FINAL REPORT OF THE
VIRGINIA COMMISSION ON YOUTH

Comparison of Academic Achievement in Virginia and Leading Industrialized Countries

TO THE GOVERNOR AND
THE GENERAL ASSEMBLY OF VIRGINIA

REPORT DOCUMENT NO. 170

COMMONWEALTH OF VIRGINIA
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COMMONWEALTH of VIRGINIA

Commission on Youth

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July 31, 2013

TO: The Honorable Robert F. McDonnell, Governor of Virginia

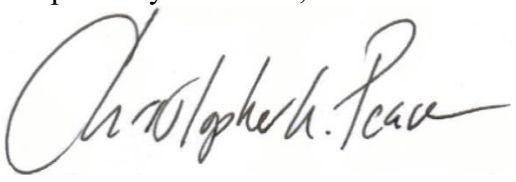
and

Members of the Virginia General Assembly

At the Commission on Youth's meeting on April 5, 2011, the Commission directed staff to conduct a two-year study comparing the academic achievement of Virginia students with students of leading industrialized countries. Commission staff presented the first-year findings at the Commission's meeting on November 9, 2011 and second-year findings and recommendations on December 3, 2012.

This report represents the work of many government and private agencies and individuals who provided input to the study. The Commission gratefully acknowledges their support to this effort.

Respectfully submitted,



Christopher K. Peace

MEMBERS OF THE VIRGINIA COMMISSION ON YOUTH

From the Virginia House of Delegates

Christopher K. Peace, Chair
Mamye E. BaCote
Robert H. Brink
Peter F. Farrell
Beverly Sherwood
Anne Crockett-Stark

From the Senate of Virginia

Harry B. Blevins, Vice Chair
Barbara A. Favola
Stephen H. Martin

Gubernatorial Appointments from the Commonwealth at Large

The Honorable Gary L. Close, Esq.
Frank S. Royal, Jr., M.D.
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I. Authority for Study

Section 30-174 of the *Code of Virginia* establishes the Commission on Youth and directs it to "…study and provide recommendations addressing the needs of and services to the Commonwealth's youth and their families." This section also directs the Commission to "…encourage the development of uniform policies and services to youth across the Commonwealth and provide a forum for continuing review and study of such services."

Section 30-175 of the *Code of Virginia* outlines the powers and duties of the Commission on Youth and directs it to "[u]ndertake studies and to gather information and data . . . and to formulate and report its recommendations to the General Assembly and the Governor."

During the 2011 General Assembly Session, Senator Yvonne B. Miller introduced Senate Joint Resolution 320, which directed the Commission on Youth to study how the academic achievement of Virginia school children compares to the academic achievement of students living in leading industrialized countries. The resolution did not pass during the General Assembly Session; however, the Commission on Youth adopted the study as a two-year study initiative.

II. Members Appointed to Serve

The Commission on Youth is a standing legislative commission of the Virginia General Assembly. It is comprised of twelve members: six Delegates, three Senators and three citizens appointed by the Governor.

Members of the Virginia Commission on Youth are:

Delegate Christopher K. Peace, Mechanicsville, Chair
Delegate Mamye E. BaCote, Newport News
Delegate Robert H. Brink, Arlington
Delegate Peter F. Farrell, Richmond
Delegate Beverly J. Sherwood, Winchester
Delegate Anne B. Crockett-Stark, Wytheville
Senator Harry B. Blevins, Chesapeake, Vice Chair
Senator Barbara A. Favola, Arlington
Senator Stephen H. Martin, Chesterfield
The Honorable Gary L. Close, Esq., Culpeper
Frank S. Royal, Jr., M.D., Richmond
Charles H. Slemp, III, Esq., Norton

III. Executive Summary

In 2011, the Virginia Commission on Youth adopted a two-year study plan, *Comparison of Academic Achievement in Virginia and in Leading Industrialized Countries,* to explore the following issues:

- Students in the United States lag in academic performance when compared with students in other industrialized countries, particularly in science and mathematics.
- The 2009 Organisation for Economic Co-operation and Development (OECD) Programme for International Student Assessment indicated that, of the 34 countries evaluated, the United States ranked 14th in reading, 17th in science, and 25th in mathematics.

- The United States falls far behind the highest scoring countries, including South Korea, Finland, Singapore, Hong Kong, Shanghai in China, Japan, New Zealand, Australia, and Canada.
- Today's United States graduates compete in a global job market where highly skilled workers are in increasing demand. While other countries have made significant improvements in education, the United States has made only incremental improvements.
- The decline in the academic achievement of American students and the failing condition of public education have been prominent among national and state concerns about the United States' ability to compete internationally.
- In the early 1980s, the Commonwealth of Virginia hosted a national meeting on "A Nation at Risk" to reform and strengthen public education. Since that meeting, Virginia education initiatives have included the Standards of Learning, the Virginia Preschool Initiative, the Governor's magnet, charter, virtual, laboratory, and alternative schools, dual enrollment, year-round schools, and career and technical education schools. These initiatives provide options for Virginia students to meet their educational needs and, as a result, significant progress in student achievement has been achieved.
- Despite progress made to date, public education in Virginia is not immune to the challenges confronting American education. Disregarding the distress signs would be imprudent and pose a significant threat to state economic status and success in the global marketplace.
- Virginia needs a cadre of scientists, engineers, mathematicians, educators, physicians, and entrepreneurs, and a steady supply of the brightest minds in all other professions and occupations to maintain and improve Virginia's productivity and competitive edge.
- It is critical to evaluate the academic achievement of Virginia's students, relative to the reported outpacing in education by students in other countries, in order to improve and strengthen Virginia's schools and learning opportunities for its students.

Exploring other countries' educational policies has the potential to enhance Virginia's educational policy and practice. A comparison of the highest performing countries can provide valuable insights that the Commonwealth may adopt or adapt. While it could be argued that comparing countries has limited meaning due to cultural and societal differences, the purpose of this study is to present and acknowledge these differences, and determine which aspects could be incorporated to increase student achievement in our schools.

First Year Study

During the first year of the study, the Commission contracted with the College of William and Mary to identify countries and conduct a literature review to provide a profile of each country with elements that could then be evaluated for potential adoption/adaptation by Virginia. Several factors were considered to identify countries (and regions of countries) that would generate comparative and contrasting data most beneficial to Virginia. Of the top performing countries on the Programme for International Student Assessment (PISA) and Trends in International Mathematics and Science Study (TIMSS) assessments, factors such as geographical region, population, population density, and gross domestic product (GDP) were used to narrow the list of countries used in the comparison.

Based on a careful review of the literature and other available sources, six countries with high quality educational systems were selected for a more in-depth analysis. The process of country selection encompassed a range of sources (governmental, intergovernmental, and non-governmental publications, surveys, international and national professional and academic journal articles, and websites) to identify the countries. Selection was made based on geographic diversity and availability of sufficient data.

The countries selected for comparison were:

- **Canada** was selected due to its proximity to the United States, its similarly diverse student population, and its decentralized educational system. Although not among the top five countries, according to the TIMSS and PISA, Canada performs at the same level as Japan and New Zealand, and outscores the United States significantly.
- **Shanghai** is new to international assessment but significantly outperformed even the previously top performing countries in all three categories, according to PISA 2009.
- **South Korea** only has secondary school level data available on international assessments of PISA and TIMSS; however, the available data ranks South Korea among the top two in PISA Reading Grade 10 assessment and TIMSS Math Grade 8 assessment, as well as the top four in PISA Math Grade 10 and TIMSS Science Grade 8, and top six in PISA Science Grade 10.
- **Singapore** consistently ranks among the top countries across years, grades, and subjects, based on both TIMSS and PISA results.
- **Finland** is consistently ranked among the top five on international assessments and provided representation of a European nation. Finland provides outstanding education, with less emphasis on standardized testing and with fewer school system resources. This ability to do more with less may provide valuable information for improving the Virginia educational system.
- **The Netherlands** was added upon the request of the Virginia Commission on Youth during the preliminary presentation made in December 2011. The Netherlands ranked 10th in reading, 12th in mathematics, and 11th in science in the 2009 PISA; on the Grade 4 TIMMS, The Netherlands ranked 9th among industrialized nations.

Researchers conducted a comprehensive literature review of selected countries, the performance of students in the targeted countries with that of students in the United States, with particular focus on what is known about Virginia students. The review attempted to identify attributes that explain/support the positive educational outcomes in the selected countries. Policies and practices that could be adopted in Virginia were identified for further study and a determination of feasibility for implementation in Virginia.

The initial findings and recommendations were published as an interim report in *Report Document No. 218*, 2012. Updated first-year report data is provided in Sections VII and VIII of this report.

Second Year Study

Further review and refinement of data gathered during the first year was completed during the second year of the study. This included addressing additional questions raised by the Commission on Youth during the initial presentation in December 2011. Themes for further discussion were selected based on the clarity of information available and the portability of interventions/actions. The Commission on Youth adopted the second year study plan on May 14, 2012. Again, the Commission contracted with the College of William and Mary.

Representatives from impacted groups were invited to participate in an Advisory Group that would explore the data collected in Year One, other states'/countries' research, findings from Virginia's Governor's Commission on Higher Education Reform, Innovation and Investment, Science, Technology, Engineering, and Mathematics-Healthcare (STEM-H) initiatives, practices from schools that excel, and innovative methods used to measure student progress. On May 9, 2012, at its first meeting, the Advisory Group was introduced to the study and organized itself into subgroups around specific themes related to the study. Membership and Advisory Group meeting minutes are provided as Appendix D and E, respectively.

On June 26, 2012, the Commission on Youth, in conjunction with the Advisory Group, hosted a statewide Roundtable on Academic Achievement. The Roundtable agenda included an overview of the study's initial findings, updates on Virginia Department of Education (VDOE) initiatives from Department staff, and time set aside for breakout groups to develop draft recommendations that were then reported to the whole group for the purpose of reaching consensus. The four breakout groups were:

- *The International Achievement Gap;*
- *Structure and Support of the Educational System;*
- *Teacher Quality and Effectiveness;* and
- *Educational Innovations*.

Meeting materials for the Roundtable, including the agenda, presenter bios, and minutes, are provided as Appendix F.

The draft Findings and Recommendations were disseminated to the Advisory Group for discussion at the October 2, 2012 meeting.

At the Commission on Youth meeting on November 7, 2012, the Commission on Youth received a presentation on revised Findings and Recommendations. Suggestions and comments from the Advisory Group were shared with the Commission members at that time. On December 3, 2012, the Commission met to receive public comment and took final action on the study recommendations.

Revised Findings and Recommendations were provided electronically to the Advisory Group for comment and subsequently distributed for feedback from constituents, VDOE staff, and the Virginia Board of Education. Recommendations were further refined by Commission on Youth staff and, on December 3, 2012, following public comment to the Commission on Youth, were presented for consideration. The Commission approved the following recommendations:

TEACHER PREPAREDNESS AND EFFECTIVENESS

Teacher Recruitment

Recommendation 1

Raise the value of the teaching profession in Virginia.

a. Request the Governor and the Secretary of Education develop and implement approaches to make teaching a more attractive career choice.
b. Request the Governor and the Secretary of Education develop and implement promotional programs and marketing which addresses the value of the teaching profession.

Recommendation 2

Develop and implement a rigorous teacher recruitment mechanism.

a. Request the Governor and the Secretary of Education develop and implement a rigorous teacher recruitment mechanism.
b. Recruit top academic achievers who are rising college freshman or are already enrolled in college.

Recommendation 3

Provide incentives for early identification and attraction of high-performing, high ability candidates.

a. Request the State Council of Higher Education in Virginia (SCHEV) and the Virginia Community College System (VCCS) review Virginia's existing scholarship programs such as the Virginia Teacher Scholarship Loan Program and Virginia's College Transfer Grants, and make recommendations for building awareness for recruiting highly qualified candidates into the teaching profession.

b. Develop dual enrollment and articulation agreements to establish a career pathway model in Virginia for recruiting high-performing teacher candidates and facilitating their entry into the teaching profession. Such a review will include dual enrollment, Virginia's two-year associates degree programs, articulation agreements with Virginia's teacher preparation programs, and master's degree program requirements that acknowledge teacher candidates who meet other criteria of highly qualified teachers.

Quality of Teacher Preparation Programs

Recommendation 4

Raise the rigor of teacher preparation programs.

a. Require all student teachers to be supervised and jointly evaluated by an experienced teacher, principal, and university advisor.
b. Request the State Council of Higher Education of Virginia (SCHEV) to review teacher practicums to ensure the inclusion of a variety of experiences in addition to classroom teaching, such as observation of lessons, conferences with teacher, or participation in extracurricular and professional development activities.
c. Strengthen the exit requirements of teacher education programs to include criteria such as completion of required courses, examinations, project assignments, and teacher practicum.
d. Expand the use of performance-based assessments proposed in the *Virginia State Board of Education Guidelines for Uniform Performance Standards and Evaluation Criteria for Teachers* for beginning teacher licensing as a means of determining effectiveness before a teacher receives a professional license.
e. Request that the Board of Education be advised of the findings from the Commission's study regarding the importance of quality teacher preparation programs and include Virginia's alternative licensing provisions as part of its comprehensive review of *Virginia's Licensure Regulations for School Personnel.*

Teacher Support and Development

Recommendation 5

Improve Virginia's teacher professional development practices/programs.

a. Request Virginia's teacher preparation programs include best practices which translate to high quality professional development to match teacher's training needs.
b. Recommend additional time be committed to professional development, and identify options for providing professional development within existing mechanisms.
c. Provide state funding for school divisions to provide high quality professional development opportunities corresponding with teachers' professional needs.
d. Create policies that encourage school divisions to hold public instruction workshops to demonstrate exemplary teaching practices.

Teacher Evaluation

Recommendation 6

Implement teacher evaluation policies which encourage educational excellence and professional accountability.

a. Implement faithfully and institutionalize, through appropriate funding, the revised teacher evaluation system policy guidelines in the Virginia Board of Education's Guidelines for Uniform Performance Standards and Evaluation Criteria for Teachers. Also, provide financial support to implement the Board of Education's Guidelines for Uniform Performance Standards and Evaluation Criteria for Principals and for Superintendents.

Teacher Compensation

Recommendation 7

Study/revise Virginia's teacher compensation system to include components that foster excellence in teaching.

a. Provide funding for teacher salary increases.
b. Provide funding based on a strategic compensation model such as Salem's City Schools Growth Project.
c. Provide funding for establishing a differentiated compensation system based on teacher performance.

