3 strategies of MMU1 from math poverty to math prosperity: if you can fly why do you run? If you can run, why do you walk? If you can walk, why do you crawl? You may be crawling and refusing to even walk, let alone to fly.

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Abstract

The whole game of MMU x.x that Lee proposes starts with Lee's mantra: "To end the math poverty is to end the poverty itself." Not only that, those who escape the math poverty spill over the math prosperity, which leads to the socio-economic prosperity quickly. The major difference is that Lee is trying to make the transitions happen in 2-4 years instead of 50-100 plus years if you go without MMU series. Before you start reading this document, I strongly suggest you to read the front page of www.uslgoglobal.com first, which may take about 5 minutes.

Lee's basic incentive highlights to the school districts, cities, states, and national governments

The following is mostly relevant for the OECD level developed countries.

1. Most of the OECD nations suffer from **the lack of the labor force supplies to the Math, Science, and technology work forces**. So far overall the current trends seem not optimistic in most of the countries perhaps except Far Eastern Asian countries.
2. **The serious shortage of the (especially the qualified) teachers**, especially for the math and science teachers and at least in most English-speaking OECD nations, the situations seem to be not getting better each year.
3. **No sufficient math proficient share without radically reducing math poverty first**: without reducing math poverty further from 20-40 percentile to below 5-10 percentile, the math proficiency shares will not increase from 10-20% to 40-60%, etc.
4. If we simply deny the historic math growth and stagnation patterns well-established by Lee's **WP series called "Math Stagnation Nations",** and if the districts, cities, states, etc. try to struggle to improve their math average or to reduce their math poverty, the history shows with the absolute clarity that the chances for changing much is very slim in the OECD level countries in spite of pouring 4-6% of the annual GDP in the public education alone and may take 50-100+ years to achieve just 30-50% of the targets of the MMU1 basically. And this is not only the math stagnations, this will be eventually make the economic growths stagnate as well inevitably.
5. **Taking way too long and expensive:** even the math poverty reductions of 20-30% (for whichever definitions we use), takes at least a few decades and as the math stagnations have become pandemic across almost all OECD nations, the future reductions will take easily 50-100 years most likely. So is it rational to stay in the traditional course? Is this rational? Is this moral practice of education?
6. **The fruitless math EDU technology and apps heavily invested and used in classes in most OECD nations for the past 5-10 years** with all their fanfares have miserably failed to show the actual, sustainable impacts on the math education because most of them have their math stagnated or even declined, especially for the past 5-10 years. Is this enough to direct

your attention to MMU1 instead of never-ending math toys for the joys fetish, fantasy fanfares without results?

7. **Staggering negative economic stagnation impacts:** as Lee summarized in his 8 point executive summary, to have math stagnations of 20 years have decades of your annual salaries going out the windows over the next 40-50 years. To ignore MMU1 proposal is multiple times worse than this. So, this is no longer just an education issue, it really becomes the issues of the inequality, socio-economic justice, ignorance, and inactions and their juggernaut consequences. Where do you stand?
8. Lee proposes to the developed countries' education establishments or even governments to collaborate as soon as possible or at least start opening the channels of communication instead of getting bogged down into the never-ending bureaucratic mayhems.

The following is the basic blueprint justifications of Lee's MMU x.x proposals to explore together with the school districts, cities, states or provinces, and national governments.

Basic statistical premise of all the established math assessments: all the currently well-recognized international or national math assessments at least for the PISA, TIMSS – or the NAEP or Common Core math (of the USA) – have been normalized and standardized. So their scores have the established mean scores and the standard deviations. When the participant number size are big enough, the overall score distributions follow the quasi-normal distributions once normalized.

Strategy 1: just focusing on the benchmark math poverty reductions.

In my approaches, I will focus on rapidly reducing the math poverty itself as the math poverty percentile reductions (which of course depends on the relative positions or which math assessments we use) instead of getting bogged down by which tests, which years, etc. Whether we use the PISA (with their definition of Low Performers cutoff point of 420 for which the average OECD countries have about 25% of the student populations in recent years), or TIMSS (where we use …), or NAEP of the USA (where we may use the Below Basic as the benchmark for the math poverty is about 20% for the math grade 4).

