About the WP (Working Paper) series on the Math Stagnation Nations (& what MMU1 can do about this quickly)
By Dongchan Lee

This paper is a part of the WP (Working Paper) series by Dongchan Lee about the math stagnations in the OECD, all the developed English-speaking or the majority of the Latin American countries.

In the WP series on the math stagnation nation series, for the USA, we observed and analyzed the following in part 1-5 in the USA series:

1) the math stagnations of the OECD countries, including the USA internationally (from the PISA 2000-2015, TIMSS 1995-2015);
2) the math stagnations of the 50 USA states;
3) the math stagnations of at least 85-90% of the big cities (or school districts) that have participated in the TUDA program of NAEP;
4) the math stagnations vs. the Common Core math for the NAEP math dips in 2015.
   Regardless of the Common Core math, the math stagnations are here to stay.
5) They key summaries of this series and beyond.

NOTE: throughout the math stagnation nations series, we use the yellow arrows for the MMU1 impacts to easy visual comparisons to the traditional quasi-flat growth over 10-20 years.

Lee’s online repository to get updates about the WP series on “Math Stagnation Nations”
http://uslgoglobal.com/wp-math-stagnation/
WP series: Mathematics Stagnation Nation series: for the USA (Part 4)
Math Education stagnations in the USA played more roles than the Common Core math standards impacts for the stagnations on the NAEP 2015, but the math dipping (especially the grade 8) were most likely were due to the Common Core math

By Dongchan Lee (Date: February 8, 2017, Version 1.2)

Abstract

This paper is an extension of the previous paper by the author on the theme of the math stagnations in almost all developed (OECD) nations internationally, for all developed English-speaking and most of the Latin American countries. The author has covered this theme for the USA math stagnations in the international math assessments, national NAEP’s national math growth stagnations, most of the states’ math stagnations, and at least 90-95% of the large districts’ (or cities’) math stagnations over the past 5-10-15-20 years. In this paper, the author observes and demonstrates the following: 1) the longer the states had stayed with the Common Core math standards, the math grade 4 average and 25 percentile had declined more than the USA states that had never participated in the Common Core math or those that had opted out by the end of 2014 or so before the NAEP 2015 math dipping happened for both the grade 4 and 8; 2) The similar pattern was also observed for the grade 4, however, with much less effect; 3) Although the negative impacts of the Common Core math on the NAEP 2015 was not negligible for the grade, the dips for the grade 8 was more likely caused by the Common Core more so than for the grade 4th math. Regardless, the math stagnations are persistent with or without the Common Core math’s overall negative effects for math for both grades will be as such. There were math dips in the grade 8 math for the states that had been out of the Common Core math, which means that the math stagnations in the USA may enter a worse phase in 2017 on even if the negative effect of the Common Core math is overcome.

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Key words: Math stagnations, math crisis, USL, MMU1, math education innovation, Education reforms, math crisis in the United States, Common Core Math

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Critical Note: Throughout in this observational report with timelines from the NAEP math scores, all
the data were gathered from NAEP’s The National Report Card data. As such, all the data 1990-1996
had “Accommodations Not Permitted” while the data from 2000 on, I used the data with the
Accommodations Permitted.

Introduction

The 2015 years were a tricky or catastrophic year for the math stagnations or collapses to most of
the developed countries, be it English-speaking countries or the top tier math countries from the
Eastern Asian countries. For the USA, the PISA 2015 math declined further and the TIMSS 2015 math
grade 4 declined. For the NAEP 2015 math, it dropped for both of the grades 4 and 8 for the first
time since more than 20 years. There have been various wild controversies to find out what had
causes this and many have speculated that the Common Core Math standards had caused this.
Although the Common Core math started around 2011, many states started joining around 2012 or
2013 and more than 10 pulled out of it by 2013 and 2014. This paper focused on which may have
cau sed the math average declines more: simply that natural math stagnations that seemed to have
happened all across most of the developed countries or in the case of the USA, was it the Common Core math?

Part 1. The USA states that pulled out of the Common Core math before the NAEP math 2015

Section 1. The USA states that had opted out of the Common Core math standards by the end of 2014 so that they had less or minimal impacts on their performance of math in NAEP 2015.

