding 842 hours per year, just two hours below the number reported by *EAG*.[55] By contrast, a typical schedule for a U.S. student in lower-secondary school involves 35 48-minute lessons per week over a 180-day academic year, yielding 1,008 hours per year, just three hours below the number reported by *EAG*.[56] On a daily basis, typical Finnish lower-secondary students have 270 minutes of instruction and 75 minutes of break time while their typical U.S. counterparts have 336 minutes of instruction and 18 minutes of pass time between classes. The length of the school day (minus lunch) is thus nearly identical: 345 minutes in Finland compared to 354 minutes in the United States. But U.S. students are in class 66 minutes longer and on break 57 minutes less.

Integrating such break time would necessitate nullifying the heavy regimen of high-stakes standardized testing in U.S. schools, as such testing has pressured school administrators to pack as much academic time into the day as the calendar allows. Recess is only one casualty. Time for art, drama, and music is another.[57] As with the structure of the school day, so with standardized testing, the Finns exhibit admirable common sense. The Finns administer standardized tests to only 10 percent of one age cohort per year.[58]

The Finnish scholar Pasi Sahlberg likens his country's method of educational assessment to medical protocol. "When your doctor needs to check your blood,"

Sahlberg said at a recent symposium on Finnish education, "he or she takes three or four vials, not five liters. We feel the same way in Finnish schools about standardized testing. Careful sampling gets us all the information we need to know how schools are doing without any stress."[59]

Finnish practice comports, as well, with the managerial theory of the legendary W. Edwards Deming, who urged manufacturers to achieve quality control through careful analysis of small samples rather than mass inspection.[60] Deming moreover repudiated performance-based pay on the grounds that it both divided employees and shifted the focus of firms from long- to short-terms goals.[61]

To Robert O'Brien, the principal since 1997 of P.S. 75—the Emily Dickinson School, serving students in kindergarten through grade 5—on Manhattan's Upper West Side and an educator since 1978 in the New York City system, it is the growing emphasis on standardized testing that challenges his teachers, not so much their teaching load. Teachers at P.S. 75 spend, on average, 4 hours and 30 minutes per day in leading classes, or 780 hours per year once proctoring of standardized exams and half-days for professional development or parent meetings are deducted. [62]

After conferring with his assistant principal about the 2015 administration of the National Assessment of Educational Progress (NAEP) to his school's fourth-graders, O'Brien said during an interview in his office, "This is all we need to know how we're doing: a careful study of a sample of our students."[63]

NAEP has been precisely that since its introduction in 1969 with tests in reading, writing, math, and science administered to a sample of students in grades 4, 8, and 12 in public schools across the country. Since 2007, NAEP has been administered every two years. The sample size is, on average, 2,500 students in each grade in each state.[64] For O'Brien, this is the first time NAEP will be administered at P.S. 75.[65]

In allocating minimal time to preparation for standardized tests in the name of more time for art and music, O'Brien said that he has been doing his best to buck the trend but that his teachers nevertheless feel the strain of mandated assessments.[66] O'Brien cited, in particular, the introduction in 2013 of Measures of Student Learning (MOSL), whereby teacher evaluations are based in part on student performance on standardized tests.[67]

* * *

Getting the differences in teaching time right is critical to understanding the challenges teachers face, to assessing curricula, and to conducting sound comparative analysis of staffing practices.

The question regarding teaching time in the next SASS should not only be refined significantly but also counterbalanced by surveys of officials in corresponding school districts. A question alone is not enough, unless the question can be confined to something as specific as the number of standard-length lessons per week, as is the case in Japan, as previously noted. It may, in sum, be best for the NCES to drop the question about teaching time from SASS. It may likewise be best for the OECD to limit all nations to statistical databases or administrative registers as sources for data on teaching time.

