Prospectus for a

Gap Analysis

Comparing Maryland's Education System to Top U.S. States and Top-Performing Jurisdictions Worldwide On Education Performance, Policies and Practices

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NCEE
National Center On
EDUCATION
And The Economy

A GAP ANALYSIS FOR THE STATE OF MARYLAND

What follows is a description of a gap analysis to be performed at the request of the Maryland Commission on Innovation and Excellence in Education. The purpose of the gap analysis is to help the Commission to compare the performance of the state's education system to that of the top-performing state education systems in the United States and the top-performing education systems in the world. That comparison will be designed to enable the Commission to identify specific polices and practices Maryland could put in place to achieve results comparable to top performing states and international top performers.

This research and analysis will be performed by the Center on International Education Benchmarking of the National Center on Education and the Economy (NCEE). NCEE has been researching the strategies used by the countries with the best-performing education systems in the world since 1989. In 2011, Arne Duncan, then U.S. Secretary of Education, asked the OECD to prepare a report on the strategies used by the best-performing and most rapidly improving education systems in the world. The OECD turned to NCEE to produce the report. Based on its years of experience in this field, NCEE created a conceptual framework to guide the research and asked the world's leading experts in this field to review the framework. That framework, updated by subsequent research, will be used to guide this gap analysis. A similar project has been conducted in Kentucky and others are underway in Indiana and Pennsylvania.

The logic of the work is straightforward. The conceptual framework is provided in a document titled 9 Building Blocks of a World-Class Education System. Each building block represents an arena of policy and practice in which the top performers pursue similar policies and practices with similar underlying principles. The 9 Building Blocks document describes policies and practices typically found in the high-performing systems. The gap analysis is performed by comparing the target state or country to the top performers world wide on each of the building blocks, using the typical policies and practices as indicators. Thus the question is, how does the target state or country compare to the top performers not just with respect to the outcomes of interest, but also the specific policies and practices used by the top performers to achieve their top positions on the world's education league tables? By asking the question this way, the target state or nation can identify the gaps between its own policies and practices and the policies and practices of the top performers and choose which policies and practices it wants to pursue if it wants to achieve the levels of student achievement and equity reached by the top performers.

This is not a mechanical process. None of the top performers are the best in all of the arenas of interest. All are better at some things than others. All have used implementation strategies different from others. In every case, some options open to a country or state are not open to others that might be interested in matching their outcomes. Virtually no top performer simply copies another. Adaptation is always the order of the day. And the top performers are always looking across countries and states, taking one thing from one country and something else from another. Because they want these things to work in harmony with one another, they are always adapting what they see in another country or state for use in their own, not only to

make it fit with their values, history and politics, but also so that it will fit with the other things they are borrowing. So the development of strategy is always a matter of judgment.

But it could not be clearer that the top performers are where they are in part because they put a lot of effort into constantly benchmarking their most able competitors, for the same reason that businesses and atheletes do the same thing. The surest way to fall behind the state-of-the-art is to be unaware of what it is.

THE STRUCTURE OF THIS DOCUMENT

This document is organized into five major parts:

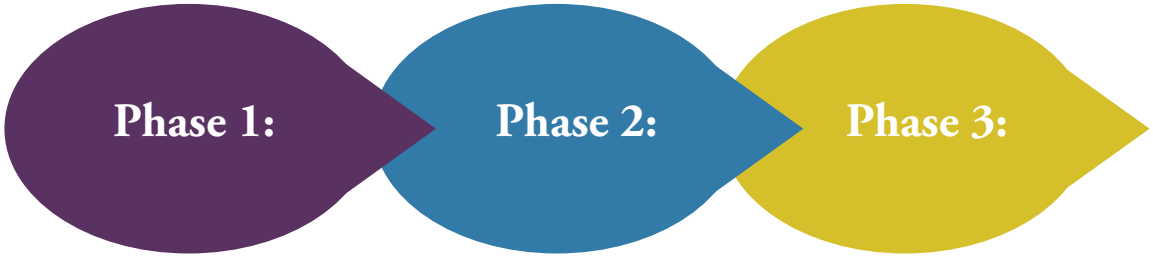
- A description of how the gap analysis will be done;
- A list of the nine building blocks for a world-class state education system;
- An overview of how the indicators for the 9 building blocks were chosen;
- An explanation of how benchmark jurisdictions were selected for comparison with Maryland;
- An overview of the benchmarked jurisdictions, with a table of comparative data;
- A full list of the key indicators for each of the nine building blocks.