STRUCTURE AND SUPPORT OF THE EDUCATIONAL SYSTEM

Principal Quality

Recommendation 8

Develop leadership mentoring and development programs targeting the skills, knowledge, and attributes of effective leaders.

a. Implement, fund, and ensure professional development provisions are included in the *Guidelines for Uniform Performance Standards and Evaluation Criteria for Principals* adopted by the Virginia Board of Education in 2012.
b. Develop leadership policies and practices, in partnership with Virginia's education associations, to identify promising teachers to prepare them for official leadership positions.
c. Request the Department of Education develop a Request for Proposal (RFP) to create a Center for Research on Teacher and Leader Excellence to promote best practices in instructional leadership developed by Virginia's institutions of higher education; and coordinating with other states' leadership programs across Virginia's school divisions.

Instructional Time and Time Spent Learning

Recommendation 9

Investigate the Commonwealth's school day structure and school year structure.

a. Request the Governor and the Secretary of Education review best practices in structuring adequate planning time for teachers.
b. Request the Governor and the Secretary of Education study ways to maximize the instructional learning time for students including the allocation of the time in school day and the school year.
c. Request the Governor and the Secretary of Education review the waivers of seat-time requirements and make recommendations to allow students to earn credit based on demonstrating course mastery.

EDUCATIONAL INNOVATIONS

Virtual Learning

Recommendation 10

a. Explore virtual learning opportunities in Virginia.
b. Investigate multiple sources of funding, such as enrollment tuition, federal or state grants, or external funders, to ensure the sustainability of the virtual schools.
c. Develop a plan to ensure equitable access to virtual learning resources, in particular, for the at-risk student population.
d. Request more research in the field of virtual learning to have more knowledge base about what makes virtual learning effective.
e. Develop a plan to create more virtual elementary, middle, and remediation courses. Currently, more courses offered are high school courses, including AP or college level courses geared toward high-achieving students working toward college credits.

f. Consider and plan teacher professional development to require a thorough knowledge of virtual teaching strategies and the workings of specific virtual teaching platforms.
g. Investigate partnerships with other states to attain the most qualified teachers in specialized fields.
h. Explore the best use of virtual learning and what works with ensuring access, success, and accountability.
i. Recommend the expansion of virtual learning in Virginia based on the evidence of what works.

Science, Technology, Engineering, and Mathematics–Healthcare (STEM-H)

Recommendation 11

Develop a plan to implement rigorous and coherent STEM-H curriculum that deepens STEM-H learning over time.

a. Strengthen science education at elementary and middle school level. Teachers can cover less material, but cover it in depth. For example, separate science into sub-subjects like biology, physics, and chemistry starting at middle school level.
b. Enhance Virginia's STEM-H curriculum to promote mastery.
c. Develop gender-specific student programming to encourage participation in STEM-H-related classes.
d. Build cooperation with STEM-H-related business and industry where students can obtain "real life" experiences in the technology sectors.
e. Increase the proportion of in-field STEM-H teachers, particularly in Title I schools.

THE INTERNATIONAL ACHIEVEMENT GAP

The International Baccalaureate (IB)

Recommendation 12

Support, financially and otherwise, the expansion of IB programs.

a. Support the expansion of IB programs at the elementary, middle, and high school levels.
b. Request more schools with IB programs to have dual credentials (having sister schools in other countries).
c. Request more research on IB curriculum and assessment in order to develop and implement a similar but cost-effective system in every public school.

More Rigorous Middle School Curriculum

Recommendation 13

Continue to examine and improve Virginia's academic standards to ensure the rigor and quality of standards.

a. Develop more advanced math/science curriculum for grades 6, 7, and 8. For example, offer age-appropriate courses in biology, chemistry and physics in grades 6-8.
b. Conduct more research on the best math/science textbooks and pedagogical instruction practices in other countries. Suggest conducting an in-depth examination of the math curriculum developed by Singapore's Ministry of Education. This curriculum emphasizes extensive coverage of a relatively small number of concepts at early stages, and integrates math concepts, such as algebra and geometry, in secondary grade levels.
c. Request a comprehensive development of middle school math and science textbooks, including electronic and interactive versions.
d. Support the Virginia Board of Education's work in establishing rigorous, focused and coherent content at all grade levels, and reducing overlap and variation in implemented curricula across grades.
e. Offer students more opportunities to take challenging classes, beginning at the elementary school level.

f. Recommend schools review and revise curricula on a regular schedule, e.g., every five or ten years. Curricula should concentrate on the topics that must be mastered in order to understand the material presented in the following year.

Assessing Virginia's Student Performance

Recommendation 14

Recommend Virginia consider additional methods to measure students' achievement.

a. Request the Virginia Department of Education design a new generation of assessment to assess a broader range of student skills and knowledge. Instead of relying on multiple-choice, computer-scored tests, which educators and researchers believe cannot accurately measure higher-order thinking skills, the assessment should be diversified to include essay-type responses or even oral examinations.
b. Request the Virginia Department of Education to develop a plan for Virginia's participation in the 2015 TIMSS and/or PISA assessment as a "separate" country. The plan will discuss recommendations regarding the most appropriate assessment, implementation issues, and potential public and/or private funding sources. The Department will report on the status of this plan to the General Assembly and to the Commission on Youth prior to the 2014 General Assembly.

IV. Study Goals and Objectives

During the 2011 General Assembly Session, Senator Yvonne B. Miller introduced Senate Joint Resolution 320, which directed the Commission on Youth to study how Virginia school children compare academically to students in other countries. The resolution did not pass during the General Assembly Session; however, at the Commission on Youth meeting on April 5, 2011, the Commission adopted the study as a two-year study initiative. On May 14, 2012, the Commission adopted an updated Study Plan for Year 2.

STUDY MANDATE

The two-year plan directs the Commission to:

- compare the academic achievement of Virginia's students with that of students internationally for the past five years, especially in reading, mathematics, and science;
- identify features in the education systems of other countries which rank higher than the United States that may contribute to academic success;
- determine whether any of these features may be adapted for use in Virginia;
- determine whether and what changes in Virginia's public education system are warranted in light of findings from the comparison of the academic achievement of students in Virginia with students internationally; and
- consider other matters related to the objectives of this study and recommend feasible and appropriate options and alternatives.

IDENTIFIED ISSUES

- Educators, parents, community leaders and policymakers at the local, state, and federal level have focused attention on the need to address the academic achievement gap illustrated by grades, standardized-test scores, course selection, dropout rates, and college-completion rates.
- This finding is considered especially relevant, as today's high school graduates enter a global job market where highly skilled workers are in increasing demand and a number of countries have made significant improvements.

- U.S. industry, science, and technological innovation are being overtaken by competitors throughout the world, and U.S. employers have specifically detailed problems with the U.S. education system.
    - In a major survey conducted in 2005 by the National Alliance of Manufacturing, when companies where asked whether K-12 schools were doing a good job preparing students for the workplace, 84% of the 800 participating companies indicated "no."
    - The Aerospace and Defense segment reported "no" 93% of the time.
    - The top three most frequently-cited deficiencies of the education system were basic employability skills, math and science, and reading and comprehension.
- The United States ranks 27th among developed countries in the proportion of college students receiving undergraduate degrees in science or engineering.
- The STEM-H (Science, Technology, Engineering, Math--Healthcare) workforce accounts for more than 50% of the countries sustained growth.
- Careers in STEM-H related fields are predicted to increase by 18% from 2008 to 2018.
- A significant segment of the STEM-H workforce is approaching retirement age. However:
    - less than 30% of high school students report interest in STEM-H related majors; and
    - less than 17% of post-secondary degrees awarded in the U.S. are in STEM-H.
- On international assessments of academic proficiency, U.S. students' performance is below other countries.
    - In the Trends in International Mathematics and Science Study (TIMSS) conducted last in 2007, middle-school students in the United States ranked 11th out of 48 countries.
    - In the 2009 Programme for International Student Assessment (PISA), secondary school students ranked 30th in math, 23rd in science, and 17th in reading out of the 34 Organisation for Economic Co-operation and Development (OECD) member countries.
- Researchers assert that international comparisons can be problematic because factors such as culture and context are difficult to measure. Variables, such as curricula, amount and rate of preschool education, age of school enrollment, class sizes, discipline, quantity of education, attendance at additional schools, early tracking, and the use of central exams and tests, which also impact student outcomes, may not be accounted for by these studies.
- Countries have started benchmarking their policies and practices with the world's top performers. A compilation of the attributes of leading industrialized countries' educational systems would be useful in order to gather best-practices to help Virginia keep up globally.

STUDY ACTIVITIES

- Review data gathered during the first year.
    a. Review findings from in-depth literature review conducted from a sample of high performing countries based on educational outcomes, test scores, and ability to apply findings to the United States/Virginia.
    b. The countries/states selected for analysis based on geographic diversity and data availability include:
        i. Virginia
        ii. United States
        iii. Canada
        iv. Finland
        v. Singapore
        vi. South Korea
        vii. China – Shanghai, specifically
        viii. Incorporate findings from the literature review conducted of the Netherlands (included in year two)

c. Conduct a comparison between Virginia and high-performing education systems including the following:
    i. Information about Country
    ii. Student Demographics
    iii. System Attributes
    iv. Curriculum
d. Select specific international attributes, features, and outcomes based on clarity and portability of outcomes.

- Convene Advisory Group to assist in process
    a. Invite representatives from impacted groups

Secretary of Education	Virginia PTA
Board of Education	Virginia Manufacturers Association
Superintendent of Public Instruction	Career and Technical Education Officials
Virginia Department of Education	Virginia Education Association
Governor's Academies/STEM-H	Virginia Association of Elementary School Principals
Virginia School Boards Association	Virginia Association of Secondary School Principals
Virginia Association of School Superintendents	State Council of Higher Education
Virtual Learning Providers	Representatives of Higher Education/ Academia
Business Representatives	Virginia Community College System
Industry & Technology Representatives	Private School Representatives Educators/Guidance
Students & Parents	Counselors

- Identify international/national best practices that can be adopted in Virginia.
    a. Identify attributes that explain/support the positive educational outcomes in the selected countries.
    b. Review other states'/nations' research and studies
    c. Practices from schools that excel
    d. Innovative methods used to measure students' progress
- Develop consensus.
- Develop recommendations.
- Synthesize findings of literature and workgroup recommendations.
- Solicit feedback to recommendations from stakeholders, constituents, and DOE/Board of Education.
- Refine recommendations.
- Present recommendations to Commission on Youth.
- Prepare final report.

V. Introduction

Globalization's impact on economies is rapidly posing new and demanding challenges to individuals and societies. In this globalized world, people compete for jobs, not just locally but internationally. On November 8, 2011, U.S. Secretary of Education Arne Duncan acknowledged that "education and global job markets are much more competitive today than even a generation ago," and he noted that educators and countries need to work together to advance "achievement and attainment everywhere."[1] Inherent in this statement is the notion that schools and students in the United States must remain competitive in order to support tomorrow's economy and American prosperity. Developing new cohorts of highly qualified and competitive workers requires high-quality education systems.

[1] U.S. Department of Education. (November 8, 2012). *Secretary Arne Duncan's remarks at the Microsoft Partners in Learning Global Forum.* Retrieved from http://www.ed.gov/news/speeches/secretary-arne-duncans-remarks-microsoft-partners-learning-global-forum.

Not only must the United States remain competitive globally, it needs to ensure that graduating students have the skills needed to enter the workforce of the future. For instance, employment in the professional, scientific, technical, and computer systems fields is expected to increase 45 percent by 2018.[2] These are fields that rely heavily on logic, reasoning, and critical thinking. Education expert, Tony Wagner, has conducted scores of interviews with business leaders and observed hundreds of classes in some of the nation's most highly regarded public schools.[3] He discovered a profound disconnect between what potential employers are looking for in young people today (critical thinking skills, problem solving, collaboration, creativity, and effective communication) and what our schools are providing (passive learning environments and uninspired lesson plans that focus on test preparation and reward memorization). This problem exists not only in low performing schools but also in top schools. Youth in the United States are being equipped to work in job fields that are quickly disappearing from the economy, while young adults in India and China are preparing to compete for the most sought-after careers around the world.

Current political and socio-economic circumstances around the globe demand more competitive human capital. For the last few decades, such investment has been emphasized as an important factor contributing to economic growth.[4] Continuous improvement of educational opportunities for young people is one of the best means of human capital investment, with an enormous potential for payback.[5] For many years, researchers, policymakers, and educational practitioners have explored variables that affect student achievement. With the implementation of *No Child Left Behind Act* (NCLB) in 2001, the United States Congress emphasized the need for states and school districts to ensure that *all* students — particularly at-risk students, students who are ethnically and linguistically marginalized, and students who are otherwise disadvantaged — have access to a quality education.[6]

During the 2011 Virginia General Assembly Session, Senator Yvonne B. Miller introduced Senate Joint Resolution 320, which directed the Commission on Youth to study how Virginia school children compare academically to students in other countries. The resolution directed the Commission to:

- compare the academic achievement of Virginia's students with that of students internationally for the past five years, especially in reading, mathematics, and science;
- identify features in the education systems of other countries that rank higher than the United States which may contribute to the academic success of their students;
- determine whether any of these features may be adapted for use in Virginia and the cost of implementation;
- determine whether and which changes in Virginia's public education system are warranted in light of findings from the comparison of the academic achievement of students in Virginia with students internationally; and
- consider other matters related to the objectives of this resolution and recommend feasible and appropriate options and alternatives.

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[2] U.S. Department of Labor, Bureau of Labor Statistics. (2010). *Occupational Outlook Handbook, 2010-11 Edition*. Retrieved from http://www.bls.gov/oco/oco2003.htm.

[3] Wagner, T. (2008). *The global achievement gap: Why even our best schools don't teach the new survival skills our children need.* New York: Basic Books.

[4] Glomm, G., & Ravikumar, B. (1992). Public versus private investment in human capital: Endogenous growth and income inequality. *Journal of Political Economy, 100*(4), 818-834.

[5] Baker, D. P., Goesling, B., & LeTendre, G. K. (2002). Socioeconomic status, school quality, and national economic development: A cross-national analysis of the "Heyneman-Loxley Effect" on mathematics and science achievement. *Comparative Education Review, 46*(3), 291-312.

Chudgar, A., & Luschei, T. F. (2009). National income, income inequality, and the importance of schools: A hierarchical cross-national comparison. *American Educational Research Journal, 46*(3), 626-658.

[6] U.S. Department of Education. (2001). *No Child Left Behind Act of 2001.* Washington, DC: Author.