The OECD was very specific, after all, in its question regarding teaching time in a survey it conducted directly of teachers in 2013. This survey, called the Teacher and Learning International Study (TALIS), was filled out by a sample of 4,000 teachers in each country, with 20 teachers drawn from an array of 200 schools.[68] The question came with the following qualification (in italics): "*Please only count actual teaching time*."[69]

Despite this qualification, the data from several countries came in way above what education ministries had reported from administrative registers and statistical databases to the OECD for *EAG*. In particular, the hours reported by Finnish lower-secondary teachers, 20.6 hours per week, or 770 hours per year, came in 17 percent above the adjusted sum, 657, confirmed by officials of the Finnish teachers union, Opetusalan Ammattijärjestö (OAJ).[70]

As the classroom lesson in Finland officially runs 60 minutes but is limited to 45 minutes of instruction, it is understandable how some respondents may have overestimated their teaching load by as much as 33 percent. The hours reported by Polish lower-secondary teachers, 18.6 hours per week, or 677 hours per year, likewise came in 21 percent above the number of hours reported in *EAG*, 561. Estonia, Japan, Portugal, and the Slovak Republic exhibited similar inconsistencies. The hours reported by U.S. lower-secondary teachers for TALIS, however, came in 11 percent below the hours reported by *EAG*—965 instead of 1,085—yet still far above the estimate in this study of 749 (or 769 without time subtracted for administration of exams).[71]

The italicized qualification in the TALIS questionnaire about teaching time appears to have generated more accurate responses from U.S. respondents than the SASS questionnaire. But more quality control than such a qualification is clearly needed.

[1] See Sharon L. Nichols and David C. Berliner, *Collateral Damage: How High-Stakes Testing Corrupts America's Schools* (Cambridge: Harvard Education Press, 2007), pp. 149-168; Linda Perlstein, *Tested: One American School Struggles to Make the Grade* (New York: Holt, 2007), pp. 120-123, 189-199; and Rafe Esquith, *Real Talk for Real Teachers* (New York: Viking, 2013), pp. 106-114.

[2] Information about teaching time was first printed in *Education at a Glance* (*EAG*) in its fourth edition, published in 1998. The next edition of *EAG* was published in 2000 and has since come out annually. All editions from the fourth onward may be accessed via the OECD iLibrary at http://www.oecd-ilibrary.org/education/education-at-a-glance_19991487.

[3] See Robert A. Compton, producer, Sean T. Faust, director, and Tony Wagner, narrator, *The Finland Phenomenon: Inside the World's Most Surprising School System* (Memphis, Tennessee: True South Studios, 2011); Jennifer Craw, "Statistic of the Month: Teachers' Salaries, Class Size and Teaching Time," National Center on Education and the Economy, October 27, 2014, accessed at http://www.ncee.org/2014/10/statistic-of-the-month-teachers-salaries-class-size-and-teaching-time/; Linda Darling-Hammond, *The Flat World and Education: How America's Commitment to Equity Will Determine Our Future* (New York: Teachers College Press, 2010), p. 202; Andy Hargreaves and Dennis Shirley, *The Global Fourth Way: The Quest for Educational Excellence* (Thousand Oaks, California: Corwin, 2012), p. 55; Rebecca Klein, "American Teachers Spend More Time in the Classroom than World Peers, Says Report," *Huffington Post*, September 9, 2014, accessed at http://www.huffingtonpost.com/2014/09/09/oecd-teacher-salary-report_n_5791166.html; Nicholas Kristof, "The American Dream Is Leaving America," *New York Times*, October 25, 2014; Jal Mehta, "Teachers: Will We Ever Learn?" *New York Times*, April 12, 2013; Catherine Rampell, "Economix: Teacher Pay Around the World," *New York Times*, September 9, 2009, accessed at http://economix.blogs.nytimes.com/2009/09/09/teacher-pay-around-the-world/; Pasi Sahlberg, *Finnish Lessons: What Can the World Learn from Educational Change in Finland?* (New York: Teachers College Press, 2011), pp. 63-64, and *Finnish Lessons 2.0: What Can the World Learn from Educational Change in Finland?* (New York: Teachers College Press, 2015), pp. 89-91 and 124-125; Stephen Sawchuk, "Teacher Quality, Status Entwined Among Top-Performing Nations," *Education Week*, January 12, 2012, p. 16; Robert Schwartz and Jal Mehta, "Finland: Superb Teachers—How to Get Them, How to Use Them," in Marc S. Tucker, ed., *Surpassing Shanghai: An Agenda for American Education Built on the World's Leading Systems* (Cambridge: Harvard Education Press, 2011), p. 65; Elena Silva, "Teachers at Work: Improving Teacher Quality Through School Design," Education Sector Reports, October 2009, p. 3, accessed at http://www.educationsector.org/usr_doc/Teachers _at_Work.pdf; and Valerie Strauss, "Answer Sheet: Where U.S. Stands in Education Internationally," *Washington Post,* June 25, 2013, accessed at http://www.washingtonpost.com/blogs/answer-sheet/wp/2013/06/25/where-u-s-stands-in-education-internationally-new-report/.