NCEE'S GAP ANALYSIS PROCESS

Researchers at the National Center on Education and the Economy have been studying the strategies used by the countries with the best education systems for more than a quarter of a century. They have identified 9 Building Blocks for a World-Class Education System. Not all of the best-performing countries are equally strong in all of these areas, but, again and again, the researchers have seen that the stronger a country or a state is in these arenas, the more likely it is that they will find a very high performing system.

Between January and April 2017, NCEE staff will be engaged in gathering data on Maryland's performance in each of the 9 Building Blocks, comparing that data to the comparable data for the states and nations with the best-performing education systems. That information will be used to identify the gaps in the performance for each building block, and that information, in turn, will be used by the Commission to develop a comprehensive set of recommendations to position Maryland to be a world leader in the global economy and to enable its citizens to enjoy broadly shared prosperity for many years to come.

PHASES OF THE WORK



NCEE staff will gather data on Maryland's performance in each of the 9 Building Blocks

NCEE staff will compare that data to the comparable data for the states and nations with the best-performing education systems

Use data gathered to identify the gaps in the performance for each building block

The Commission will develop a comprehensive set of recommendations based on the gap analysis

THE NINE BUILDING BLOCKS FOR A WORLD-CLASS STATE EDUCATION SYSTEM

The following nine points summarize what NCEE has learned about the steps that top performing country, state and provincial education systems have taken to get to the top of the world's education league tables:

1. Provide strong supports for children and their families before students arrive at school;
2. Provide more resources for at-risk students that need additional help;
3. Develop world-class, highly coherent instructional systems;
4. Create clear gateways for students through the system, set to global standards, with no dead ends;
5. Assure an abundant supply of highly competent teachers with the necessary dispositions, knowledge and skills;
6. Redesign schools to be places in which teachers, as professionals, work collaboratively with incentives and support to continuously improve their professional practice and the performance of their students;
7. Create an effective system of career and technical education and training;
8. Create a leadership development system that develops leaders at all levels to manage such systems effectively; and
9. Institute a governance system that has the authority and legitimacy to develop coherent, powerful policies and is capable of implementing them at scale.

KEY INDICATORS OF SUCCESS

NCEE has identified key indicators for each of the 9 Building Blocks that will enable Maryland to compare itself to the countries and American states with the most effective education systems. These indicators are listed in full at the end of this document. After these indicators have been discussed and the data to support them has been documented with help from the corresponding state agencies, a gap analysis will be conducted by NCEE to help the Commission understand where Maryland stands on each indicator, how far it has to go to meet the targets represented by each indicator.

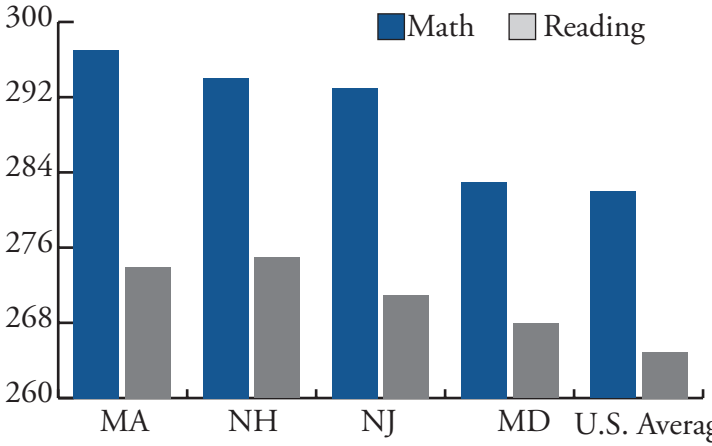
WHICH STATES AND COUNTRIES IS MARYLAND BEING COMPARED TO? WHY THESE STATES AND COUNTRIES?