While Senator Miller's resolution did not pass the Virginia General Assembly, the Commission on Youth adopted a two-year study plan for *Comparison of Academic Achievement in Virginia and Leading Industrialized Countries* to explore the following issues:

- Students in the United States lag in academic performance when compared with students in other industrialized countries, particularly in science and mathematics.
- The 2009 Organisation for Economic Co-operation and Development (OECD) Programme for International Student Assessment indicated that, of the 34 countries evaluated, the United States ranked 14th in reading, 17th in science, and 25th in mathematics.
- The United States falls far behind the highest scoring countries, including South Korea, Finland, Singapore, Hong Kong, Shanghai in China, Japan, New Zealand, Australia, and Canada.
- Today's United States graduates compete in a global job market where highly skilled workers are in increasing demand. While other countries have made significant improvements in education, the United States has made only incremental improvements.
- The decline in the academic achievement of American students and the failing condition of public education has been prominent among national and state concerns about the United States' ability to compete internationally.
- In the early 1980s, the Commonwealth of Virginia hosted the national meeting on "A Nation at Risk" to reform and strengthen public education. Since that meeting, Virginia education initiatives have included the Standards of Learning, the Virginia Preschool Initiative, the Governor's magnet, charter, virtual, laboratory, and alternative schools, dual enrollment, year-round schools, and career and technical education schools. These initiatives provide options for Virginia students to meet their educational needs and, as a result, significant progress in student achievement has been achieved.
- Despite progress made to date, public education in Virginia is not immune to the challenges confronting American education. Disregarding the distress signs would be imprudent and pose a significant threat to state economic status and success in the global marketplace.
- Virginia needs a cadre of scientists, engineers, mathematicians, educators, physicians, and entrepreneurs, and a steady supply of the brightest minds in all other professions and occupations in the workplace, to maintain and improve Virginia's productivity and competitive edge.
- It is critical to evaluate the academic achievement of Virginia's students, relative to the reported outpacing in education by students in other countries, to improve and strengthen Virginia's schools and learning opportunities for its students.

Exploring how other countries approach educational policy issues has the potential to enhance Virginia's educational policy and practice. A comparison of the highest performing countries can provide valuable insights that the Commonwealth of Virginia may wish to consider. While it can be argued that comparing countries has limited meaning due to cultural and societal differences, the purpose of this report is to present and acknowledge these differences and determine which aspects could be incorporated to increase student achievement in Virginia's educational system.

Literature and other extant data were reviewed to identify countries (and regions of countries) that would generate comparative and contrasting data most beneficial to Virginia. Using top performing countries on the Programme for International Student Assessment (PISA)[7] and Trends in International

[7] PISA involves extensive and rigorous international surveys to assess the knowledge and skills of 15-year-old students. PISA is the result of collaboration of more than 70 countries interested in comparing their own student achievement with the student achievement in other countries. Every three years, PISA compares outcomes for 15-year-old students on measures of reading, literacy, mathematics, and science. PISA's assessments are designed to determine not only whether students have mastered a particular curriculum, but also whether they can apply the knowledge they have gained and the skills they have

Mathematics and Science Study (TIMSS)[8] assessments, the list was narrowed using factors such as geographical region, population, population density, and gross domestic product (GDP).

Researchers conducted a comprehensive literature review of selected countries, comparing the performance of students in the targeted countries with that of students in the United States, with a particular focus on what is known about Virginia students. The review attempted to identify attributes that explain/support the positive educational outcomes in the selected countries. Policies and practices that could be adopted in Virginia were identified for further study and a determination of feasibility for implementation in Virginia.

The initial findings and recommendations of the study were published as an interim report in *Report Document No. 218*, 2012. Data from the first year are highlighted in Sections VII and VIII of this report.

VI. Methodology

The findings of this study are based on several distinct study activities.

A. RESEARCH AND ANALYSIS

The Commission on Youth contracted with the School of Education at the College of William and Mary to conduct an extensive literature review. Patricia A. Popp, Ph.D. and James H. Stronge, Ph.D. of William and Mary served as the principal investigators for the study. In addition to the literature review, three researchers from William and Mary participated in site visits to Shanghai, providing first-hand observations and interactions with this city's educational system.

For this study, high-performing international educational systems were analyzed to identify best practices that may be appropriate for inclusion in Virginia's educational system. The research team reviewed data, reports, and research studies to identify attributes of educational system both in Virginia and in the United States. A review of the literature addressing features of the educational systems from high-performing countries was also conducted. Existing data sources and international assessments were used for this analysis. The primary data sources included:

- Organisation for Economic Co-operation and Development (OECD);
- Trends in International Mathematics and Science Study (TIMSS);
- 2009 Programme for International Student Assessment (PISA);
- American Institutes for Research;
- National Center for Education Statistics; and
- Studies published in educational research journals.

Given the nature of the questions posed, this study focused on descriptive statistics and a qualitative case study approach.

B. REVIEW OF INTERNATIONAL ASSESSMENTS

One of the main ways to identify high-performing education systems is through international assessments. The results from two international assessments were analyzed for this study effort: the

acquired to the new challenges of an increasingly modern and industrialized world. Thus, the purpose of the assessments is to inform countries on the degree to which their students are prepared for life. [Source: OECD. (2011)]. *Strong Performers and Successful Reformers: Lessons from PISA for the United States.* Retrieved from http://dx.doi.org/10.1787/9789264096660-en.

[8] Developed and implemented at the international level by the International Association for the Evaluation of Educational Achievement (IEA), TIMSS is used to measure the mathematics and science knowledge and skills of fourth- and eighth-graders over time. About 40 percent of TIMSS assessment focuses on the cognitive domain of knowledge, with 40 percent on application, and 20 percent on reasoning.

Programme for International Student Assessment (PISA) and Trends in International Mathematics and Science Study (TIMSS):

- PISA – The Program for International Student Assessment is given every 3 years to 15-year- olds worldwide. The Organisation for Economic Cooperation and Development (OECD), which is funded by 30 countries, coordinates the testing. The first PISA test was given in 2000. Every test specializes in one particular subject, but includes other subject areas. In 2006, the focus was science. In 2009, the focus was reading.
- TIMSS – The Trends in International Mathematics and Science Study, given first in 1995, is conducted by the International Association for the Evaluation of Educational Achievement (IEA). The test is given to 4th and 8th grade students and is administered every 4 years. In 2011, approximately 63 countries and 14 benchmarking entities participated.

Another international assessment, the Progress in International Reading Literacy Study (PIRLS), assesses reading achievement in 4th graders in 50 different countries. For purposes of this study, however, only TIMSS and PISA data were utilized.

National-level data on student achievement were also reviewed. In the United States, this information comes from the National Assessment of Educational Progress (NAEP), also known as the "Nation's Report Card." The NAEP is a nationally representative assessment of the United States students and is administered periodically to students in grades 4, 8, and 12 in math, science, and other subjects.

C. SELECTION OF HIGH-PERFORMING COUNTRIES

The successes of other countries can provide potential guidance for decision-making in Virginia. Interestingly, other countries have commenced benchmarking their educational policies and practices with the world's top performing countries. Likewise, a compilation of successful attributes of leading countries' educational systems would be useful to gather knowledge of best practices to ensure Virginia maintains and enhances its economic competitiveness. Consistent high-performers on the PISA and TIMSS assessments include Singapore, Finland, South Korea, Canada, and Japan.[9]

Countries with high-performing educational systems and a variety of educational attributes appropriate for benchmarking were included for the initial data review. The process of selecting countries for this study involved reviewing a range of sources, including those in the listing which follows.

- Governmental, intergovernmental, and non-governmental publications;
- Existing surveys;
- International and national professional and academic journal articles;
- Websites and web-based networking facilities; and
- Extant literature.

[9] In order to ensure the comparability of results across countries, PISA devoted attention to including representative samples of comparable target populations in the assessments. Differences among countries related to the nature and extent of pre-primary education and care, the age of entry for formal schooling, and the structure of the education system do not allow school grade levels to be defined in a way that is internationally comparable. Therefore, PISA defined their populations with reference to a target age. PISA covers students who are between 15 years 3 months and 16 years 2 months at the time of the assessment and who have completed at least six years of formal schooling, irrespective of the type of institution in which they are enrolled, whether they are in full-time or part-time education, whether they attend academic or vocational programs, and whether they attend public or private schools or foreign schools within the country. As a result, PISA data can make comparisons about the knowledge and skills of 15-year-old students, despite their having had different educational experiences, both in and outside school. (Source: PISA 2009 Technical Report).

Based on a careful review of the literature and other available data sources, five countries with high quality educational systems were selected for a more in-depth analysis; a sixth country was added at the request of the Commission on Youth at its December 2011 meeting. The process of country selection encompassed a range of sources (governmental, intergovernmental, and non-governmental publications, surveys, international and national professional and academic journal articles, and websites) to identify the countries. Selection was made based on geographic diversity and availability of sufficient data.

- **Canada** was selected due to its proximity to the United States, its similar diverse student population, and its decentralized educational system. Although not among the top five according to the TIMSS and PISA, Canada performs at the same level as Japan and New Zealand, and outscores the United States significantly.
- **Shanghai** is new to international assessment but significantly outperformed even the previously top performing countries in all three categories, according to PISA 2009. In addition, three researchers on this research team have had the opportunity to participate in site-visits to Shanghai, providing first-hand observations and interactions with their system.
- **South Korea** has only secondary-school level data available on international assessments of PISA and TIMSS; however, the available data ranks South Korea among the top two in PISA Reading Grade 10 assessment and TIMSS Math Grade 8 assessment, as well as the top four in PISA Math Grade 10 and TIMSS Science Grade 8, and top six in PISA Science Grade 10.
- **Singapore** consistently ranks among the top countries across years, grades, and subjects, based on both TIMSS and PISA.
- **Finland** is consistently ranked among the top five on international assessments and its inclusion provided representation of a European nation. Finland provides outstanding education with less emphasis on standardized testing and with fewer school system resources. This ability to do more with less may provide valuable information for improving the Virginia educational system.
- **The Netherlands** was added upon to the request of the Commission on Youth during the preliminary presentation made by William and Mary in December 2011. The Netherlands ranked 10th in reading, 12th in mathematics, and 11th in science in the 2009 PISA; on the Grade 4 TIMMS, The Netherlands ranked 9th among industrialized nations.

D. ADVISORY GROUP

The Commission established an Advisory Group in order to help identify, refine and prioritize issues of the study. Members of the Advisory Group also identified subgroups for the purpose of exploring key identified themes.

The Advisory Group established by the Commission included representatives from the following agencies and organizations:

- Boehringer Ingelheim Chemicals, Inc.
- Enterprise Solutions and Assessment Team
- General Assembly Members
- Hanover County Public Schools
- International Association for K12 Online Learning
- Murray High School, Charlottesville
- Norfolk State University
- Office of the Virginia Secretary of Education
- Special Advisor to the Governor on Children's Services
- State Council of Higher Education
- University of Virginia Weldon Cooper Center for Public Services
- University of Virginia Center to Promote Effective Youth Development
- Virginia Association of Elementary School Principals;
- Virginia Association of School Superintendents
- Virginia Association of Secondary School Principals

- Virginia Board of Education;
- Virginia Chamber of Commerce
- Virginia Commission on Youth
- Virginia Commonwealth University L. Douglas Wilder School of Government and Public Affairs
- Virginia Community College System
- Virginia Department of Education
- Virginia Education Association
- Virginia Governor's Academy for Engineering Studies
- Virginia PTA/PTSA
- Virginia School Board Association
- Virginia State University School of Liberal Arts and Education
- Virginia Poverty Law Center
- Voices for Virginia's Children
- William and Mary University School of Education

A complete listing of the Advisory Group membership is provided as Appendix D.

The Advisory Group met twice in 2012: on May 9 and on October 2. The Advisory Group also participated in the Roundtable on Academic Achievement on June 26, 2012. Minutes for Advisory Group meetings are provided as Appendix E.

E. ROUNDTABLE ON ACADEMIC ACHIEVEMENT

To expand the discussion of ideas raised during the May 9 Advisory Group meeting, the Commission invited impacted stakeholders representing K-12 education, higher education, and business to attend a statewide Roundtable in Richmond on June 26, 2012. The more than 70 participants were divided into the four subcommittees and tasked with refining specific issues in breakout sessions. When participants reconvened in the full Roundtable, Commission staff outlined key discussion points identified by the each subcommittee and invited participants to provide additional feedback. Minutes for the Roundtable are provided in Appendix F.

VII. Education Profiles of Virginia and Selected Countries/Regions

This section provides educational profiles of the selected countries for comparison with the Commonwealth of Virginia. In addition to general information related to population and gross domestic product, the educational organization, a brief history of the educational system, financing of schools, and recent efforts to improve student achievement are provided to add context to the quantitative data. The next section includes analyses across the profiles.

A. VIRGINIA

Brief History of Educational System[10]

The Underwood Constitution of 1869 called for the initial establishment of a state education system in Virginia, providing for a state superintendent of public instruction and a Board of Education consisting of the Governor, Attorney General, and chief state school officer. Previous to the Underwood Constitution, Virginia's educational system consisted of apprenticeships for youth, especially orphaned youth, or private tutoring among more affluent citizens. The first state superintendent, Dr. William H. Ruffner, established policies that set precedents for current educational policy. He stipulated that the costs of public education would be subsidized by the state and local governments, and that all individuals ages 5 to 21 would be offered a free and public education.

[10] Virginia Department of Education. (2003). *A history of public education in Virginia.* Retrieved from http://www.cteresource.org/TFTfinalWebFiles/OtherDocuments/history_public_ed.pdf.

Table 1

General Information on Virginia

Population	8 million
GDP per capita[11]	$47,430
Number of divisions[12]	132
Number of local schools[11]	
Pre-K	26
Elementary	1186
Middle	311
High	313
Local alternative, career, technical, and special education centers	119
Number of regional schools	
Alternative centers	45
Career and technical centers	10
Governor's schools	18
Special education centers	19
Total students[11]	1,258,521
Total teachers[13]	71,415

In the early 20th century, citizens of Virginia worked to improve public education by establishing school divisions, increasing local and state funding, improving teacher salaries, and establishing policies regarding teacher certification. The 1920s marked the spark for growth in the field of education in Virginia. The Virginia Board of Education expanded to 13 members and supervisory roles were created to ensure quality education was offered to students. High schools, scarce prior to the 1920s, became more standard and offered a four-year college preparatory program that included agricultural courses and vocational options. Following World War II, the Virginia education system lacked teachers, as those returning from war did not return to classrooms. Scholarship programs attempted to bring in more teachers.

The Sputnik Era once again fueled Virginia's desire for a well-educated society. However, at the same time, the Civil Rights Act of 1964 provided that all individuals have the right to a public education, free of discrimination. The desegregation of schools resulted in the closing of many high schools until integrated.