[4] The OECD first published *EAG* in 1992 but did not include data about teaching hours. Subsequent editions were published in 1993 and 1997 but neither included such data. With the exception of 1999, *EAG* has been published every year since 1998, and every edition has comprised data on teaching time.

[5] From 1999 to 2008, the author was a teacher at a public high school in New York. From 2001 to 2008, the author served as the school scheduler as well as a teacher.

[6] When questioned by email in January 2012 about U.S. teaching data, an OECD official replied that all concerns are relayed to national representatives. The OECD official explained that the responses of national representatives are final, as the OECD does not have the staff to do independent investigations.

[7] The NCES provides all of these surveys online at http://nces.ed.gov/surveys/sass/question 1112.asp.

[8] OECD, *Education at a Glance 2014: OECD Indicators* (Paris: OECD Publishing, 2014), Table D4.1, p. 484.
[9] *Ibid*., p. 477.
[10] *EAG 2014*, Annex 3: Sources, Methods and Technical Notes, pp. 62-67, accessed at http://www.oecd.org/edu/eag-annex3-chapterD2-D5.pdf.
[11] Information regarding SASS may be found on the Web site of the National Center for Education Statistics: http://nces.ed.gov/surveys/sass/overview.asp. According to this Web site, SASS was conducted in 1987-1988, 1990-1991, 1993-1994, 1999-2000, 2003-2004, 2007-2008, 2011-2012.
[12] Thomas D. Snyder, telephone interview, December 9, 2014.
[13] *Ibid*., December 17, 2014.
[14] Data in this table come from 16 editions of *EAG*. All editions may be accessed at http://www.oecd-ilibrary.org/education/education-at-a-glance_19991487.
[15] Specific details about the 2007-08 SASS may be found at http://nces.ed.gov/surveys/sass/methods0708.asp.
[16] U.S. Department of Education, National Center for Education Statistics, Public School Teacher Questionnaire: Schools and Staffing Survey, 2007-08 School Year, p. 30, question 50, accessed at http://nces.ed.gov/surveys/sass/pdf/0708/sass4a.pdf.
[17] Data in this table come from 16 volumes of *EAG*. All volumes may be accessed at http://www.oecd-ilibrary.org/education/education-at-a-glance_19991487.
[18] *Ibid*., Public School Teacher Questionnaire: Schools and Staffing Survey, 1993-94, p. 21, question 38b, accessed at http://nces.ed.gov/surveys/sass/pdf/9394/sass4a.pdf; Public School Teacher Questionnaire: Schools and Staffing Survey, 1999-2000, p. 28, question 36, accessed at http://nces.ed.gov/surveys/sass/pdf/9900/sass4a.pdf; Public School Teacher Questionnaire: Schools and Staffing Survey, 2003-04, p. 33, question 59, accessed at http://nces.ed.gov/surveys/sass/pdf/0304/sass4a.pdf; and Public School Teacher Questionnaire: Schools and Staffing Survey, 2011-12, p. 33, question 54, accessed at http://nces.ed.gov/surveys /sass/ pdf/ 1112/ SASS4A.pdf.
[19] U.S. Department of Education, National Center for Education Statistics, Schools and Staffing Survey (SASS), "Public School Data File," 2007-08, and "Public School Teacher, BIE School Teacher, and Private School Teacher Data Files," 2007-08, accessed at http://nces.ed.gov/surveys/sass/tables/sass0708_035_s1s.asp; and http://nces.ed.gov/pubs2009/2009324/tables/sass0708_2009324_t12n_06.asp.
[20] NCES, *Digest of Education Statistics: 2012*, Table 98, accessed at http://nces.ed.gov/programs/digest/d12/tables/dt12_098.asp?referrer=report.
[21] The numbers for these charter networks come from the Web sites of each organization.
[22] Snyder, December 17, 2014.
[23] *Op. cit*.
[24] *Ibid*., December 9, 2014.
[25] OECD-INES Network for the Collection and Adjudication of System-level Descriptive Information on Educational Structures, Policies and Practices (NESLI), Teachers and the Curriculum: Definitions, Explanations, and Instructions, October 15, 2010, obtained by the author from the OECD, January 2012. While these instructions imply that pass time between classes (when students, for example, transition from an English class to a chemistry class) should be counted as "net contact time for instruction" so long as the break is under ten minutes, the wording in *EAG* itself contradicts this interpretation in its definition of teaching time. In the 2011 volume of *EAG*, based on the cited 2010 instructions, teaching time is described as "the number of hours per year that a full-time teacher teaches a group or class of students as set policy. It is normally calculated as the number of teaching days per year multiplied by the number of hours a teacher teaches per day (excluding periods of time formally allowed for breaks between lessons or groups