NCEE chose jurisdictions for comparison on the basis of data collected by the Organization for European Cooperation and Development (OECD) by their Programme on International Student Assessment (PISA). This is the largest and most highly regarded comparative survey of student performance in the world. It is intended to measure not what students can recall from the curriculum they have studied, but what they can do with what they have learned. It is therefore the best data available anywhere on the kind of learning that is useful to young people as they enter the workforce. These surveys measure student achievement in mathematics, reading and science. NCEE took the most recent data for each of these subjects and, taking an average of national performance in all three subjects, constructed a league table of national performance, identifying the top performers. We then took two of the top performing countries from Asia (China and Singapore), one from North America (Canada) and one from Europe (Finland) for the comparisons with Maryland. These choices were intended to produce a set of countries very different from each other in national culture, type of government, structure of the education system and so on. What unifies these countries is their top performance. Finally, because China and Canada are very large countries that delegate a great deal of education policymaking to their provinces and municipalities, we chose two high performing jurisdictions from within those countries – Ontario in Canada and Shanghai in China – for the purpose of comparing to a state the size of Maryland. Although our analysis includes background on the governance and history of Canada and China at large, for the most part we compare Maryland to the policies and practices of Shanghai and Ontario specifically.

NCEE also chose three states for comparison to Maryland. These states are the three top achievers on the National Assessment of Education Progress (NAEP), the survey that the United States uses to compare student achievement across the states. Massachusetts, New Jersey and New Hampshire scored at or near the top in performance across subject areas, both reading and math, and grade levels, both fourth and eighth grade.

The benchmark international jurisdictions (Shanghai, China; Singapore; Finland and Ontario, Canada) all scored at or near the top out of 70 jurisdictions in reading, mathematics and science on the 2015 PISA examinations and were specifically chosen to represent different models of education system design and governance models, all of which are highly successful.

NAEP 2013 8th Grade

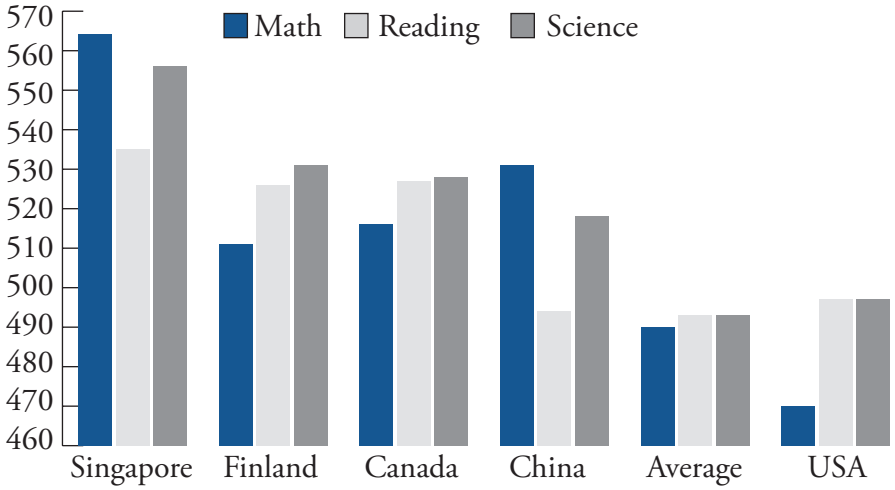


State	Math Score	Reading Score	Science Score*
MA	297	274	162
NH	294	275	165
NJ	293	271	156
MD**	283	268	155
U.S. Average	282	265	155

*The NAEP Science exam, administered in 2015, has a substantially smaller sample size compared to the Reading and Math exams. Therefore, less weight was given to science results when selecting benchmark states.

**Maryland was ranked 26nd in mathematics, 15th in reading, and 26th in science for NAEP 2015 for 8th grade.

PISA 2015



Country	Math Score	Reading Score	Science Score
Singapore	564	535	556
Finland	511	526	531
Canada **	516	527	528
China *	531	494	518
Average from 70 Participating Countries	490	493	493
United States	470	497	497

* Scores for China include four provinces: Shanghai (the province described in the gap analysis), Guangdong, Beijing, and Jiangsu.
** Scores for Canada include all provinces. This gap analysis focuses on the province of Ontario for the purposes of comparison with a U.S. state.