The Commonwealth's new Constitution, adopted in 1970, required for the first time a high-quality education program (Article VIII, Section 1 – Virginia Constitution). In 1971, the Board of Education adopted the Standards of Quality. By the early 1980s, the basic Standards of Learning had been established. In 1995, the Board of Education revised Virginia's Standards of Learning to include expectations for teachers and students and to provide for greater accountability in public schools. The following year, the Board of Education developed a new state testing program to measure skills and competencies. Currently, Standards of Learning assessments are being offered to all students in specific

[11] Bureau of Economic Analysis. (2011). [Graph illustration GDP by state]. *Gross domestic product by state (GDP by State) Interactive Map.* Retrieved from http://www.bea.gov/regional/gdpmap/GDPMap.aspx.
[12] Virginia Department of Education. (2011). *Local and regional schools and centers.* Retrieved from http://www.doe.virginia.gov/statistics_reports/school_report_card/index.shtml.
[13] Local School Directory. (2012). State information for public schools. Retrieved from http://www.localschooldirectory.com/state-schools/VA.

subjects. The Standards of Accreditation sets forth graduation requirements and use results from assessments in core subjects to determine if schools are providing the quality education expected. The Board of Education upholds the quality of public education in Virginia through the Standards of Quality.

Education Finance

The following information is taken from the Superintendent's 2010-2011 Annual Report for Virginia.[14] In Fiscal Year 2011, the Commonwealth of Virginia spent approximately $13 billion on education expenses, allocating approximately $10,793 per student. In general, Virginia's public schools are funded by a combination of federal, state, and local funding. State funding is determined using the composite index formula, which attempts to measure a locality's ability to pay for public education, and then subsidizes an estimated cost that the state will pick up. Federal funds contributed $1,119 per pupil while state funds contributed $4,303 per pupil.

School Turnaround Strategy

Recently, the Commonwealth of Virginia has made some significant changes emphasizing improvements in pre-kindergarten (Pre-K) education, teacher evaluation, and electronically-supported learning and teaching (e-learning). In 2005, Governor Warner initiated support and funding for the Virginia Early Childhood Foundation/Smart Beginning partnership, designed to provide all at-risk students with a Pre-K opportunity. Governor Kaine continued this trend through increased funding for Pre-K and the development of the Start Strong Council in 2006, tasked with the challenge of expanding Pre-K programs to even more four-year-olds.[15] In 2007-2008, the Commonwealth of Virginia spent approximately $47 million to provide Pre-K services to 13,125 students, or approximately 13 percent of four year olds in the Commonwealth.[16]

In 2010 Governor McDonnell introduced his Opportunity to Learn Initiative. This initiative included revisions to Virginia's charter school statute and the establishment of virtual schools and college partnership laboratory schools.

Another significant initiative in Virginia education is the newly-released revised Teacher Performance Standards and Evaluation Criteria, a performance-based evaluation tool in which 40 percent of teacher performance is based on student academic progress. Furthermore, the Virginia Performance Pay Incentives Initiative, which is based on the recently revised and released Teacher Performance Standards and Evaluation Criteria, is in its pilot phase in 2011-2012.[17]

The Commonwealth of Virginia has also been recognized as a leader in e-learning. The Virtual Virginia Initiative currently offers "40 different online courses, including 24 Advanced Placement (AP) courses, other core courses, foreign languages and electives," and "enrolls approximately 2,500 students from 238 Virginia middle and high schools."[18] The reach of the program extends to 5,700 students, who receive remedial instruction through online tutorials hosted by Virtual Virginia. These steps towards e-

[14] Virginia Department of Education. (2011). Table 15 of the *Superintendent's Annual Report for Virgini*a. Retrieved from http://www.doe.virginia.gov/administrators/superintendents_memos/2012/069-12a.pdf.
[15] Pre-K Now. (2008). *State Profile: Virginia.* Retrieved from http://67.199.18.33/resource/profiles/virginia.cfm?&print=1.
[16] Barnette, W., Epstein, D., Friedman, A., Boyd, J., & Hustedt, J. (2008). *The state of preschool 2008: State preschool yearbook.* The National Institute for Early Education Research, New Brunswick, NJ.
[17] Virginia Department of Education. (2012). *Teaching in Virginia: Performance & evaluation.* Retrieved from http://www.doe.virginia.gov/teaching/performance_evaluation/index.shtml.
[18] Virginia Department of Education. (March 26, 2009). Virginia recognized by *Education Week* as an E-Learning leader. *Virginia Department of Education News.* Retrieved from http://www.doe.virginia.gov/news/news_releases/2009/mar26_print.pdf.

learning have begun to provide more college-level opportunities for students, as well as an increase in graduation rates.

B. CANADA

Table 2

General Information on Canada[19]

Population	33.7 million
GDP per capita	$46,000
Number of provinces/territories	10 provinces, 3 territories
Number of schools[20]	15,500 (2005)
Total students [22]	5.3 million (2005)
Total teachers[21]	310,000

The number of students enrolled in schools, as well as the number of educators, had decreased slightly from the previous year. In 2004-2005, 515,000 students in Canada were enrolled as either full-time or part-time students in undergraduate programs at universities, colleges, or institutes.[22]

Education Finance

In Canada in 2004-2005, total expenditures on education amounted to $9,040 per student. Costs were highest in the Northwest Territories and the Yukon, at over $13,000 per student, and lowest in the Atlantic Provinces, where average cost per student ranged from a high of $6,253 in Newfoundland to a low of $5,344 in Nova Scotia.[23] Figure 1 depicts the structure of the current education system in Canada.

In 2005-2006, total public funding of Canada's public education system amounted to a total of $75.7 billion, representing 16.1 percent of Canada's total public expenditures. Private expenditures on education amounted to approximately 17.7 percent of total expenditures on education.[24]

Brief History of Educational System

The family was the primary source of education during the 18th and early 19th centuries. By the mid-19th century, the clear establishment of a school system was developed and primarily intended to instill positive behaviors and thinking among children. School systems were thought to be the prime point of dissemination of behavior and values. By the late 19th century, compulsory education laws were put into effect (except in Quebec), although most parents were already sending their children to schools. French Canadians in Quebec and other provinces did not assimilate as well to the new education movement, resulting in significant differences in literacy rates and economic status.

By the 1960s, during the Quiet Revolution period, Quebec revamped the public education system in an effort to significantly increase the quality of the labor force. A new mindset was promoted that stressed the impact of education on socio-cultural and economic opportunities.

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[19] U.S. Department of the State. (2011). *Background Note: Canada.* Retrieved from http://www.state.gov/r/pa/ei/bgn/2089.htm.
[20] The Council of Education Ministers Canada. (n.d.). *Education in Canada: An Overview.* Retrieved from http://www.cmec.ca/299/Education-in-Canada-An-Overview/index.html.
[21] Blouin, P. & Courchesne, M. (2007). Summary Public School Indicators for the Provinces and Territories, 1998/1999 to 2004/2005. Statistics Canada. Retrieved from http://www.statcan.gc.ca/pub/81-595-m/81-595-m2007050-eng.pdf.
[22] The Council of Education Ministers Canada. (n.d.).
[23] Retrieved from Canadian Information Centre for International Credentials, The Council of Ministers of Education, Canada, 2010.
[24] The Council of Ministers of Education, Canada. (n.d.).

Education policy in Canada has been guided by the goal of ensuring that organizations, schools included, have a positive impact on society. Canadians strongly believe in peace, order, and good government and this expression is used in law. Because schools are such a powerful venue to communicate this message to children, state funding for education in Canada is among the highest in the world.

School Turnaround Strategy

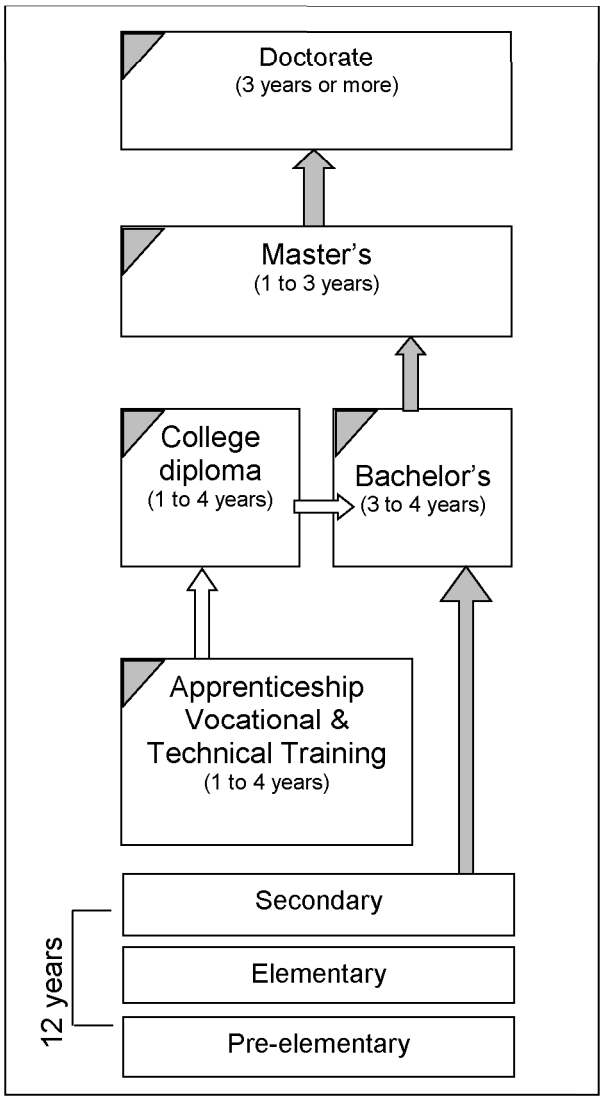
Learn Canada 2020 is an initiative intended to guide public education in the provinces and territories. It entails a framework with four foci, or pillars, which include:

1. Ensuring access to early childhood education;
2. Ensuring equal opportunity to attend quality elementary, middle, and high schools;
3. Increasing the number of post-secondary degree pursued; and
4. Developing an adult learning and skills development system.

The Prime Minister has advocated Learn Canada 2020 as a national goal in order to promote the Canadian workforce and economy. The declaration does not provide specific plans, but instead leaves the provinces and territories to determine which strategies will be implemented to reach these goals. Ministers are to report progress annually.

Figure 1

Current Education System in Alberta, British Columbia, Manitoba, New Brunswick, Ontario, Newfoundland and Labrador, Yukon



C. SHANGHAI

Table 3

General Information on Shanghai[25]

Population	20,555,100
GDP per capita	$11,361 (2009)
Number of schools	
Preschool	1,057
Primary	626
Secondary	794
Total Preschool and Compulsory	2,477
Total students	
Preschool	299,800
Primary	535,700
Secondary	440,000

Number of Schools and Enrollment

In 2007, Shanghai had 1,057 preschools, 626 elementary schools, and 794 secondary schools. There are about 535,700 elementary students and 440,000 secondary students. The enrollment rate for the nine-year compulsory education (Grade 1 through Grade 9, i.e., elementary and middle school level) has been consistently at 99.99 percent.

There were 60 institutions of higher learning which offered three-year diploma programs to 171,500 students and four-year undergraduate programs to 292,800 students. Among these 60 higher education institutions, 51 provided post-graduate programs. There were 65,800 students seeking a master's degree and 21,100 seeking a doctorate. Figure 2 depicts the structure of China's educational system.

Figure 2

Structure of China's Education System[26]

<table>
<tr><td colspan="2">Tertiary</td></tr>
<tr><td>Senior Secondary (3 years) (General)</td><td>Vocational Secondary Schools</td></tr>
<tr><td colspan="2">Junior Secondary (3 years) (Shanghai: 4years)</td></tr>
<tr><td colspan="2">Primary (6 years) (Shanghai: 5 years)</td></tr>
<tr><td colspan="2">Pre-School (3-4 years)</td></tr>
</table>

Education Finance

In 2006, the budgeted finance of education was RMB 23 billion Yuan,[27] an increase of 9.52 percent from the prior year. The total educational expenditure was RMB 37 billion Yuan, an increase of 8.19 percent from 2005. In order to diversify the funding of education, sources of unbudgeted income have merged in recent years, such as students' fees, university-run enterprises, donations, and private schooling. In 2006, RMB 4.6 billion Yuan was generated from students' fees (12.44 percent), RMB 350

[25] Shanghai Ministry of Education. (2007). *Education in Shanghai: An overview.* Retrieved from http://www.shmec.gov.cn/web/concept/show_article.php?article_id=252.
[26] OECD. (2010). *Strong Performers and Successful Reformers in Education: Lessons from PISA for the United States.* Retrieved from http://dx.doi.org/10.1787/9789264096660-en.
[27] One U.S. States dollar is equivalent to approximately RMB 6 Yuan.

million Yuan from university-run enterprises (0.94 percent), RMB 45 million from donations (0.12 percent) and RMB 3.5 billion Yuan from some other sources to fund the education (9.52 percent).[28]

Brief History of the Educational System

The educational system in Shanghai, and in China at large, has undergone several stages of development: the rigid Russian model during the 1950s, the period of "renaissance" in the early 1960s, disastrous damage during the Cultural Revolution (1966-1976), rapid expansion of basic education during the 1980s and 1990s, and the move towards massive higher education in the 21st century.[29] The Cultural Revolution in China from 1966 to 1976 essentially halted the education system by eliminating all "bourgeois" cultural symbols or representations, including art, music, drama, and novels, and fully implementing the egalitarian ideal that all should be equal and wealth be redistributed.

Professors and educators were sent to factories and farms, while factory workers and farmers were sent to schools to teach. With the death of Chairman Mao in 1976, the Cultural Revolution came to an end, but China's education system was in disrepair and needed to be restructured and rebuilt. Through the late 1970s, schools reopened and higher education institutions began accepting students once again. In the early 1980s, in order to tap into community resources, China allowed schools to be supported by additional non-governmental funds from communities. This sparked the development of primary schools. In 1986, China enacted the *Law of Compulsory Education* that required all children take at least nine years of compulsory education. By the 1990s, China's primary enrollment rate was nearly 100 percent, with post-secondary rates around 79.2 percent, including both academic and vocational programs. The 1990s was the era of higher education. The enrollment rates for higher education institutions increased by 25 percent in 2000 and 22 percent in 2001.

As one of the most internationalized cities in China, Shanghai has been at the forefront of educational reform. It was among the first to achieve universal nine-year compulsory education and to achieve almost universal senior secondary education. Moving away from its traditional examination-driven system, Shanghai has invested tremendous effort to reform its curriculum and assessment over the last two decades so as to better equip its children and youth with 21st Century skills.