<table>
<thead>
<tr>
<th>No</th>
<th>States</th>
<th>Adoption stance</th>
<th>Notes (from <a href="https://en.wikipedia.org/wiki/Common_Core_State_Standards_Initiative">https://en.wikipedia.org/wiki/Common_Core_State_Standards_Initiative</a>)</th>
<th>Author’s notes for the CCSS math relevance for NAEP math 2015</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Alaska</td>
<td>Non-member</td>
<td>Stopped in favor of &quot;New York State Standards&quot;, which are based on Common Core standards.[36]</td>
<td>basically out of CCSS math in 2013-2014</td>
</tr>
<tr>
<td>2</td>
<td>Florida</td>
<td>Non-member</td>
<td>Stopped in favor of &quot;New York State Standards&quot;, which are based on Common Core standards.[36]</td>
<td>basically out of CCSS math in 2013-2014</td>
</tr>
<tr>
<td>3</td>
<td>Nebraska</td>
<td>Non-member</td>
<td>[31]</td>
<td>June, 2014</td>
</tr>
<tr>
<td>4</td>
<td>Texas</td>
<td>Non-member</td>
<td>[32]</td>
<td>June, 2014</td>
</tr>
<tr>
<td>5</td>
<td>Virginia</td>
<td>Non-member</td>
<td>[33]</td>
<td>June, 2014</td>
</tr>
<tr>
<td>6</td>
<td>Minnesota</td>
<td>Partially adopted</td>
<td>English standards only, math standards rejected.</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Indiana</td>
<td>Repealed</td>
<td>Implementation passed by law for one year in May 2013 and under public review; formally withdrawn in March 2014, but retained many of the standards.[34]</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Oklahoma</td>
<td>Repealed</td>
<td>Legislation restoring state standards signed June 7, 2014.[35]</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Alabama</td>
<td>Repealed</td>
<td>Repealed legislation passed by law for one year in May 2013 and under public review; formally withdrawn in March 2014, but retained many of the standards.[34]</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Louisiana</td>
<td>Repealed</td>
<td>Repealed legislation passed by law for one year in May 2013 and under public review; formally withdrawn in March 2014, but retained many of the standards.[34]</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Massachusetts</td>
<td>Repealed</td>
<td>Repealed legislation passed by law for one year in May 2013 and under public review; formally withdrawn in March 2014, but retained many of the standards.[34]</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>New York</td>
<td>Repealed</td>
<td>Repealed legislation passed by law for one year in May 2013 and under public review; formally withdrawn in March 2014, but retained many of the standards.[34]</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>Pennsylvania</td>
<td>Repealed</td>
<td>Repealed legislation passed by law for one year in May 2013 and under public review; formally withdrawn in March 2014, but retained many of the standards.[34]</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>Mississippi</td>
<td>Repealed</td>
<td>Repealed legislation passed by law for one year in May 2013 and under public review; formally withdrawn in March 2014, but retained many of the standards.[34]</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>South Carolina</td>
<td>Repealed</td>
<td>Repealed legislation passed by law for one year in May 2013 and under public review; formally withdrawn in March 2014, but retained many of the standards.[34]</td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>Arizona</td>
<td>Repealed</td>
<td>Repealed legislation passed by law for one year in May 2013 and under public review; formally withdrawn in March 2014, but retained many of the standards.[34]</td>
<td></td>
</tr>
</tbody>
</table>

Source: based on the Wikipedia article on CCSS (the author adjusted the states to simplify the appearances here.) https://en.wikipedia.org/wiki/Common_Core_State_Standards_Initiative, Lee found out about these 13 states that effectively hadn’t really participated on CCSS for math at least by the end of 2014 as the NAEP math took place.

Thus, out of the 51 jurisdictions of the USA (50 states and DC), 13 were not really involved with CCSS math assessments till the end of 2014. So these 13 states’ math stagnations or declines in NAEP 2015 math should have nothing to do with the Common Core impacting the math scores.

For PARCC

PARCC test participations by states. Source: taken from Wikipedia article.
According to the PARCC article from the Wikipedia, there seem to be 10 states (in grey color) that had been out of the Common Core math by 2013-2014.

So, the 10 states that dropped out of PARCC effectively 1-2 years before 2015 NAEP math declines:

Section 2. Merged list of the 6-13-18 USA states that had spent much less time on the Common Core math standards before the NAEP 2015 math took place

When I combined these 2 tables from Wikipedia data about CCSS, I got this merged table.
In summary, according to this merged table, there were 6 states that had never been with the Common Core Math, other 7 states that had been out of it by 2013-2014, and another 5 states that dropped out according to the list from the PARCC (Wikipedia).