AN OVERVIEW OF MARYLAND AND THE BENCHMARKED JURISDICTIONS

Maryland's future depends on becoming a much stronger economic competitor within an ever-expanding circle of states and nations. To meet the challenges of an increasingly interconnected, knowledge-driven global economic landscape—and in so doing preserve the quality of life and well-being of its residents—Maryland must build the systems and processes to produce a highly skilled workforce. Failing to do so may not be immediately catastrophic, but the long-term impact of the status quo's incremental progress in these key areas will be felt

nonetheless through a slow slide toward economic and wage stagnation across the state and increasing poverty for a steadily growing number of Maryland's citizens.

The chart that follows this analysis offers an at-a-glance understanding of key attributes and characteristics of each of the comparison jurisdictions. Maryland ranks 3rd among U.S. states in terms of innovation and entrepreneurship, making it among the most competitive states. In addition, its per capita GDP is similar to the top performing states and is a bit higher than that of the top performing international jurisdictions even when accounting for parity of purchasing power. The challenge for Maryland is whether it can maintain this edge into the future. Maryland has consistently ranked in the middle or slightly above average in measures of student proficiency such as NAEP. But above average is, as the chart shows, still below the top of the U.S. rankings and far below the world's education leaders. The data show not only that the average U.S. high school student scores very poorly relative to high school students in other countries, but also that American millennials in the workforce are not only among the least well educated in the industrial world, they are less well educated than they used to be. Maryland's economic prospects, if it is indeed producing new workers with skills below those of a growing number of other countries and producing workers whose skills now rank near the bottom of the rankings of the workers in all the industrialized countries, are worrisome indeed.

Well-documented links exist between socioeconomic status and academic achievement and Maryland's poverty rate—10.3 percent—puts it squarely in the middle of domestic comparison jurisdictions. However, deep and widespread poverty has not prevented Shanghai and Singapore from creating education systems capable of topping the world's league tables. Indeed, China, Ontario and Singapore have relative poverty rates well above Massachusetts, New Hampshire, New Jersey and Maryland, but their students now substantially out-perform students in the U.S. states.

Maryland has the highest rate—by a wide margin—of students meeting the federal Free and Reduced Lunch (FRL) income requirements of the comparison states, while Shanghai and Singapore have much higher rates of student poverty than both Finland and Ontario. The rate of FRL is even higher in Baltimore, at over 80 percent. It should be noted that the FRL threshold for need is higher than that used for the poverty rate in the U.S., with 49.6 percent of school children qualifying for FRL and only 23 percent of school children meeting the poverty definition. Given that distinction, it it likely that both Shanghai and Singapore would have proportions of FRL-eligible, low-income students higher than Maryland's.

The broader demographic make-up of the jurisdictions shows wide variations, but also substantial similarities. New Hampshire, Shanghai and Finland have more demographically homogenous populations than Maryland and the rest of the comparison jurisdictions, while New Jersey, Massachusetts, Singapore and Ontario—all of which outperform Maryland—have more diverse populations resembling Maryland's. That being said, while New Hampshire may be homogeneous, it has by far the largest proportion of its population living in rural areas—around 40 percent.

At 6.5 percent, Maryland's proportion of students who are non-native English speakers is below the figures for both Massachusetts and New Jersey, but much higher than New Hampshire's 2 percent. Of the international jurisdictions, only Finland has a percentage of foreign-born students—a proxy for non-native speakers for the international jurisdictions—that is in the single digits. Both Ontario and Singapore have much higher rates of foreign-born students and China faces similar linguistic diversity with migrant students a significant proportion of its school population. This linguistic diversity, frequently seen as a challenge unique to U.S. schools, has not prevented those top performing jurisdictions from rapidly improving their education systems.