School Turnaround Strategy

One interesting strategy employed by Shanghai to improve weak schools is the commissioned education program. Under this scheme, a top-performing school is assigned to administer a weak school. Such assignments are most easily implemented within the city; however, this type of exchange program is being used with poor rural schools. Such a system assists weaker schools and benefits stronger schools by allowing them to promote teachers and administrators. Efforts for this strategy included:

- Systematically upgrading the infrastructure of all schools to similar levels;
- Transferring financial resources to schools serving disadvantaged student bodies and transferring high-performing teachers from socio-economically advantaged schools to disadvantaged ones;
- Pairing high-performing districts and schools with low-performing districts and schools to collaborate on educational development planning and to share resources such as curricula, teaching materials, and best practices; and
- Having strong schools take over the administration of weak ones, by appointing new school leaders and sending a team of experienced teachers to lead in teaching.[30]

[28] Shanghai Ministry of Education. (2007).
[29] OECD. (2010). *Strong Performers and Successful Reformers in Education.*
[30] Ibid.

D. SOUTH KOREA

Table 4

General Information on South Korea[31]
2008

Population[32]	48,754,657 (2011)		
GDP per capita	$20,757		
Number of schools	20,261		
Public schools	14,133		
Private schools	6,030		
Total students	11,443,741		
Total public school teachers	533,649		
Numbers by Grade Level	Students	Teachers	Schools
K-12			
Kindergarten	538,587	7,212	8,388
Elementary	3,299,133	25,519	5,855
Middle	1,979,656	12,110	3,144
High	1,982,207	13,598	2,313
Post-Secondary			
Junior College	772,509	5,742	149
Undergraduate	2,555,016	28,441	222
Graduate	316,633	723	40

Education Finance

Compared to other OECD countries, South Korea has outspent all other countries on education, except Iceland, in respective GDP. The Ministry of Education was budgeted approximately 7.6 percent of the GDP. According to the OECD, 22 percent of education costs in South Korea are paid by parents or private organizations and companies. This means far less government spending than other OECD countries, which averages 91 percent.

Although preschool programs are not part of South Korea's compulsory program, they are increasingly popular. The government helps subsidize the cost of pre-school education kindergarten, and enrollment has steadily increased over the past 40 years, with a 36.2 percent enrollment rate in 2007. Elementary school enrollment has been fairly consistent, hovering in the mid- to upper-90s. In 2007, it was at 99.3 percent. Approximately one-fifth of college students are on the junior college track, while the remainder pursue an undergraduate course track.

Brief History of the Educational System

Pre-modern Korean education dates back to prehistoric times and ended with the advent of the first formal education systems around Year 372. Curriculum in that period focused on ethics based on Confucianism and Buddhism. The first modern schools were introduced by Christian missionaries in the 19th century. Following the end of the Korean War, South Korea's education system underwent rapid and continuous transformations, beginning with policies addressing compulsory and curricular education, adult literacy education, and higher education. In an attempt to promote an educated

[31] Ministry of Education, Science and Technology. (2011). *Education for the future: Science and technology towards the future overview.* Retrieved from http://english.mest.go.kr/web/1722/site/contents/en/en_0219.jsp.
[32] U.S. Department of State. (2011). *Background Note: South Korea.* Retrieved from http://www.state.gov/r/pa/ei/bgn/2800.htm.

democracy, the government initially used the education system to provide basic education, which has since evolved into one of the highest-achieving educational systems in the world.

By the 1960s and 1970s, rapid economic growth resulted in drastic increases in student population, but shortages in facilities and qualified teaching staff. Teacher/education reform helped South Korea increase the numbers of qualified educators and normalize education at all school levels. Standardized preliminary college screening assessments were instituted. By the 1980s, South Korea had developed tax systems to finance education, college graduation quotas, and reforms aimed at improving early education, the college entrance system, curriculum, instruction, school facilities, and teacher quality. For the first time, South Korean education policy promoted the idea of life-long education.

To help students prepare for the challenges of the 21st century, the national curriculum was updated in 1998, moving away from a didactic educational approach to an increased focus on student-oriented curriculum emphasizing individualism and creativity.

School Turnaround Strategy

South Korea proposed six major tasks for 2011, which included the following goals:[33]

- Expanding creative and character building education.
  - Encourage creative classes by revising curriculum and reducing student loads to provide more tailored education.
  - Introduce more art, sports, and science programs and connect to real world companies/industries.
  - Facilitate a more democratic education and incorporate more experience-based education.
  - Improve support for students with special needs or students with challenges at home.
  - Improve safety of students at school.
- Establishing an advanced vocational education system that links education and work.
  - Provide more career guidance.
  - Link education curriculum and job qualification.
  - Strengthen vocational education in college.
- Offering quality teaching at universities.
  - Advance college admission process by establishing an admission officer system and revising the college ability test.
  - Advance university education by strengthening the educational capacity of universities and by attracting more foreign students.
  - Introduce an education accreditation system and restructure private universities.
- Promoting science and engineering talents.
  - Create a national strategic research and development (R&D) system with a focus on science and technology that includes a basic science research institute-hub for sharing information.
  - Globalize education, science, and technology with the goal of continuously enhancing national image.

[33] Ministry of Education and Culture. (2011). *6 Major Tasks for 2011*. Retrieved from http://english.mest.go.kr/web/1717/site/contents/en/en_0275.jsp.

E. SINGAPORE

Table 5

General Information on Singapore[34]

Population (2011)	5.8 million
GDP per capita (2010)	$43,867
Number of government/government-aided schools (2010)[35]	342
Elementary	173
Secondary	148
Mixed level	8
Junior Colleges	13
Total students (2010)[35]	510,714
Total public school teachers (2010)[35]	29,862

Number of Schools and Enrollment

As described by the Ministry of Education, Singapore, although the majority of schools in Singapore are public institutions, about one-fourth are either government-aided or independent of government funding. Of the 342 government-funded schools, 173 are primary schools; 148 are secondary; 8 are mixed level schools; and 13 are junior colleges. Singapore houses a grand total of 356 schools, including the independent and specialized schools. 13,318 teachers instruct 256,801 students at the primary level, while 12,183 teachers instruct 196,220 secondary students, 2,572 teachers instruct 37,225 students in mixed level schools, and 1,789 teachers instruct 20,468 junior college level students. Figure 3 depicts the structure of Singapore's current educational system.[35]

Singapore Education System Structure

A graphic depiction of the education system structure is provided as Figure 3.

Education Finance

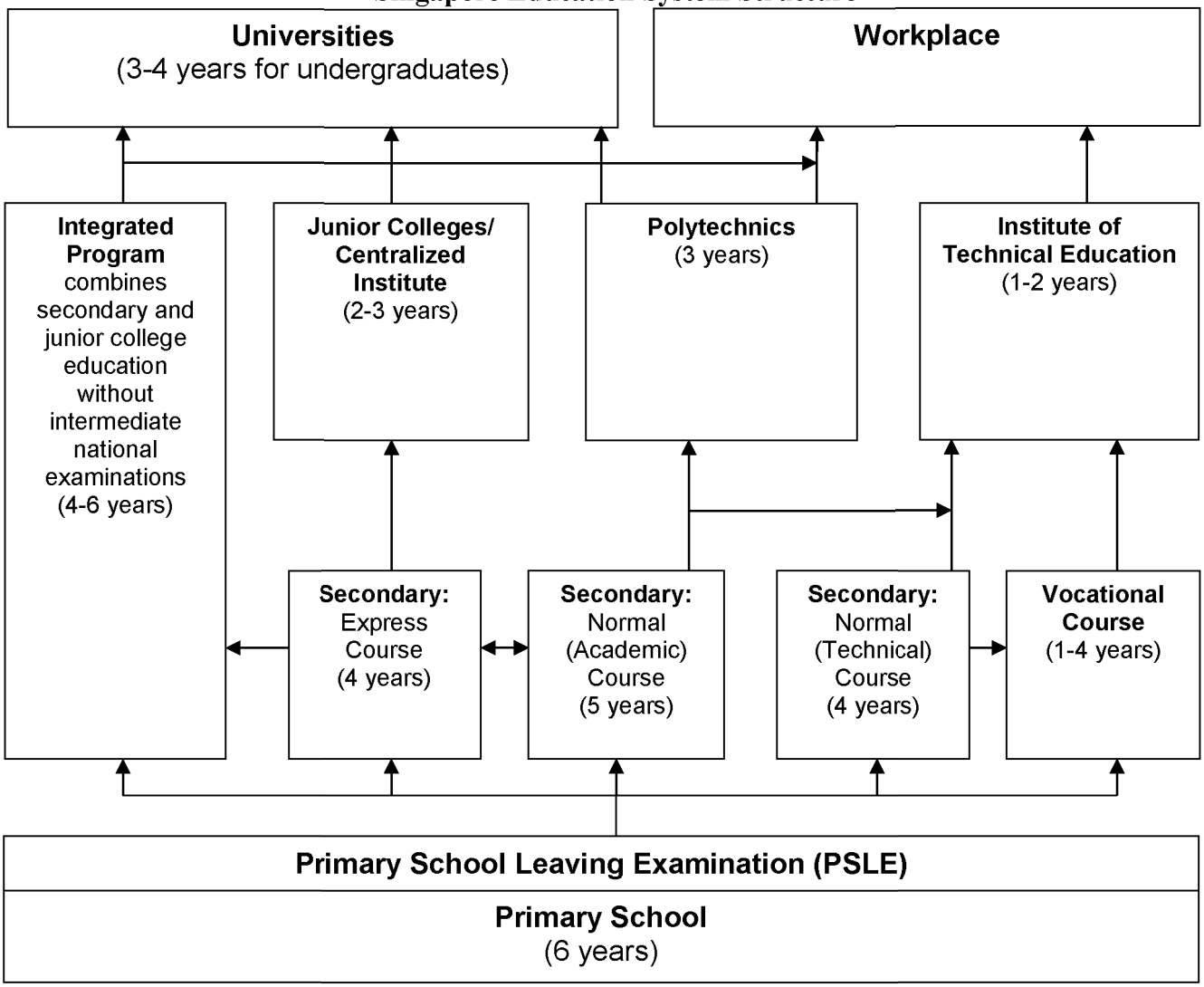
Singapore spends 2.8 percent of its GDP and 15.3 percent of total public expenditures on education.[36] The Ministry of Education has full administrative responsibility over all government-funded schools, and advisory and supervisory roles over all private schools.

Public schools in Singapore are not completely funded by the national and local governments. Although the government subsidizes much of the funding for school, there is still a fee associated with attending school. However, even this fee can be further subsidized under specific circumstances. Primary school fees are almost completely subsidized for all students. On average, school fees after subsidies are approximately $5 a month, with an additional standard miscellaneous fee of $8. Autonomous schools collect their own school fees, ranging from $3 to $18 per month in addition to the miscellaneous fees. Furthermore, independent schools charge their own separate fees, ranging from $200 to $300 per month.[37]

[34] Ministry of Education, Science and Technology. (2011).
[35] Ministry of Education, Singapore. (2011). *Education statistics digest 2011: Molding the future of our nation.* Retrieved from http://www.moe.gov.sg/education/education-statistics-digest/files/esd-2011.pdf.
[36] OECD. (2010). *Strong Performers and Successful Reformers in Education.*
[37] Ministry of Education, Singapore. (2011).

Figure 3

Singapore Education System Structure



The educational system in Singapore used to allow students to learn at their own pace from Grade 5 on, but there has been a shift to more subject-based tracking. Some of the early school years' curriculum focuses on English, mother language, mathematics, science, civics and moral education, social studies, health, physical education, art, and music. At the end of Grade 6, all students take the primary school leaving examination in English, math, mother language, and science. The results determine the students' future track. Sixty percent are admitted to the express track; 25 percent to the normal academic track; and 15 percent to the normal technical track.[38]

Primary school is followed by four to five years of tracked secondary education. Depending on primary leaving examination scores, students follow one of the following three tracks:

1. A special/express course resulting in a General Certificate of Education (GCE 'O' level) upon completion;
2. The normal academic course resulting in GCE 'N' level upon completion; or
3. The normal technical course, which is a four-year course leading to the GCE 'N' upon completion.

[38] OECD. (2010). *Strong Performers and Successful Reformers in Education*.

Depending on the program completion in secondary school, students either attend a two-to-three year junior college, a three-year polytechnics school, or a two year institute of technical education. Students who complete junior college or polytechnical school may apply for admission to three-to-four year undergraduate universities. Students identified as clearly on the university track can be admitted into the Integrated Programme track, which is a combined secondary and junior college track.[39]

Brief History of the Educational System

The following information is taken from the OECD.[40] In 1965, Singapore had declared its independence from Malaysia. The first prime minister, Yew, began promoting goals "to build a modern economy" and "to create a sense of Singaporean national identity." These goals ultimately led to the successful education system currently in place. Singapore's population consists of various religious and ethnic groups (74 percent Chinese, 13 percent Malay, 9 percent Indian, and 3 percent other). Upon the creation of Singapore as a nation, there was no common language and no common school system or curriculum. Although English is the national language, Singapore recognizes and teaches four different languages (Chinese, Malay, Tamil, and English, the language of government and all schools). With fears that the segregation of diversity would result in problems, leaders created the Singapore pledge: "One united people, regardless of race, language or religion." Government actions influenced the mixture of different groups, taking steps such as assigning housing to diversify communities. Schools became the venues responsible for instilling values including honesty, commitment to excellence, teamwork, discipline, loyalty, humility, national pride, and emphasis on common good.

Education is highly valued in the city-state of Singapore. Additionally, human resource has become the most valuable resource due to the lack of other resources in Singapore. In the early 1970s, shortly after Singapore's independence, the quality of education was poor. In 1979, Goh published a report highlighting high dropout rates and low standards in the public education system. In response, Singapore began tracking students and creating multiple pathways for students in an effort to decrease dropout rates, improve quality of education, and produce a more technically skilled labor force. Tracking begins in elementary schools and the various pathways are framed around three distinct paths:

1. Academic high schools;
2. Polytechnic high schools, with advanced occupational and technical training which can lead to college; or
3. Technical institutes with a focus on occupational and technical training for the lowest academically-performing students.

A new motto was adopted by the public school system: "Thinking Schools, Learning Nation." Policy leaders agreed, "No single accountability model could fit all schools." Therefore, emphasis is placed upon clusters managing themselves autonomously and selecting their own teaching methods.

School Turnaround Strategy

Singapore's Ministry of Education (MOE) posits five strengths of Singapore's educational system to explain its strong student performance on international assessments:[41]

- In an effort to give students a global advantage in the future, all students are required to learn one of the official "Mother Tongue" languages, as well as English, the official language of schools.

[39] Ministry of Education, Singapore. (2011).
[40] OECD. (2010). *Strong Performers and Successful Reformers in Education.*
[41] Ministry of Education, Singapore. (2010). Education in Singapore. Retrieved from http://www.moe.gov.sg/about/files/moe-corporate-brochure.pdf.