1) For the OECD average PISA math seem to have Low Performance (math poverty for PISA) of about 23-24 percentile, I will focus mostly on reducing these to 5-10 percentile, which is roughly the math poverty in the top 5 math countries in the Eastern Asia for the PISA math or TIMSS math.
2) For the English-speaking 6 OECD countries, I will focus on the similar manner as the data from the past 15-20 years of PISA and TIMSS show, they have been in either math stagnations or even declining without exceptions.
3) For the German-speaking 3 OECD countries, the math poverty (using PISA's Low Performance definition as a benchmark) is 14-23% (averaging about 20%). For the past half a decade their math are all declining, which means that their math poverty has been increasing, I propose to reduce their math poverty from about 20 percentile average to 5-10 percentile level.
4) For the Latin American countries, for the top 5 math LAC countries (e.g. Chile, Uruguay, Costa Rica, Mexico, and Trinidad & Tobago) – where their math poverty (using PISA's Low Performance) hinges around 50% of the student population – I propose to radically reduce

their 50 percentile math poverty to 20-30 percentile level over the next several years, depending on their governmental level supports.

5) For the top 5 Eastern Asian countries (e.g. Singapore, Hong Kong, South Korea, Taiwan, and Japan), their math poverty is usually around 7-15 percentile only and there is not too much to reduce, but their reductions have reached their limits and their math poverty reductions haven't been going down. If their governments are willing, I will rapidly reduce the math poverty below 3-7 percentile instead of 7-15 percentile, basically halving over the next a few years.
6) For the USA, if we use the Below Basic benchmark of the NAEP, for which the national average is about 20 percentile of the student population while it ranges between 10-30 percentile or so in recent years, I will focus on reducing the average 20 percentile to below 5-10 percentile, which is actually equal or harder than to boost their math of the bottom 25% of math students to about the national average level.

Strategy 3: MMU 1, 0.5, 1/3 variations

1) MMU1 (what Lee prefers): to raise the math average of the bottom half average (about 25 percentile) to the top half average (about 75 percentile), which is typically equivalent to boost about 1.2-1.5 Standard Deviations whether we pick PISA or TIMSS or NAEP for the districts that initially fully support and collaborative.
2) MMU 0.5 (only half level of MMU1): to raise the math average of the bottom half average (about 25 percentile) to the national, state or school district average (about 50 percentile), which is typically equivalent to boost about 0.6-0.7 Standard Deviations whether we pick PISA or TIMSS or NAEP for the districts, cities and states that support reasonably well and commit to the cause in rational manner.
3) MMU1 1/3 (only 1/3 level of MMU1): to raise the math average of the bottom half average (about 25 percentile) to the national, state or school district 43 percentile, which is typically equivalent to boost about 0.4-0.47 Standard Deviations whether we pick PISA or TIMSS or NAEP.

	Math poverty reductions	**In terms of average math boosts in Standard Deviation (STDEV)**	**For the OECD level countries**	**For the USA**
MMU x.x variations	To radically boost the math average from the bottom half (or about 25 percentile of math)	Equivalent boosts in Standard Deviations	Years it needs for almost all OECD countries from PISA or TIMSS (rough estimations)	Years needed: NAEP math for the USA (based on the trends 2007-2015)
MMU1 (what Lee prefers):	to the top half average (about 75 percentile)	which is typically equivalent to boost about 1.2-1.5 Standard Deviations	70-150+ years	50-150 years (because there has been 0% reduction in Below Basic of NAEP math grade 4)
MMU 0.5 (only half level of MMU1):	to the national, state or school district average (about 50 percentile)	which is typically equivalent to boost about 0.6-0.7 Standard Deviations	Over 30-100 years	30-70 years [1]

[1] (because even if we include 1995-2015 NAEP math not 2007-2015 where the math stagnations are prominent, much less than MMU 0.5 was achieved in 20 years.)

MMU1 1/3 (only 1/3 level of MMU1):	to the national, state or school district 43 percentile	which is typically equivalent to boost about 0.4-0.47 Standard Deviations	Over 20-50 years	At least 20+ years (following the similar reasons as above)
Below MMU 1/3	(too boring for Lee and he is not interested)			