Understanding the student body of the comparison jurisdictions is critical, but so too is the actual organization of that student body. While Finland and Singapore have smaller total student populations than Maryland's 880,000, when the number of schools in each jurisdiction is taken into account, a very different picture emerges. With 1,442 schools in the state, Maryland's average school size is 610 students. With only 365 schools, Singapore's average school population is by far the largest—1430 students—while Finland's average school population is by far the smallest at just 162 students per school. Maryland's 610 average school size is similar to Massachusetts' and New Jersey's average school populations, 514 and 540 students respectively.

Education spending as a percentage of gross domestic product is fairly similar across all jurisdictions, between 3.5 and 4.2 percent, with New Jersey—5 percent—and Singapore—2.8 percent—as outliers on the high and low ends respectively. Annual per pupil spending, on the other hand, varies widely. At $13,829, Maryland spends more per pupil than the U.S. average ($10,700), and slightly less than top performing state Massachusetts ($14,515). But both Maryland and the domestic comparison jurisdictions get very different returns on their investments than the international top performers. Singapore—a jurisdiction that spends only $7,862 per pupil—and Finland – only $9,180 – have the highest secondary school completion rates by significant margins (99 and 93 percent, respectively), while the U.S. jurisdictions—including Maryland—and Ontario have completion percentages in the mid-80s. With respect to education attainment, Ontario and Massachusetts have the highest percentage of adults with higher education degrees or diplomas and Shanghai and Singapore have the lowest. However, the rates of higher education completion in Shanghai and Singapore – jurisdictions that have dramatically rebuilt their education systems within the lifetimes of most of the adults currently working – are rising rapidly.

The benchmark jurisdictions are at once exceedingly different and at the same time possess striking similarities. Many of the comparison jurisdictions have risen from extremely challenging and disadvantaged positions to their current place at the top of the league tables for student performance. Their experience and progress, despite those obstacles, demonstrate that a country, state, or city, committed to the proposition that its future is inextricably linked to the rapid improvement of its education system can reverse its fortunes and build the high-skill, innovation-centered economy necessary to compete globally.

	Maryland	Massachusetts	New Hampshire	New Jersey	U.S.	Shanghai	Singapore	Finland	Ontario
Demographic Data									
Population (2015)[1]	6.0 million	6.8 million	1.3 million	8.9 million	316 million	23.9 million	5.4 million	5.4 million	13.6 million
Ethnic Makeup (2015)[2]	52% White, 31% African American, 9% Hispanic, 7% Asian	74% White, 11% Hispanic, 8% African American, 7% Asian	91% White, 3% Hispanic, 3% Asian, 2% African American	56% White, 20% Hispanic, 15% African American, 10% Asian	64% White, 16% Hispanic, 13% African American, 5% Asian, 2% Other	92% Han Chinese, 8% Other	77% Chinese, 14% Malay, 8% Indian, 1.4% Other	93% Finn, 6% Swede, .5% Russian, .3% Estonian, .1% Roma, .1% Sami	28% British, 23% French, 15% Other European, 2% Native, 32% Other
Percent of Population Living in Rural Areas (2010)[3]	12.8%	8.00%	39.70%	5.32%	19.30%	10.70%	0%	16%	14% (2011)
Relative Poverty Rate (Percent of Population Below 50% Median Income)[4] (China 2015, Singapore 2011, Ontario, U.S. and Finland 2010)	No Data	No Data	No Data	No Data	17%	16%* (China)	26%	7%	13.9%
Absolute Poverty Rate (2012)[5]	10.3%	11.9%	10%	10.8%	16%	No Data	No Data	No Data	No Data
Economic Data									
GDP (2016 in current dollars)[6]	$372 billion	$485 billion	$75 billion	$580 billion	$16.7 trillion	$352 billion	$339 billion	$260 billion	$695 billion
GDP (in comparable USD$ using purchasing power parity of PPP) for 2013[7]	No data	No data	No data	No data	$16.7 trillion	$436 billion	$298 billion	$242 billion	$862 billion
Composition of Economy (U.S. Data 2015, International Data 2011)[8]	Agriculture 0% Services 64%, Manufacturing 5%, Trade 10%, Government 21%	Agriculture 0% Services 70%, Manufacturing 10%, Trade 9%, Government 11%	Agriculture 0% Services 63%, Manufacturing 11%, Trade 14%, Government 12%	Agriculture 0% Services 48%, Manufacturing 8%, Trade 14%, Government 11%	Agriculture 1%, Services 63%, Manufacturing 12%, Trade 12% Government 12%,	Services 46%, Industry 44%, Agriculture 10%	Services 71%, Industry 29%, Agriculture 0%	Services 72%, Industry 25%, Agriculture 3%	Services 70%, Industry 28%, Agriculture 2%
GDP Per Capita (U.S. Data 2015, in 2009 dollars adusted for inflation over time. International Data 2010)[9]	$54,388	$62,918	$49, 225	$56,721	$49,844	$11,361	$37,293	$35,918	$46,304 (2010)
GDP Per Capita (in comparable USD$ using PPP) for 2013[10]	No data	No data	No data	No data	$47,495	$14,088	$32,818	$33,404	$57,417
Unemployment Rate (2015)[11]	5.2%	5.0%	3.4%	5.6%	5.3%	4.1%	1.9%	8.1%	7.5%
Youth Unemployment Rate (2015)[12]	16.9%	12.2%	13.4%	18.2%	16.2%	9.7%	10.2%	17.7%	12.9% (2013)
Competitiveness Data									
World Economic Forum Global Competitiveness Rank (2014)[13]	No Data	No Data	No Data	No Data	3rd	28th (China)	2nd	4th	15th (Canada)
Innovation and Entrepreneurship State Ranking (2015)[14]	3rd	5th	18th	14th	No Data	No Data	No Data	No Data	No Data