- While Singapore's students focus on core competencies, they receive a variety of curricular experiences, including music, arts, and sports. The holistic framework of the curriculum allows students to develop a variety of skills.
- Providing incentives in order to hire the best teachers and leaders is a focus of the MOE. Singapore's National Institute of Education (NIE) provides a comprehensive teacher preparation program, as well as opportunities for ongoing professional development.
- Information Communication Technology (ICT) is incorporated into school curriculum to provide students with new skills and learning experiences.
- Singapore's education system stresses parents and community involvement.

F. FINLAND

Table 6

General Information on Finland[42]

Population (2012)	5.4 million
GDP per capita (2011)	$47,386
Number of schools	
Comprehensive	2,719
Comprehensive school level special education schools	118
Upper secondary general schools	388
Vocational institutes	129
Total students	
Comprehensive	522,400
Comprehensive school level special education schools	6,200
Upper secondary general schools	118,500
Vocational institutes	179,700

Number of Schools and Enrollment

In 2011, Finland's public and private comprehensive schools consisted of 2,719 schools serving 522,400 students. Pre-primary school, which is free, is attended by 99 percent of six-year-olds. A nine-year basic education is mandatory for all Finnish students. Following the nine-year compulsory curriculum, 2.5 percent of students opt to remain in voluntary basic education for an additional year, 55 percent choose general upper secondary education, and 38.5 percent enroll in vocational education and training. The 129 vocational study programs provide opportunities to earn 53 different vocational qualifications. Finland offers 16 universities which have academic autonomy and independence from the government and are treated as independent corporations or foundations. The 25 polytechnic schools are run either by local governments or private institutions and are funded by both the local government and national government.

Figure 4 depicts the structure of Finland's educational system.[43]

Education Finance

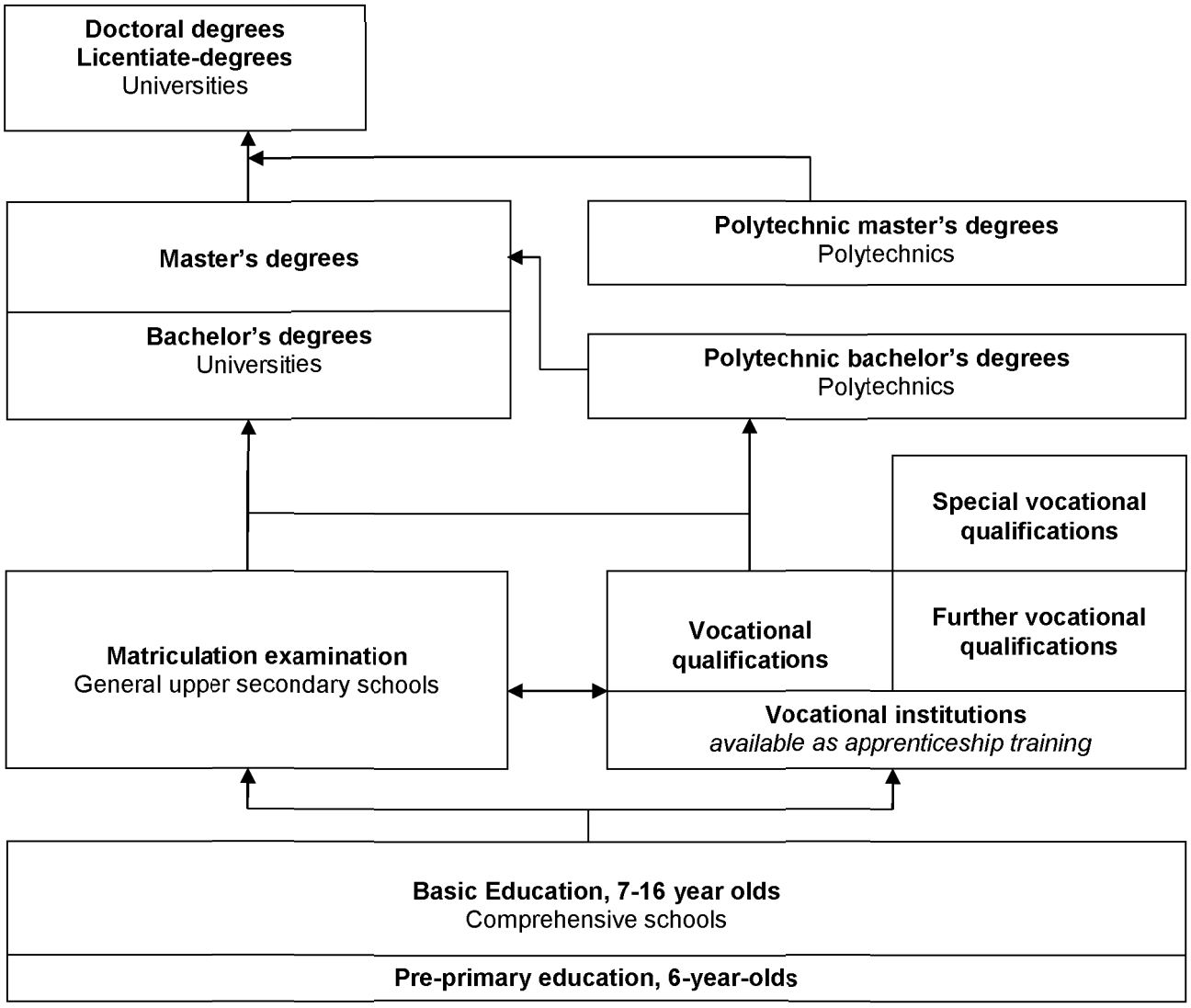
As described by the OECD, Education in Finland is co-financed by the national government and localities. Approximately 54.7 percent of educational costs are financed by the localities, while the

[42] Ibid.
[43] U.S. Department of State. (2011). Background Note-Finland. Retrieved from http://www.state.gov/r/pa/ei/bgn/3238.htm.

remainder is subsidized by the government. Additional funding in the form of grants is offered by the government. Student populations of schools determine the funding each school receives, based upon a unit cost per student.

Figure 4

Finland's Education System[45]



Finland spends approximately $7,711 per student across all levels of education (slightly above the corresponding OECD average of $7,527); however, only $5,557 is spent per primary student (below the corresponding OECD average, $6,252) and an average of $7,324 is spent on secondary students (lower than the corresponding OECD average $7,804). Spending on post-secondary levels is $12,285, higher than the OECD average of $11,512. Between the years of 1995 and 2005, primary and secondary education spending increased far more rapidly (38 percent increase) than the 13 percent increase in enrollment. There is no charge for basic education, which includes additional services such as school meals, health care, and dental care. There is also no charge or fee for those students pursuing post-secondary degrees. [44] [45]

[44] OECD. (2008). *Education at a Glance 2008, OECD Briefing Note for Finland.* Retrieved from http://www.oecd.org/dataoecd/31/46/41277828.pdf.

Brief History of the Educational System

In the 1950s and 1960s, Finland's population increase resulted in a relatively quick change from a rural society to a developing modern industrial society. By the 1960s, political leadership and public education advocates guided Finland to adopt a nine-year compulsory education system for all children ages 7 to 16. [46] This shift to a standardized education system resulted in the development of detailed and standardized curriculum framework, and the training of teachers to help support implementation of the new system. Finland's performance on the PISA 2000 has been attributed to the radical change in the public school system during the 1970s.

School Turnaround Strategy

As described by the Finnish Board of Education, Finland ensures that all teachers are highly qualified, especially those teaching in secondary subject areas. Finland has localized school control, giving far more autonomy to individual schools than in the past. Finnish schools have implemented a pre-school program that almost all students participate in before entering compulsory basic school. These programs focus on self-reflection and social behavior. Finland's Constitution provides all children with the right to education and culture. The Constitution requires that pre-primary and basic education be free for all students, and even most post-secondary schools are free of charge.

G. THE NETHERLANDS

A sixth country, The Netherlands, was added at the request of the Virginia Commission on Youth during the preliminary presentation made in December 2011. The Netherlands ranked 10th in reading, 12th in mathematics, and 11th in science in the 2009 PISA. In addition, in Grade 4 TIMSS, The Netherlands ranked at the 9th. These outcomes are remarkably higher than the average. An education profile for The Netherlands is provided in the following paragraphs.

The school system is comprised of 6,993 primary schools serving approximately 1.5 million students, 659 secondary schools serving approximately 900,000 students, and 63 postsecondary schools serving approximately 650,000 students.[47] Figure 5 illustrates the educational structure.

Education is compulsory, beginning no later than age five, although most Dutch children begin at age four, and lasts 12 years. After eight years of primary education, a student chooses one of the following more specialized secondary tracks: VMBO (pre-vocational four-year track), HAVO (general secondary education 5-year track), or VWO (pre-university 6-year track).[48] If a student's track is completed prior to satisfying the 12-year requirement, that student must continue to take classes at least two days a week.

Education Finance

Public and special schools in the Dutch education system are publicly funded, with additional, optional contributions provided by families. Public expenditure per student in primary and secondary schools amounted to $9,251 per student and, in tertiary education, $17,245 per student.[49] In 2010, public expenditure on education was 5.9 percent of the GDP (Statistics Netherlands, 2012). Each public and special school is allocated a specific discretionary budget from the government, based on number of

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[45] Retrieved directly from The Finnish National Board of Education. (n.d.). Educational structure. Retrieved from http://www.oph.fi/english/education/overview_of_the_education_system.

[46] Kupiainen, S., Hautamaki, J., & Karjalainen, T. (2009). The Finnish Education System and PISA. *Helsinki University Print.* Retrieved from http://www.pisa2006.helsinki.fi/files/The_Finnish_education_system_and_PISA.pdf.

[47] Statistics Netherlands. (2012).

[48] Government of the Netherlands. (n.d.). http://www.government.nl/issues/education.

[49] OECD. (2011). *Country statistical profile: Netherlands, Country statistical profiles: Key tables from OECD*. doi: 10.1787/csp-nld-table-2011-1-en.

students. Additional government educational funds are provided to primary and secondary schools as an incentive to their admitting socio-economically challenged students. Further, public and special schools cannot charge any additional tuition, but are permitted to use religious criteria in the admission process.

Table 7

General Information on The Netherlands

Population	16.6 million [50]
GDP per capita	$42,300[51]
Number of Schools[52]	
Primary	6,993
Secondary	659
Special Schools	327
Postsecondary	
Vocational	50
University	13
Total students[53]	
Primary	1,534,362
Secondary	939,629
Special Schools	68,765
Postsecondary	
Vocational	416,934
University	241,686
Demographics: Predominantly Dutch. Major minority groups include Moroccans, Turks, Surinamese and Dutch Caribbean.	

PISA 2009 Results
Reading: 508
Math: 526
Science: 522

Scores are above the United States' averages in all subjects, but below all comparison countries in all subjects.

Number of schools and enrollment

Only one-third of the educational system in the Netherlands is completely state-run, while the remaining two-thirds are organized by what are called "special schools," religious schools similar to private schools that are publicly-funded. Special schools are required to adhere to a national curriculum but are allowed to decide how to teach the content, as well as to teach any additional content.

Parents are free to choose which schools their children attend and the public funding for schools follows the student.[54] Primary and secondary education is free and postsecondary education is virtually free, so long as the student completes the program. In the Dutch tertiary education, the virtually free education is provided through a series of loans provided to students each month. The repayment of the loans, however, is contingent upon the completion of the compulsory education within the respective time period. Students who complete compulsory programs within provided time periods are not required to repay the education loans provided by the government.[55]

Brief History of the Educational System

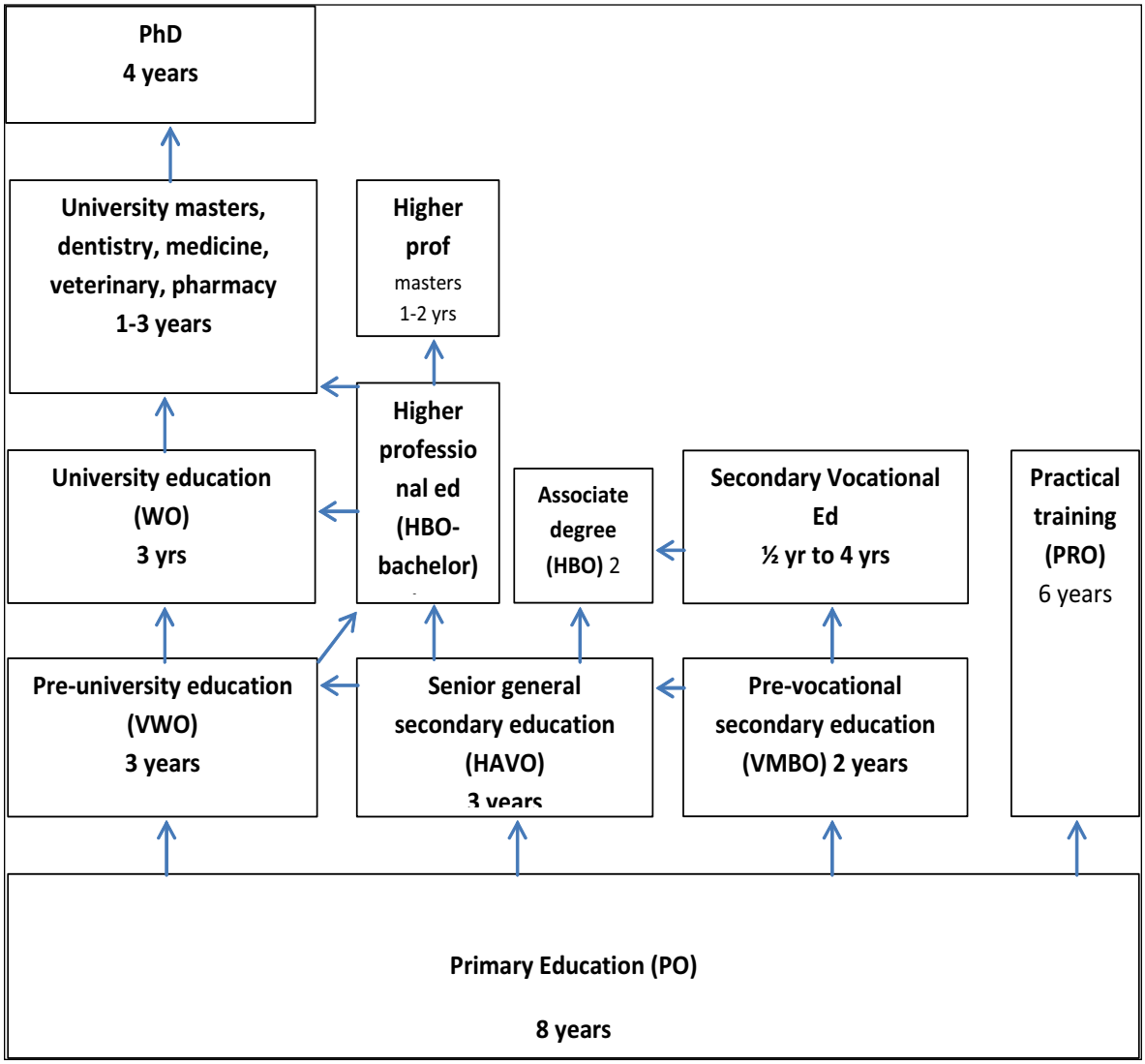
Although a new Constitution was adopted by The Netherlands in 1848 which granted the freedom to provide education, the government refused to fund private schools in an attempt to keep education funding nondenominational. Protestants and Catholics strongly advocated for denominational schools that were still funded by the government. By 1917, an agreement was reached, and the Constitution was amended to provide all primary schools with public funding, regardless of denomination. This public