Part 2. Math stagnations of the grade 4

Section 3. NAEP math scores of the grade 4 for the states that had opted out of the Common Core math standards before the NAEP 2015 math took place.

Math average growth timelines of the NAEP math grade 4 over the years for the 18 states that had opted out of CCSS math before 2015 for the past 10 years (2005-2015)

Math average growth timelines of the NAEP math grade 4 over the years for the 13 states that had opted out of CCSS math before 2015 for the past 10 years (2005-2015)
Math average growth timelines of the NAEP math grade 4 over the years for the 6 states that had never been the Common Core math member states: for the past 10 years (2005-2015)

25 percentile of math growth trajectories

Math 25 percentile (math poverty share) growth timelines of the NAEP math grade 4 over the years for the 13 or 18 states that had opted out of CCSS math before 2015, for the past 10 years (2005-2015)
Math 25 percentile (math poverty share) growth timelines of the NAEP math grade 4 over the years for the 6 states that had never been the Common Core math before 2015 for the past 10 years (2005-2015)

Section 4. For the USA states that had not opted out of the Common Core math grade 4 by the end of 2014
Math average growth timelines of the NAEP math grade 4 over the years for these states that had not opted out of CCSS math before 2015: for 10 years (2005-2015)
Section 5. An undeniable pattern: the more and longer the states stayed with the Common Core math standards, their average math score declined more for the grade 4 math in NAEP 2015.

As we can see below in the table, the difference between the states that had opted out by the end of 2014 or never embraced the Common Core Math before the NAEP 2015 math is about 0.5-2 points in NAEP math grade 4, which are roughly 1.6-6.5% of a Standard Deviation differences. 3-7% of Standard Deviation is not a negligible effects although we can dismiss a few 5 of a standard deviations. So for the grade 4 math, the Common Core Math apparently impacted the math education negatively.
Section 6. Regardless of the impacts of the Common Core math on NAEP 2015 math’s dipping, the undeniable fact is that the math stagnations nationwide in the USA over the past a decade or so already.

For the states that had opted out of the Common Core Math by the end of 2014, sufficiently before the NAEP 2015 math was administered, the black or red dotted lines are their average scores and they have reached their math saturations, but not the declines.

For the 6 states that had never joined the Common Core math standards:

For the 13-18 states that had never joined or had joined the Common Core math standards but had opted out earlier before the NAEP math 2015:
The states that had stayed with the Common Core math till at least nearly before the NAEP 2015:

For the states that had stayed with the Common Core math at least by the end of 2014 mostly declined in math average in NAEP math 2015 for the grade 4.

Their 25 percentile growth trajectories:
Conclusion for the math grade 4:
Regardless of the durations that the states stayed with the Common Core math, the inevitable math growth stagnations kicked in by around 2005-2007 for most of these USA states for the grade 4. The only real difference is that the states that had stayed with the Common Core math till around the time of the NAEP math 2015 had a dip stronger.

Part 3. Math stagnations of the grade 8

The USA states that had pulled out of the Common Core Math by the end of 2014 or earlier

USA states that had stayed with the Common Core Math by the end of 2014 or later
For the math grade 8, the math average decline slope is a bit steeper than otherwise.

The overall comparisons of the states out of the Common Core Math vs. those stayed with it till at least early 2015 NAEP time for the math grade 8.

<table>
<thead>
<tr>
<th></th>
<th>2013.00</th>
<th>2015.00</th>
<th>the dip 2015-2013</th>
<th>math grade 8</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average of the 6 states that had been never been members of Common Core math</td>
<td>283.19</td>
<td>281.30</td>
<td>-1.88</td>
<td></td>
</tr>
<tr>
<td>Average of the states 13 opted out of the CCSS math by 2014</td>
<td>283.35</td>
<td>281.39</td>
<td>-2.00</td>
<td></td>
</tr>
<tr>
<td>Average of the states 18 opted out of the CCSS math by 2014</td>
<td>283.13</td>
<td>281.13</td>
<td>-2.00</td>
<td></td>
</tr>
<tr>
<td>Average of the jurisdictions that had stayed with the Common Core math before 2014</td>
<td>284.31</td>
<td>282.02</td>
<td>-2.29</td>
<td></td>
</tr>
<tr>
<td>Average of the jurisdictions that had stayed with the Common Core math before 2015 (except DC and DoDEA)</td>
<td>284.72</td>
<td>282.35</td>
<td>-2.37</td>
<td></td>
</tr>
</tbody>
</table>
The states that had stayed with the Common Core math did about 1.5-2 NAEP point’s worse or about 3-4% to 6-7% of 1 Standard Deviation worse for the math grade 4.