	Maryland	Massachusetts	New Hampshire	New Jersey	U.S.	Shanghai	Singapore	Finland	Ontario
Student Population Data									
Public School Enrollment (2015)[15]	879,601	943,700	180,500	1,362,000	49,522,000	1,837,800 (2012)	522,000	542,100	2,000,000
Number of Schools (2014)[16]	1,442	1,865	482	2,508	98.271	2,964 (2012)	365	3,347 (2005)	4,897
Average Class Size, Lower Secondary (2011-12)[17]	Not available as reporting standards not met	25	24	25	26	35	35.5	17.8	25
Percent of Children Ages 0-17 Living In Households With Equivalent Incomes Below 50% of National Median (International) And % of Children Eligible For Free and Reduced Lunch (U.S. States) 2011-12[18]	46% (2015)	35.1% FRL	26.3% FRL	35.5% FRL	49.6% FRL or 23% using 50% median income measure	29%* (China)	26%	3%	14%
Percent of Students Who Are Non-Native Speakers (U.S. Data 2014)/Intl Data (2011-12)[19]	2.5%	7.9%	2%	4%	9.1%	20% Migrant Students	16.6% Non-Official Language Speakers	5% Foreign-Born Students	27% Foreign-Born Students
Education Spending Data									
Percent of GDP Spent on Primary, Secondary, and Non-tertiary Education (U.S. Data 2010/Intl Data 2010)[20]	4.0%	3.7%	4.2%	5.0%	7.3%	3.5%	2.8%	4.1%	4.1%
Annual Per Pupil Primary and Secondary Expenditures (U.S. Data 2013/Intl Data 2011)[21]	$13,829	$14,515	$13,721	$17,572	$10,700	$3,602	$7,862	$9,180	$10,273
Annual Per Pupil Primary and Secondary Expenditures Adjusted for Regional Cost Differences (2013)	$12,679	$13,546	$14,718	$15,742	$11,841	No Data	No Data	No Data	No Data
Student Outcomes Data									
Percentage of Students Who Complete Secondary School (2014)[22]	86%	86%	88%	89%	82%	79.2%	98%	93%	83.1%
Percentage of Adults Ages 25-64 with a Tertiary Degree/Diploma (2014)[23]	49.9%	55.4%	49.2%	50.1%	45.3%	13.7%	25.8% (2008)	40%	53%
Programme for the International Assessment of Adult Competencies (PIAAC) 2013, Literacy Rank out of 23 Countries[24]	No data	No data	No data	No data	16	No data	No data	2	11
Programme for the International Assessment of Adult Competencies (PIAAC) 2013, Numeracy Rank out of 23 Countries[25]	No data	No data	No data	No data	23	No data	No data	1	17
Programme for the International Assessment of Adult Competencies (PIAAC) 2013, Problem Solving Rank out of 23 Countries[26]	No data	No data	No data	No data	19	No data	No data	1	15
Change in Percent of 25-64 Year-Olds with a Tertiary Degree from 2008 to 2014 [27]	+6.0%	+5.8%	+3.2%	+5.5%	+7.4%	+7.1%	+14.9%	+5%	+3.3%