of lessons)." In this regard, the OECD could have been clearer in its instructions lest national representatives include such pass time "between lessons or groups of lessons," which at five minutes, for example, between periods for a teacher with five teaching periods a day could amount to an additional 20 interstitial minutes a day or 60 hours for a 180-day school year.

[26] Data for distribution of responses to the SASS questionnaire are available only for the 2011-12 survey, accessed at http://nces.ed.gov/surveys/sass/overview.asp.

[27] According to *EAG 2014*, the student-to-teacher ratios in Mexican primary and lower-secondary schools are 28:1 and 32:1, respectively, while average class sizes in Mexican primary and lower-secondary schools are 20 and 27, respectively. See Tables D1.1, p. 436, and D4.1, p. 484.

[28] *EAG 2014*, Table D1.1, p. 436, Table D4.1, p. 484.

[29] While there are 34 nations in the OECD, there are 36 entities reporting data, as England, Scotland, Flemish Belgium, and French Belgium all report separately.

[30] *Op. cit.*

[31] *Ibid.*, Tables D2.1, p. 450, and D2.2, p. 451.

[32] *Ibid.*, p. 449.

[33] *EAG 2014*, Tables D1.1, p. 436, and D4.1, p. 484.

[34] Enrollment and staffing data come from the Web site of the Massachusetts Department of Education, accessed at http://profiles.doe.mass.edu/profiles/student.aspx?orgcode= 01370505 &orgtypecode=6&. The teacher assignments and daily schedules come from the Web site of Holyoke High, accessed at http://www.hps.holyoke.ma.us/hhs/. All details were confirmed in a phone interview on December 2, 2014, with the school's principal, Stephen Sullivan.

[35] Sullivan, December 2, 2014.