[50] U.S. Department of State. (2011). *Background notes: The Netherlands.* Retrieved from http://www.state.gov/r/pa/ei/bgn/3204.htm.
[51] Ibid.
[52] Statistics Netherlands. (2012). *Education financing, education expenditure and CBS/OECD indicators.* http://statline.cbs.nl/StatWeb/publication/?VW=T&DM=SLEN&PA=80393ENG&LA=EN
[53] Ibid.
[54] Frontier Centre for Public Policy. (2003). *Frontier background brief analysis: The public school market in the Netherlands: Money follows the child.* Retrieved from http://www.fcpp.org/pdf/FB16%20Dutch%20School%20Model.pdf.
[55] Statistics Netherlands. (2012).

funding of all schools, regardless of denomination, was eventually extended to all tracks of Dutch education. The term "special schools" was given to religious schools receiving government funding. Although these schools were allowed to determine the content and how it was taught, they are still required to abide by the basic curriculum provided by the Ministry of Education, Culture and Science. Currently, more than two-thirds of schools in The Netherlands are publicly-funded special schools. The Dutch school system is a strong proponent of providing discretionary funds to schools and leaving all of the decision-making to the schools themselves.[56]

Figure 5

The Netherlands Education Structure[57]



School Turnaround Strategy

In response to a growing shortage of secondary teachers, the Dutch Department of Education, Culture and Science developed an action plan focusing on new policy for retaining high-quality teachers

[56] Ministry of Education, Culture and Science, 2007.
[57] Dutch Eurydice Unit. (2007). *The Education System in the Netherlands 2007*. The Hague, Netherlands: Ministry of Education, Culture and Science.

and recruiting new high-quality teachers. The action plan focuses on the improvement of rewards and professionalism of teachers, highlighting the following major recommendations: [58]

- Rewards in salary and benefits will reflect performance and results, especially in secondary and senior secondary education fields.
- Salary supplements will be introduced as incentives to recruit more teachers in the junior/vocational track of secondary education, as well as for high performing teachers already being paid the maximum salary.
- Increased salaries of school managers.
- The development of a private professional teacher registry.
- Increased funding for training grants and professional development.
- Agreements to alleviate teacher's workloads that allow teachers to focus more on teaching.
- "Fast Tracks" to recruit qualified teachers and post-graduate students from various fields in order to address the immediate shortage of teachers.

The government is attempting not only to increase the salary and possible supplements for teachers, especially in needed fields, but also increasing the professionalism of teachers.

VIII. Summary of Findings from Year I Study: Comparisons between Virginia and High-performing Education Systems

Year I findings were summarized for the Advisory Group as educational inputs, educational outcomes, and potential lessons learned. While the performance of U.S. and Virginia students on international achievement measures is of concern, America is still seen as a success story, as evidenced by quality of life and economic productivity. The United States even has the greatest number of Nobel award winners. Table 8 provides a comparison of the study's target countries.

It is important to note, however, that in many of the top performing Asian countries, compulsory instruction during the school day is often supplemented by after-school lessons, as seen in Table 10. An estimated 45 percent of students in South Korea and Shanghai spend up to four hours per week on supplemental after-school lessons; an additional 20 percent spend more than four hours per week. It is estimated that children in South Korea will receive almost two years more learning time than United States students by the end of high school.

Table 8

Nobel Prizes: 1901-2012[59]

	Canada	South Korea	Finland	Singapore Shanghai	The Netherlands	United States	Total Recipients
Chemistry	3	0	1	0	1	62	163
Physics	2	0	0	0	6	87	194
Medicine	2	0	1	0	2	95	201
Economics*	0	0	0	0	1	49	71
Literature	0	0	1	0	0	11	105
Peace	1	1	1	0	0	21	101+24
TOTALS	8	1	4	0	10	325	863

Note: Tally is based on citizenship/residence of the recipient at the time of the award

*The Bank of Sweden (Svergies Riksbank) Prize in Economic Sciences was first awarded in 1969.

[58] Department of Education, Culture and Science. (2008). *Teachers matter: tackling the teacher shortage and improving the position and quality of teachers in the Netherlands.* Retrieved from http://english.minocw.nl/documenten/Actieplan_LeerKracht_ENGDEF.pdf.

[59] The Nobel Foundation, Retrieved November 18, 2012 from http://nobelprize.org.

A. EDUCATIONAL INPUTS

With this caveat in mind, highlights of educational inputs were reviewed: time attending school, funding for education, teacher selectivity and training, teacher compensation, student/teacher ratio and class size, professional development, principal leadership and assessment practices.

Time Spent Learning

United States' school students have a shorter school year, with school days of similar length to those in comparison countries. Among the countries studied, the number of days in the academic year ranged from 180 to 204, with the U.S. at the lower end of the continuum: when the length of a school day was compared, the U.S. had the longest day. Table 9 provides the detail for these data. OECD analyses suggest slight, but positive correlation between hours of instruction and test performance.

Table 9

Students' Learning Time at School (lower secondary)
(Minutes per Week) [60]
(Based on Students' Self-Reports)

Regular Lessons at School in Subject Area	Canada	Shanghai	South Korea	Singapore	Finland	The Nether-lands	United States
Language	237.2	324.6	186.1	284.3	150.2	166.3	257.7
Mathematics	238.1	345.9	169.3	262.7	171.5	168.2	258.5
Science	218.5	218.8	181.4	253.1	194.4	190.1	258.3

It is important to note, however, that in many of the top performing Asian countries, compulsory instruction during the school day is often supplemented by after-school lessons, as seen in Table 10. An estimated 45 percent of students in South Korea and Shanghai spend up to four hours per week on supplemental after-school lessons; an additional 20 percent spend more than four hours per week. It is estimated that children in South Korea will receive almost two years more learning than U.S. students by the end of high school.

Table 10

Percentage of Students Attending After-school Lessons, 2009
Enrichment [E] or Remedial [R] Lessons [61]
(Based on Students' Self-report at age 15)

By Subject Area and Type Lesson		Canada	Shanghai	South Korea	Singapore	Finland	The Nether-lands	United States
Language	E	13.0	27.0	27.1	5.9	1.3	7.4	9.8
	R	17.9	54.4	30.3	4.5	2.2	4.2	6.6
Mathematics	E	28.1	37.9	48.5	11.9	2.5	10.8	14.8
	R	37.7	61.2	49.1	8.4	9.2	10.1	8.7
Science	E	9.3	17.2	34.2	6.4	1.8	5.3	11.1
	R	6.6	44.8	41.7	4.3	2.0	4.2	7.2
Attend after-school	E	46.7	47.6	60.5	18.6	5.4	17.6	24.8
for at least one of the three subjects	R	51.4	69.3	60.7	11.8	12.6	17.8	14.3

[60] OECD. (2010).
[61] Ibid.

Funding

Funding for education varied across the countries. Funding is a complex input related to the overall wealth of a country. Data suggest a weak relationship between educational resources and student performance. Given the complexity and the amount of missing data, OECD cautions against any causal relationship being made between students' test performance and per pupil expenditures. Table 11 indicates that the United States' per pupil expenditures exceed those of comparison nations.

Table 11

Annual Expenditure per Pupil[62]
2008

Canada	$8,388
Finland	$8,068
Shanghai	*
Singapore	$3,667[63]
South Korea	$6,723
Netherlands	$9,251
United States	$10,995
Virginia [64]	$10,793

Note: Per pupil for primary through postsecondary, non-tertiary education. Virginia data reflects K-12 public expenditures. The range of expenditure per pupil between districts in Virginia was $8,105 for King George County and $20,317 for Arlington County.[65]

*2008 data for China reported post-secondary expenditures of $1,593. No other data were available.

Teacher Selectivity and Training

While the role of funding appears to have limited correlation with results, more variation in performance can be explained by the quality of human resources, i.e., teachers and principals. Generally, all educational systems require prospective teachers to complete both educational and professional preparation requirements. The educational requirements in China and Singapore for elementary teachers are lower than those established for secondary teachers; however, there is a movement to bring requirements for elementary teachers up to par with secondary teachers. All educational systems require prospective teachers to receive professional preparation in both subject matter and pedagogy—expertise in knowing what and how to teach.

The top-performing countries do two things to maintain their high quality teacher workforce. First, they maintain a high level of selectivity for people interested in entering the teaching profession. Second, top-performing countries start teachers off with good pay. The decision to hire a teacher is viewed as extremely important, considering that the hiring of a specific individual could result in 30 years of good teaching or bad teaching. Singapore has developed a single-statewide-selection process overseen by the Ministry of Education and the National Institute for Education.

[62] OECD. (2011). *Education at a glance 2011.* Retrieved http://www.oecd.org/education/skills-beyond-school/48630868.pdf.
[63] Calculated based on 2008 GDP per capita and percent of GDP allocated to education.
[64] Virginia Department of Education. (2009). Table 15 of the *Superintendent's Annual Report for Virgini*a. Retrieved from http://www.doe.virginia.gov/statistics_reports/supts_annual_report/2007_08/index.shtml.
[65] Ibid.

Only candidates in the top 30 percent in high school are considered for admission. Finland has implemented the use of assessments to determine teacher quality. In Singapore, only one in six applicants is accepted to be a teacher, while only one in ten applicants is hired in Finland.[66] Table 12 summarizes selectivity in the preparation and hiring of teachers.

In the United States, the teaching profession is not as selective it is in the comparison countries and has the reputation of being a non-competitive, easy-entry occupation. Most of those who desire to enter the occupation are free to do so—because individuals choose the occupation, unlike law, medicine, engineering, architecture, and academia.[67] While increases in licensure requirements create a more selective environment, the difficulty in recruiting teachers in high teacher-shortage areas (e.g., special education, math, and science) and for high need-areas results in the use of waivers for requirements and teachers teaching out-of-field. Furthermore, teaching is portrayed as a "revolving door" occupation in the United States, referring to the phenomenon that large numbers of teachers flow in and out of schools each year. About 40 to 50 percent of teachers leave teaching in the first five years. The amount of turnover accounted for by retirement is relatively minor in comparison to other reasons, such as teacher job dissatisfaction and seeking better careers.[68]

In Shanghai, the past 20 years have brought drastic increases in teacher threshold qualifications. Primary teachers were often taught at the level of senior secondary schools in teacher-training programs, and junior secondary teachers obtained sub-degree diplomas. Now, all primary teachers are required to hold sub-degree diplomas while all secondary teachers are required to hold degrees and teaching certifications. Master's degrees are concentrated on subject matter; in the last decade, however, there have been closer links between schools and normal (teacher training) universities. There are opportunities for prospective teachers to apply their educational theory and skills through student teaching.[69]

Leaders in Finland attribute their student success in learning to their intensive investments in teacher education (all teachers receive three years of high-quality graduate level preparation completely at state expense), and the major overhaul of the curriculum and assessment system. Most teachers now hold master's degrees in both their content area and in education, and their preparation is aimed at learning to teach diverse learners, including special needs students, with a strong focus on how to use formative performance assessments to enhance student learning.[70]

In Singapore, prospective teachers are carefully selected from the top one-third of the secondary school graduating class by panels which include principals. Strong academic ability is essential, as is the commitment to teaching, an ability to communicate, and creativity, confidence, and leadership qualities. Prospective teachers receive a monthly stipend that is competitive with the monthly salary of new

[66] Barber, M., & Mourshed, M. (2007).
[67] Ingersoll, R. M. (Ed.). (2007). A comparative study of teacher preparation and qualifications in six nations. Retrieved from http://www.cpre.org/images/stories/cpre_pdfs/sixnations_final.pdf.
[68] Ingersoll, R. M. (2001). Teacher turnover and teacher shortages: An organizational analysis. *American Educational Research Journal, 38*(3), 499-534.
Ingersoll, R. M. (2003). *Is there really a teacher shortage?* Philadelphia: Consortium for Policy Research in Education, University of Pennsylvania, and the Center for the Study of Teaching and Policy, University of Washington.
[69] Preus, B. (2007). Educational trends in China and the United States: Proverbial pendulum or potential for balance? *Phi Delta Kappan, 89*(2), 115-118.
[70] Laukkanen, R. (2008). Finnish strategy for high-level education for all. In N. C. Soguel and P. Jaccard (Eds.). *Governance and Performance of Education Systems* (pp. 305-324). Dordrecht, Netherlands: Springer Verlad.
Buchberger, F., & Buchberger, I. (2003). Problem solving capacity of a teacher education system as a condition of success? An analysis of the "Finnish case," In F. Buchberger and S. Berghammer (Eds.): *Education Policy Analysis in a Comparative Perspective* (pp. 222-237). Linz: Trauner.

graduates in other fields. They must commit to teaching for at least three years. Interest in teaching is seeded early through teaching internships for high school students. There is a system for mid-career entry, which is a way of bringing real-world experience to students.[71]

Table 12

Overview Descriptions of Teacher Selection by Country[72]