KEY INDICATORS WITH SUBQUESTIONS

1. Provide strong supports for children and their families before students arrive at school

Context: Overview of day care and preschool systems

What proportion of children have access to high quality childcare options?

- What percent of young children use childcare?
- Is childcare considered affordable?
- What public funding is provided for low-income families to obtain childcare?
- What is the quality of the childcare professionals (pay, qualifications, turnover)?

What proportion of children have access to high quality early childhood education?

- What percentage of children are enrolled in preschool?
- What is the preschool enrollment rate for low income students?
- How is preschool funded: is preschool universally funded or income-based?
- What percentage of preschool students attend full-day programs?
- What are the qualifications for preschool teachers?
- What systems are in place to ensure preschool quality?
- What proportion of young children are ready for kindergarten or the first year of compulsory education?

2. Provide more resources for at-risk* students than for others

Context: Overview of how resources are allocated to at-risk students

Do at-risk students receive more or less resources than other students, and if so how much?

- Do at risk students receive more funding?
- Do at risk students have access to high quality teachers?
- Are student-teacher ratios lower for at-risk students than for other students?

*For example, low income, ELL, and students with disabilities. But definitions vary by jurisdiction and information will be provided about what resources are available from all public sources—national, state, and local.

3. Develop world-class, highly coherent instructional systems

Context: Overview of instructional systems, including standards, assessment and curricula

To what extent are standards internationally benchmarked in the core subjects* and in the competencies demanded of a 21st century workforce?

- Are standards internationally benchmarked?
- Are standards set for a full range of core subjects?
- Are standards set for 21st century skills?
- Are national and state standards aligned?

*(Native language, mathematics, sciences, history, the arts)

To what extent are curriculum frameworks, syllabi and curriculum provided to guide teachers?

- Are aligned curriculum frameworks, syllabi and curriculum provided to teachers?
- How systematically are teachers trained to use those materials?

Are high quality assessments that measure the knowledge and skills students need to succeed in the 21st century being used?

- Do assessments include a combination of summative and formative assessments?
- Are the assessments used to provide incentives? Are there consequences for students, teachers and/or schools?
- Do the assessments have multiple formats which measure critical thinking skills, including essays and multi-step problems?
- Are past exam questions and samples of answers to those questions released so that teachers, students and parents are clear about the expectations?

To what extend is the instructional system aligned?

- Are standards, curriculum/frameworks and assessments aligned?
- Are exit standards for secondary school aligned to entrance requirements for tertiary/ post-secondary?

4. Create clear gateways for students through the system, set to global standards, with no dead ends

Context: Overview of pathways through the education systems, including gateways and qualifications

Are there clear gateways for students through the primary, secondary and post-secondary systems with no dead-ends?

- Are there clear college and career readiness standards and gateway exams set to those standards?
- Does the system define courses and grades in those courses or cut scores on examinations necessary to move from one program of study or pathway to the next?
- To what extent is support available to students who do not meet those qualifications?
- Do all secondary school options include a path to post-secondary education?
- To what extent are students prepared to enter college or career training without remediation?
- Is there a regular, timely and relevant guidance system that helps students develop their future plans? What is the ratio of guidance counselors to students?

5. Assure an abundant supply of highly qualified teachers with the necessary dispositions, knowledge and skills

Context: Overview of the systems' efforts to recruit and train high quality teachers

Are systems in place to manage the supply of teachers in relation to the demand for them?