[36] *Ibid.*

[37] While a standard teaching load of five 49-minute classes a day over 180 days means 735 hours of contact time for the year, this sum drops to 681 hours once time for exams and early-release days is subtracted. Eight days for midterms and finals means a reduction of 32.7 hours. In addition, while the state exams are given to only students in tenth grade, no classes are held at that time. With these state exams consuming three periods for each of seven days, 21 periods, equivalent to 3 days of instruction at a school with a seven-period day, are lost. This means the reduction of another 12.3 hours in contact time. On early-release days, periods are compressed to 35 minutes (the first period of the day is compressed to 28 while the remaining six are compressed to 36), which means teachers teach 174 minutes per day rather than 245. This means a reduction of another 9.5 hours in contact time. In sum, 54.4 hours must be subtracted from 735 hours to arrive at what the OECD defines as contact time.

[38] Massachusetts Department of Elementary and Secondary Education, 2014-2015 Statewide Testing Schedule, accessed at http://www.doe.mass.edu/mcas/cal.html.

[39] Jacqueline M. Glasheen, principal, Dr. Marcella R. Kelly School, phone interview, December 4, 2014. Glasheen explained that recess has been cut back significantly since she started as a teacher in the Holyoke system in 1992. This change in Holyoke reflects national developments. See Center on Education Policy, "Choices, Changes, and Challenges: Curriculum and Instruction in the NCLB Era," 2007, pp. 5 and 10.

[40] Elementary and middle schools in Holyoke are run as single entities, with one principal each. The schedules are uniform for six of seven of the district's elementary/middle schools. Details provided by Glasheen, phone interview, December 4, 2014.

[41] Confirmed in consultation by phone with James Desautels, assistant principal, Sullivan School, Holyoke, January 7, 2015.

[42] For computational purposes, the primary level does not include kindergarten, in conformity with classifications in *EAG*. See *EAG 2014*, p. 22. For teachers of grades one through five, the instructional day runs from 9:05 to 3:05; contact time amounts to 280 minutes per day. For

teachers of grades six through eight, the instructional day runs from 8:15 to 2:52; contact time amounts to 295 minutes per day. This is uniform for six of seven elementary/middle schools in Holyoke. Sullivan is the exception, according to Desautels, assistant principal of Sullivan, where the teaching load is marginally greater because of the difficulty of scheduling classes in art and music. There are seven early-release days for professional development, with school ending 90 minutes early for grades one through five and 82 minutes early for grades six through eight. There are four half-days for parent-teacher conferences and one half-day at the end of the year. There are four MCAS days for teachers of grades three and six (meaning a 0.67 teaching load x 4); five MCAS days for teachers of grades four and seven (meaning a 0.67 teaching load x 5); and six MCAS days for teachers of grades five and eight (meaning a 0.67 teaching load x 6). For teachers of grades one and two, the math is as follows: (177.5 x 280) - (7 x 90) = 818 hours. For teachers of grade three, the math involves subtraction of time for MCAS exams: 818 hours - 4(0.67 x 280)/60 = 805. For subsequent grades, the formulas work in a similar manner. The impact of early-release days on teaching time for teachers of grades six through eight is marginal in this district, as the conventional school day ends with 70 minutes of teacher preparation, except for teachers of art, music, and physical education. Teachers of grades six through eight teach merely 10 fewer minutes on early-release days.

[43] Compton, Faust, and Wagner, 2011; Hargreaves and Shirley, 2012; Sahlberg, 2011 and 2015; and Schwartz and Mehta, 2011.

[44] Olli Luukkainen, OAJ president, and Mika Vaisanen, staff economist, interview, January 28, 2014. Vaisanen explained that primary teachers, on average, teach 1.5 lessons per week above the contractual minimum; lower-secondary teachers, 2.4; and upper-secondary teachers, 3.5.

[45] In addition to leading classes, Finnish teachers, like U.S. teachers, also have non-pedagogical responsibilities. At the primary level, teachers typically eat lunch with their students and cover one recess period per day. At the lower-secondary level, teachers typically cover one recess period per day. At all levels, teachers partake in three six-hour days of professional development; and teachers are expected to spend from four to eight hours per month after school on collaborative planning as well as 30 to 45 minutes per day on a Web interface called WILMA addressing concerns from parents and updating student records. These estimates are based on visits from 2009 to 2014 to 15 schools spread across the following six cities: Espoo, Helsinki, Jyävskylä, Lohja, Raisio, and Turku.