For the math grade 8, the difference is almost negligible by about ±0.3-0.4 NAEP math points or about 1% of 1 Standard Deviation.

Conclusion
The interesting patterns we saw here for the grade 4 math scores are the following:

1) For the grade 4, it seems that the Common Core Math have caused the math score decline in NAEP math for the first time since at least 20 years because the decline was none or negligible for the 6-13-18 states that had not in it or pulled out of it.

2) For the grade 8, the differences are much smaller than for the grade 8. Those that had stayed with the Common Core till at least around early 2015, however, did slightly worse than the states than those that had been out of it by then.

3) Regardless, the math stagnations had taken place in either cases as we can clearly see from the math stagnations starting around 2005-2007 for the grade 4; and for the grade 8, the math stagnations were starting around 2009-2011 mostly and then the sudden drops in 2015 were more likely due to the Common Core effects because as we demonstrated in our Part 3 of this series of math stagnations in the USA that there are usually about 4 years of time lag between the declines of the math stagnations of the grade 4 that may lead to the declines in the math grade 8. In 2015, the vast majority of the states suddenly dropped. So this is almost definitely caused by the Common Core math although the overall declines may have taken to various states for sure.

4) By 2017, the chances are that the states out of the Common Core math may continue stagnates and the who continued staying may depend on the efficiency improvements of the Common Core math implementations, but the chances are there may not be good improvements that the Common Core Math was originally promising to deliver.

5) There were math dips in the grade 8 math for the states that had been out of the Common Core math, which means that the math stagnations in the USA may enter a worse phase in 2017 on even if the negative effect of the Common Core math is overcome.
The USA states that had opted out of the Common Core math before the 2015 NAEP math

<table>
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<tr>
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</tr>
</thead>
<tbody>
<tr>
<td>2014</td>
<td>Average of the states that opted out of the Common Core math by 2014</td>
<td>218.522886</td>
<td>224.456686</td>
<td>225.145581</td>
<td>233.601067</td>
<td>236.952927</td>
<td>239.448956</td>
<td>239.224742</td>
<td>240.218113</td>
</tr>
<tr>
<td></td>
<td>Average of the states that opted out of the Common Core math by 2014</td>
<td>219.114377</td>
<td>223.137345</td>
<td>227.029528</td>
<td>234.738595</td>
<td>238.137927</td>
<td>240.744462</td>
<td>260.321956</td>
<td>240.855629</td>
</tr>
<tr>
<td>2015</td>
<td>Average of the 6 states that had been never member of Common Core math</td>
<td>223.209457</td>
<td>225.110449</td>
<td>229.080222</td>
<td>236.993015</td>
<td>240.63795</td>
<td>241.440064</td>
<td>240.016083</td>
<td>241.523028</td>
</tr>
<tr>
<td></td>
<td>kk</td>
<td>223.3215446</td>
<td>232.9916543</td>
<td>235.5107355</td>
<td>237.278302</td>
<td>237.212943</td>
<td>236.105909</td>
<td>236.120344</td>
<td>236.38427</td>
</tr>
</tbody>
</table>

APPENDIX

For the NAEP math grade 4 data


The USA states that had not opted out of the Common Core math before the 2015 NAEP math
<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td>Average</td>
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<tr>
<td>25 percentile</td>
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</tr>
</tbody>
</table>

Note: The table data is extracted from the provided image.
For the NAEP math grade 8 data

Data source: arranged by the author from the NAEP website for the math grade 8.

For the NAEP math grade 8. The 6-13-18 states are those above the red, horizontal line are those that had pulled out of the Common Core math by 2013-2014 or never tried. Those below the red line are those that had stayed with it at least till around the NAEP 2015 math.

Table: the USA 50 states and 2 jurisdictions (DC and DoDEA) and their math grade 8 of NAEP scores.