- Does the state produce the appropriate supply of teachers annually? That is, how many are needed and how many graduate statewide in each area of specialization?

How qualified are the candidates admitted to teacher preparation programs?

- From what quartile of college-bound high school graduates are teacher education students drawn?
- What are requirements for entry to the teacher preparation program?
- Are requirements for entry competitive? (E.g., how many people apply? What percent get in? How do admissions rates for teacher preparation compare to preparation programs for high-status professions?)

How rigorous is the program of instruction for teacher preparation?

- What is required for completion? (How many years and what kind of courses? Is there a clinical experience and if so, how long?)
- To what extent is teacher education being conducted in research universities?
- To what extent are teacher being provided with research skills & being taught diagnosis and prescription?
- To what extent are teachers required to have mastery of the subject(s) they will teach?
- What percentage of teachers are teaching without being traditionally prepared?

6. Redesign schools to be places in which teachers, as professionals, work collaboratively with opportunities, incentives and support to continuously improve their professional practice and the performance of their students

Context: Overview of school organization and professional learning to support high quality teaching and teachers

How competitive are teachers' salaries with the compensation in the high status professions?

- What is teachers' starting salary? Is it competitive relative to high-status professions?
- What is a teachers' average salary? Is it competitive relative to high-status professions?
- Is there a career ladder for educators?
- How is the career ladder for teachers organized?
- What are the criteria for moving along these ladders?
- Is there a formal method for identifying first-rate teachers and for assigning them to

mentor new and junior teachers for a significant period of time?

Does the way the school is organized promote teacher growth and improvements in student learning?

- Are there strong incentives for teachers to continuously improve their performance?
- Are there formal structures that provide the time and incentives for teachers to learn from other teachers?
- Is there substantial time available for teachers to work together in teams to improve instruction?
- Are there resources available to teachers to gain the knowledge they need to build their expertise and improve their practice?

7. Create an effective system of career and technical education and training

Context: Overview of Career and Technical Education systems

Is there a Career and Technical Education (CTE) system that supports 21st century careers?

- To what extent is training available to students in a wide range of high-skill, high-demand and well-paying careers?
- To what extent does training occur in authentic work environments which include up-to-date equipment, academic integration and work-based learning?
- Are there enough apprenticeship slots for all CTE students who want them?
- To what extent are instructors provided the opportunity to become familiar with state-of-the-art practices?
- To what extent is information available to students, parents and counselors that will help students make informed career choices?

Do CTE programs lead to industry-recognized qualifications?

- Do all programs lead to qualifications that are widely recognized by industry?
- Are qualifications continuously adjusted to the needs of economic sectors at the state, national, and global levels?

Is the CTE system attractive to a broad range of students and parents?

- What proportion of students choose to pursue a CTE program of study?
- What percent complete those programs at the secondary level?
- What percent go on to post-secondary education or training or work?

8. Create a leadership development system that develops leaders at all levels to manage such systems effectively

Context: Overview of systems of developing high quality school leaders, including recruitment, training, and support

Does the system prepare school leaders effectively?

- How are principals recuited and selected?
- What form does principal training take?
- Are principals prepared to manage professionals effectively?
- Does the system develop school leaders continuously throughout their careers?

Does a career ladder for school leaders exist that provides incentives for increasing roles and responsibilities?

- If so, what does it look like? Does it extend to district and state level? Who establishes it? Is it aligned with goals for improvement?

9. Institute a governance system that has the authority and legitimacy to develop coherent, powerful policies and is capable of implementing them at scale

Context: Overview of education governance systems

Are there shared goals across the system?

- Are goals known to all partners in the system?

Is there a place where the buck stops?

- Responsible for pre-school, K12, teacher education, higher education and vocational education?
- Is it clear what the roles of various partners are?
- Are there clear lines of authority to make and implement policies?
- Is system progress tracked, publicized and easily located?

Is there an effective way to hold the other parts of the system accountable and to provide effective help to non-performing parts of the system?

- Does the system have an effective way of identifying non-performing teachers, principals, schools, districts and schools of education?
- Does the system have a way to help less successful teachers and principals?
- Does the system have a way to help less successful schools and districts?

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