[46] This practice was observed by the author in the above-mentioned schools and confirmed as official practice by Luukkainen, January 28, 2014. The practice is grounded in Section 23 of the Basic Education Act, made law October 12, 1984, which stipulates that classes should run 45 minutes, with at least 10 minutes as a break between classes. Details about this provision in Finnish school law may be accessed at http://www.finlex.fi/fi/laki/alkup/1984/19840718.

[47] The computation of teaching hours involved five steps: examination of teacher contracts; consultation by phone with district superintendents, school administrators, and/or union officials; subtraction of teaching time for half-days for parent-teacher conferences and early-release days for professional development; subtraction of teaching time for administration of standardized exams and, for grades nine through twelve, midyear and final exams; and subtraction of teaching time on account of high school seniors finishing the academic year early (the mean for this sample was 13 days). Contracts were accessed at http://educatorcontracts.doemass.org/. All demographic data for school districts were accessed at http://profiles.doe.mass.edu/. In the case of Boston, hours for proctoring midyear and final exams for grades nine through 12 are an estimate based on interviews by phone with school administrators and union officials. While supervisors in the district office maintained during a phone interview on January 9, 2015, that many high schools administer midyear and final exams, they stipulated that there is no district-wide policy, as there is in all nine of the other districts in this sample.

[48] U.S. Department of Education, National Center for Education Statistics, Schools and Staffing Survey (SASS), "Public School Teacher Data File," 2011–12, accessed at http://nces.ed.gov/surveys/sass/tables/sass1112_2013314_t1s_005.asp.
[49] This mean is determined by multiplying the primary average by six, the lower-secondary average by three, and the upper-secondary average by three; adding the products and dividing by 12. For computational purposes, the primary level does not include kindergarten, in conformity with classifications in *EAG*. See *EAG 2014*, p. 22. This was confirmed by Snyder, December 17, 2014. According to *EAG*, lower-secondary education applies to grades seven through nine. This presents a computational problem in the United States, as lower-secondary education often comprises grades six through eight. In this study, grades seven through nine were used for all calculations.
[50] Sinikka Herajärvi, teacher of Finnish language and literature, Helsingin Suomalainen Yhteiskoulu, confirmed by e-mail the annual exam schedule at the upper-secondary level, January 11, 2015. The deduction of 36 hours is an estimate based on average teaching time for upper-secondary teachers, confirmed by Luukkainen and Vaisanen, January 28, 2014, minus time for proctoring exams five times a year. The number reported to the OECD, 547, for the contractual minimum number of lessons appears to include time for proctoring exams. The range of contractual minimum lessons for teachers at the upper-secondary level runs from 16 45-minute lessons per week for teachers of Finnish language and literature to 23 45-minute lessons per week for teachers of physical education and several electives. See Section B of Annex 2 of the Finnish teachers' collective agreement, accessed at http://www.kuntatyonantajat.fi/fi/ajankohtaista/yleiskirjeet/2011/Sivut/27-11-ovtes-2012-2013.aspx. With an average total of 547 hours per year of teaching time as a contractual minimum for a 177-day academic calendar, the weekly average comes to 20.6 lessons per week. On top of that, teachers, on average, teach an additional 3.5 lessons per week for extra pay, as confirmed by Luukkainen and Vaisanen. This means teachers, on average, teach 24.1 lessons per week (or 4.8 per day) and, in turn, proctor 36 hours of exams per year: $5(4.8 \times 90)/60 = 36$.
[51] On its Web site, the U.S. Department of Energy depicts the decline in fuel efficiency for automobiles above 50 miles per hour: http://www.fueleconomy.gov/feg/driveHabits.jsp.
[52] Public School Teacher Questionnaire: Schools and Staffing Survey, 2011-12, pp. 40-42, questions 69-75, accessed at http://nces.ed.gov/surveys /sass/ pdf/ 1112/ SASS4A.pdf.
[53] OECD, *EAG 2014*, Table D3.2, p. 469.
[54] Charles H. Hillman *et al*., "Effects of the FITKids Randomized Controlled Trial on Executive Control and Brain Function," *Pediatrics*, Vol. 134, No. 4, October 2014, pp. e1063-e1071; and Matthew B. Pontiflex, "Exercise Improves Behavioral, Neurocognitive, and Scholastic Performance in Children with Attention-Deficit/Hyperactivity Disorder," *The Journal of Pediatrics*, Vol. 162, No. 3, March 2013, pp. 543-551.
[55] Finnish National Board of Education, *National Core Curriculum for Basic Education 2004* (Helsinki: National Board of Education, 2004), p. 302; confirmed as current by Kari Louhivuori, principal, Kirkkojarvi Comprehensive School, Espoo, Finland, by e-mail correspondence, January 12, 2015.
[56] The cited schedule is used at John F. Kennedy Middle School in Northampton, Massachusetts, and may be accessed at http://www.northampton-k12.us/our-schools/jfk-middle-school. The bell schedule is printed on page 6 of the student handbook; pass time between classes is listed as three minutes.
[57] Since the enactment of No Child Left Behind (NCLB) in 2002, school administrators have significantly cut recess as well as art, drama, and music from the curriculum. See Center on Education Policy, "Choices, Changes, and Challenges: Curriculum and Instruction in the NCLB Era," 2007, pp. 5 and 10; and Basmat Parsad and Maura Spiegelman, *Arts Education in Public*