<table>
<thead>
<tr>
<th>Category</th>
<th>all students/all students/all students/all students/all students/all students/all students/all students</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average of the 6 states that had been never been members of Common Core math before 2014</td>
<td>266.98</td>
</tr>
<tr>
<td>Average of the states that had opted out of the CCSS math by 2014</td>
<td>269.30</td>
</tr>
<tr>
<td>Average of the states that had not opted out of the CCSS math by 2014</td>
<td>265.77</td>
</tr>
<tr>
<td>Nevada</td>
<td>280</td>
</tr>
<tr>
<td>Maine</td>
<td>279</td>
</tr>
<tr>
<td>New Jersey</td>
<td>281</td>
</tr>
<tr>
<td>New Mexico</td>
<td>286</td>
</tr>
</tbody>
</table>

1. Alaska
2. Arkansas
3. California
4. Colorado
5. Connecticut
6. Delaware
7. Florida
8. Georgia
9. Hawaii
10. Idaho
11. Illinois
12. Iowa
13. Kansas
14. Kentucky
15. Louisiana
16. Maryland
17. Massachusetts
18. Michigan
19. Minnesota
20. Mississippi
21. Missouri
22. Montana
23. Nebraska
24. Nevada
25. New Hampshire
26. New Jersey
27. New Mexico
28. New York
29. North Carolina
30. North Dakota
31. Ohio
32. Oklahoma
33. Oregon
34. Pennsylvania
35. Rhode Island
36. South Carolina
37. South Dakota
38. Tennessee
39. Texas
40. Utah
41. Vermont
42. Virginia
43. Washington
44. West Virginia
45. Wisconsin
46. Wyoming
47. District of Columbia
48. DoDEA

Average of the jurisdictions that had stayed with the Common Core math before 2015 (except DC and DoDEA) 267.4918 271.6676 271.9407 277.882 281.1764 283.1522 286.4481 286.7162 282.3516
References

   https://en.wikipedia.org/wiki/Common_Core_State_Standards_Initiative

National or state or city or district level math assessment timelines

4) NAEP math data from using the report was generated using the NAEP State Comparisons Tool. http://nces.ed.gov/nationsreportcard/statecomparisons/


1) Lee, Dongchan. 2017 February. WP series of “Mathematics Stagnation Nations” for the USA, Australia, New Zealand, UK, and Ireland and most Latin American countries (Part 1). “Math stagnation nations of all 5 developed, English-speaking countries according to PISA and TIMSS for the past 15-20 years of the math growth history: what this means for education and economy”
3) Lee, Dongchan. 2017 February. WP series of “Mathematics Stagnation Nations” for the USA (Part 3). The collective Math stagnations of the grades 4th and 8th in the big cities (or the School Districts based on TUDA of NAEP) of the USA over the 1 decade: their confirmations, time lags, math poverty shares, and the roles of the Common Core math (http://vixra.org/abs/1702.0101)
4) Lee, Dongchan. 2017 February. WP series of “Mathematics Stagnation Nations” for the USA (Part 4). Math Education Stagnations in the USA played more roles than the Common Core Math Standards impacts for the stagnations on the NAEP math 2015, but the Math dipping were most likely due to CCSS Math (http://vixra.org/abs/1702.0097)
5) Lee, Dongchan. 2017 February. WP series of “Mathematics Stagnation Nations” for the USA (Part 5). The quasi-universal math stagnations in almost all developed countries are real and won’t go away. How to transcend them with MMU1 or at least 1/3 of its full version in just 2-4 years

4) Lee, Dongchan. 2017 February. 8 point executive summary: math stagnations and the Economic impacts of MMU1: To end the math poverty multiple times faster with MMU1 than without it (then to achieve the POST-2015 goals of the UN multiple time faster than without MMU1)  (http://rxiv.org/abs/1702.0056)

Some Youtube versions by Dongchan Lee

1) Lee, Dongchan. 2017. “Math edu crisis in most of the USA states and what MMU1 can do”  https://www.youtube.com/watch?v=qiZW2GnNLXQ
2) Lee, Dongchan. 2017. “Math EDU crisis in most of the USA states Part 2 and what MMU1 can do”  https://www.youtube.com/watch?v=vB7LcMLVWs4

Lee’s online repository to get updates about the WP series on “Math Stagnation Nations”  http://uslgoglobal.com/wp-math-stagnation/