Elementary and Secondary Schools: 1999–2000 and 2009–10, National Center for Education Statistics, Institute of Education Sciences, U.S. Department of Education, Washington, DC., 2012.
[58] Heikki Lyytinen, secretary general, Finnish Education Evaluation Council, interview, Jyävskylä, April 28, 2009.
[59] Sahlberg, symposium on Finnish education, hosted by Bill Doyle and Maarit Glocer, New York, November 13, 2014.
[60] W. Edwards Deming, *Out of the Crisis* (Cambridge, Massachusetts: MIT, 1982), p. 207.
[61] *Ibid*., pp. 102-103 and 105.
[62] Robert O'Brien, principal, P.S. 75, New York, December 17, 2014.
[63] *Ibid*.
[64] Information about NAEP may be accessed on the Web site of NCES: http://nces.ed.gov/nationsreportcard/about/.
[65] *Op. cit*.
[66] O'Brien said that teachers spend two or three periods per week from January through March preparing students for state tests in reading and math. For those parents who want more than that for their children, O'Brien in 2010 added a three-hour program held on nine Saturday mornings from January through March. To give students a break between sessions in reading and math, O'Brien scheduled 30 minutes of physical education. O'Brien said approximately 20 percent of the 300 students in grades three through five participate in the Saturday program. Teachers are paid extra to lead these classes.
[67] *Ibid*. For details about MOSL, see this memo from the New York City Department of Education: http://schools.nyc.gov/NR/rdonlyres/0E7EE6DE-41CA-4BFE-B508-F1E58DCBCEA0/0/SummaryofAgreementsforTeacherEvaluationandDevelopment.pdf.
[68] OECD, *TALIS 2013 Results: An International Perspective on Teaching and Learning* (Paris: OECD, 2014), p. 27, accessed at http://www.oecd-ilibrary.org/education/talis-2013-results/teachers-working-hours_9789264196261-table214-en.
[69] OECD, Teaching and Learning International Survey (TALIS) 2013, Teacher Questionnaire: Main Study Version, Question 17, p. 8, accessed at http://www.oecd.org/edu/school/Questionnaires%20TALIS%202013.pdf.
[70] Luukkainen and Vaisanen, January 28, 2014.
[71] OECD, *TALIS 2013* (2014), Table 6.12, p. 387.