Country	Descriptions
Canada	Most schools require an undergraduate degree and an additional degree in education (additional 1 to 2 years). Secondary certification often requires a specific number of credits in the subject area. Requirements differ from province to province.
Shanghai	High societal regard and competitive income for teaching remain reasons the teaching profession is preferred. Stable incomes, as well as the recent improvements in teacher salaries, help draw and retain qualified teachers. Furthermore, in 1997, when universities in China began to charge tuition, China initiated a priority admission policy to normal (teacher training) universities to recruit better students and attract more competitive students.
South Korea	Anyone can apply and participate in a teacher preparation program, but following the program and testing, only the top 30 percent will obtain teaching jobs.
Singapore	Only the top third of each graduating high school class is recruited for initial screening. Final candidates enter a fully paid, four-year teacher education program and are paid by the government during their education.
Finland	Only 10 percent of undergraduates are accepted into teacher-training programs. Since 1979, all teachers in Finland must have a master's degree. Candidates enter teaching programs at the graduate level.
The Netherlands	Teacher preparation varies based on students the teachers will serve. For non-university bound students, prospective teachers must complete an undergraduate program; for university bound students, prospective teachers must have an undergraduate degree to enter a 12-18 month graduate education program with extensive student teaching. Prospective teachers teach part-time, observe other teachers and are observed by other teachers before obtaining a permanent position.[73]
United States	Just as in Korea, anyone can apply to teacher preparation programs, however two-thirds of teacher preparation programs accept more than half of their applicants, and a fourth of teacher preparation programs accepted nearly all of their applicants.[74] Only 40 percent of teacher preparatory programs were found to implement some type of minimum grade point average.[75] It has been asserted that the United States teacher preparatory programs pull college bound students from the bottom third of their high school class.[76]

A number of studies have found teacher education and preparation are significantly correlated to increases in student achievement.[77] For instance, one study found teacher education in mathematics (as measured by a major in math or math education, or having a regular teaching certificate in math) to be

[71] Ingersoll, R. M. (Ed.). (2007).
[72] Ibid.
[73] Wang, A., Coleman, A, Coley, R., & Phelps, R. (2003). *Preparing teachers around the worlds. Princeton, NJ: Educational Testing Services.*
[74] Walsh, K., & Jacobs, S. (2007). *Alternative Certification Isn't Alternative.* Washington, DC: Thomas B. Fordham Institute and National Council on Teacher Quality. Retrieved from http://www.hunt-institute.org/elements/media/files/reVISION-Number-1-November-2011.pdf.
[75] National Governors Association. (2009). Building a High-Quality Education Workforce: A Governor's Guide to Human Capital Development. Washington, DC. Retrieved from http://www.hunt-institute.org/elements/media/files/reVISION-Number-1-November-2011.pdf.
[76] Barber, M., & Mourshed, M. (2007).
[77] Greenwald, R., Hedges, L., & Laine, R. (1996). The effect of school resources on student achievement. Review of Educational Research, 66, 361-396.

significantly related to math proficiency in eighth-grade students.[78] Studies exploring other subjects have found less significant relationships between teachers' degrees and student achievement.

Teacher Compensation

Most of the high-achieving countries have policies aligning teacher compensation to other professions that are traditionally deemed as attractive careers, such as engineering. Table 13 offers some comparisons.

Although teachers in Shanghai do not receive very high salaries, they often have substantial supplemental income. This additional income may come from school bonuses or assignments beyond normal instructional responsibilities, such as private tutoring. Bonuses may be generated from sponsoring fees collected from students who come from other residency areas, or those whose test scores are below the official cut-off score for admission.[79] Salaries for Finland's teachers appear low when compared with South Korea; however, salaries are relatively flat throughout Finland, and the social status of the teaching profession is high. In the United States, teachers earn an average starting salary of about $36,000, lower than the averages of $43,635 for computer programmers, $44,668 for accountants, and $45,570 for registered nurses. Teacher pay is not only lower than other occupations requiring the same level of education, but has been falling farther and farther behind for 60 years.[80]

School systems differ in the amount of time, human, material, and financial resources dedicated to education and in how these resources are invested. PISA data show that higher teacher salaries, not smaller class sizes, are associated with better student performance. As mentioned earlier, teacher salaries are related to class size: if spending levels are similar, school systems make trade-offs between smaller classes and higher salaries for teachers. The findings from PISA suggest that systems prioritizing higher salaries over smaller classes tend to perform better, which corresponds with research showing that raising teacher quality, rather than creating smaller classes, is a more effective route to improving student outcomes.[81]

Table 13

Teacher Salaries by Country[82]
2007/2008

	Canada	Shanghai	South Korea	Singapore	Finland	United States	The Netherlands
Ratio of salary of primary education after 15 years' experience to GDP per capita	N/A	1.39	2.01	1.67	1.07	0.97	1.14
Ratio of salary of lower sec after 15 years' experience to GDP per capita		1.71	2.01	1.67	1.15	0.94	1.25
Ratio of salary of upper sec after 15 years' experience to GDP per capita		1.75	2.01	1.67	1.26	1.01	1.66

[78] Greenberg, E., Rhodes, D., Ye, X., & Stancavage, F. (2004). Prepared to teach: Teacher preparation and student achievement in 8th grade mathematics. Paper presented at the American Educational Research Association Annual Meeting, San Diego.
[79] OECD. (2010). *Strong performers and successful reformers in education*.
[80] Tucker, M. S. (2011). *Standing on the shoulders of giants: An American agenda for education reform.* Washington, DC: National Center on Education and the Economy.
[81] OECD. (2010). *PISA 2009 results: What makes a school successful?* (Volume IV).
[82] Ibid.

Class size and student-teacher ratios are strongly correlated to public school expenditures and student achievement. Student-teacher ratios are higher in South Korea, Singapore, and Shanghai, which fund teacher pay comparatively well (comparable to salaries of other professionals in the given country). Lower student-to-teacher ratios drive education costs upward (as seen in the United States and Virginia). Finland has been able to maintain low student-to-teacher ratios while paying teachers comparatively well. Extant research finds a weak relationship between reduced class size and student performance.[83] Class size appears more important in younger students than for older students.[84] PISA data indicated that average class sizes in Finland ranged from fewer than 20 students per classroom to more than 30 per classroom in South Korea, Singapore, and Shanghai. In the United States, over 65 percent of class size variation occurs within schools, indicating that students attending the same school may attend classes of different sizes.[85] Table 14 provides the average class size for the studied countries/regions.

Table 14

Average Class Size of Public Schools[86]

	Primary Schools	**Secondary Schools**
Canada	N/A	N/A
Shanghai	N/A	N/A
South Korea	31	35.8
Singapore[87]	34.3	36.6
Finland	19.8	20.4
The Netherlands	N/A	N/A
United States[88]	20.1 (Self-contained classes) 23.3 (Departmentalized instruction)	18.6 (Self-contained classes) 23.0 (Departmentalized instruction)
Virginia[89]	18.2 (Self-contained classes) 20.0 (Departmentalized instruction)	15.5 (Self-contained classes) 20.5 (Departmentalized instruction)

All countries, with the exception of Finland, tend to use students' achievement data to monitor teacher practices, and complement this information with qualitative assessments, including peer reviews and classroom observations. Finland and Canada have rejected merit pay due to the lack of an empirical research base supporting the value of such an approach. These two countries encourage extensive dialogues between principals and teachers about student progress.[90] On the other hand, teachers in Shanghai and Singapore receive extra pay and promotions for high student achievement. In Singapore, like every other profession, teachers' performance is appraised annually, by a number of people, against 16 different competencies, including teacher contribution to the academic and character development of

[83] Ehrenberg, R., Brewer, D. J., Gamoran, A., & Wiliam, J. D. (2001). Class size and student achievement. *Psychological Science in the Public Interest, 2*(1), 1-30.
[84] Finn, J. D. (2002). Class-size reduction in grades K-3. In A. Molnar (Ed.). *School reform proposals: The research evidence* (pp. 15-24). Tempe, AZ: Education Policy Research Unit, Arizona State University.
[85] OECD. (2010). *PISA 2009 results: What makes a school successful?* (Volume IV).
[86] OECD. (2009). *Education at a Glance 2009: OECD Indicators.* Retrieved from http://www.oecd.org/dataoecd/41/25/43636332.pdf.
[87] Ministry of Education, Singapore. (2011).
[88] Institute of Education Sciences. (2009). *Characteristics of public, private, and Bureau of Indian Education elementary and secondary school teachers in the United States.* Washington, D.C.: National Center for Education Statistics. Retrieved from http://nces.ed.gov/pubs2009/2009324.pdf.
[89] Institute of Education Sciences. (2009). *Schools and staffing survey.* Retrieved from http://nces.ed.gov/surveys/sass/tables/sass0708_2009324_t1s_08.asp.
[90] Stewart, V. (2010). Raising teacher quality around the world. *Educational Leadership, 68*(4), 16-20.

the students in their charge, their collaboration with parents and community groups, and their contribution to their colleagues and the school as a whole. Teachers who do outstanding work receive a bonus from the school's bonus pool. It is important to note this individual appraisal system is not based solely on student test scores, but is developed and implemented within the context of the school's overall goal for educational excellence and a strong system of professional accountability.[91]

Professional Development

Over the last several decades, high-quality staff development has evolved from a remedial support system primarily focused on individual improvement to a dynamic, reflective, and continuous improvement process essential to meeting the critical demands of today's public schools. Virginia has recognized a rich knowledge of content, coupled with a wide variety of research-based teaching strategies and sound assessment techniques, as the essential ingredients for contemporary teachers to be able to meet the individualized learning needs of today's students.[92] Table 15 outlines the amount of professional development teachers in the comparison countries undergo.

Extensive research has contributed to a rich understanding of how professional development practices impact teacher learning and foster change.[93] Researchers agree that professional development unrelated to teacher content and pedagogy often produces minimal results because follow-up is lacking and classroom implementation is rare.[94] Barriers that effect the successful implementation of staff development initiatives may occur at the individual or systemic level, making transfer of learning exceedingly complex.[95]

Table 15

Amount of Professional Development by Country[96]

Nation	Amount of Professional Development
Canada	N/A
Shanghai	240 hours of professional development within five years
South Korea	90 hours every three years
Singapore	100 hours per year
Finland	200 hours per year
The Netherlands	Voluntary with paid leave up to one month[97]
United States	Determined by each state

[91] OECD. (2010). *PISA 2009 results: What makes a school successful?* (Volume IV).

[92] Virginia Department of Education. (2004). *High-quality professional development criteria*. Richmond, VA: Author.

[93] Cohen, D., & Hill, H. (2000). Instructional policy and classroom performance: The mathematics reform in California. *Teacher College Record, 102*(2), 294-343.

Desimone, L. M., Porter, A. C., Garet, M. S., Yoon, K. W., & Birman, B. F. (2002). Effects of professional development on teachers' instruction: results from a three-year longitudinal study. *Educational Evaluation and Policy Analysis, 24* (2), 81-112.

Garet, M., Porter, A., Desimone, L., Birman, B., & Yoon, K. (2001). What makes professional development effective? Results from a national sample of teachers. *American Educational Research Journal, 38*(3), 915-945.

Guskey, T. R. (1985). Staff development and the process of teacher changes. *Educational Researcher, 15*(5), 5-12.

Guskey, T. R. (2000). *Evaluating professional development*. Thousand Oaks, CA: Corwin Press.

Hawley, D., & Valli, L. (1999). The essentials of effective professional development: A new consensus. In L. Darling-Hammond & G. Sykes. (Eds.) *Teaching as the learning profession: Handbook of policy and practice*, pp.127-150. San Francisco: Jossey-Bass Publishers.

Richardson, V., & Placier, P. (2001). Teacher change. In V. Richardson (Ed.), *Handbook of research on teaching* (4th ed.). New York: Macmillan.

[94] Abdal-Haqq, I. (1996). *Making time for teacher professional development*. ERIC Document Reproduction Service No. ED 400 259. Retrieved from http://ericae.net/edo/ed400259.htm.

Hendrickson, J., O'Shea, D., Gable, R., Heitman, S., & Sealander, K. (1993). Putting a new face on an old strategy: In-service preparation for the year 2000. *Preventing School Failure, 37*(2), 31-35.

[95] Thomas, E. (2008). Thoughtful planning fosters learning transfer. *Adult Learning,* 18(3), 4-8.

[96] OECD. (2010). *PISA 2009 results: What makes a school successful?* (Volume IV).

[97] Wang, A., Coleman, A, Coley, R., & Phelps, R. (2003).

Frequently, professional development in the United States is not tightly linked to the instructional agenda of the school.[98] However, China has developed a rigorous system to connect professional development with classroom teaching. At the grassroots level, subject-based "teaching-study groups" engage in study and teaching improvement on a daily basis.[99] Classrooms are routinely open for observation. Teachers at the induction stage, practicing teachers, and administrators are required to observe and provide feedback on a certain number of teachers' lessons each year.

It is worth noting that teachers in high-achieving countries spend less time teaching classes; leaving them with more time to do collaborative planning, to provide feedback individually to students, to reach out to and engage families, and to engage in professional development.

According the Virginia Department of Education, adult participants involved in professional development activities need to actively participate in meaningful learning experiences.[100] Research indicates that when adults are actively engaged in self-directed learning based on a set of established goals and in a learning community with like professionals, they tend to become more self-directed and take responsibility for their own learning.[101] In doing so, teachers may become more satisfied, self-reliant, and goal-oriented.[102]Accordingly, adult learning theories propose that in order for professional development to be effective, teachers need to be actively engaged in planning, implementing, analyzing, and reflecting upon their own current practice in collaboration with other professionals.[103] These research findings support what the highest-performing educational systems are doing with their teacher professional development.

Principal Leadership

Principals in the United States and Singapore assume more leadership roles across various domains, while principal leadership is relatively low in Finland and South Korea. For example, in Finland, very few students attend schools where principals monitor teacher practices in the classroom or use examination results to make decisions about the curriculum. The principals in Finland are often head teachers. They continue to teach while they manage and are still viewed as teachers, but with additional responsibilities. In China, the principals are appointed because of their superior teaching ability.[104]

PISA data indicates that high-performing educational systems often featured feature high autonomy at the school level. Schools are held accountable for their results and given decision-making responsibilities.[105] With the exception of Shanghai, few schools in these countries have a major influence on establishing teachers' starting salaries and determining increases. More than three-quarters of students are in schools whose principals reported that only national and/or regional education authority have responsibility for these tasks. In comparison, school principals and/or teachers have more responsibility in selecting and hiring teachers, dismissing teachers, formulating the school budget, and deciding on budget allocations within the school.

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[98] Stewart, V. (2010).
[99] OECD. (2010). *Strong performers and successful reformers in education*.
[100] Virginia Department of Education. (2004).
[101] Ibid.
[102] Ibid.
[103] Desimone, L. M., Porter, A. C., Garet, M. S., Yoon, K. W., & Birman, B. F. (2002); Virginia Department of Education. (2004); Willis, S. (2002). Creating a knowledge base for teaching: conversation with James Stigler. *Educational Leadership,* 59(6), 6-11.
[104] Tucker, M. S. (2011).
[105] Fuchs, T., & Woessmann, L. (2007). What Accounts for International Differences in Student Performance? A Re-examination using PISA Data. *Empirical Economics, 32*(2-3), 433-464.

A majority of students in Shanghai and South Korea are in schools whose principals reported that only principals and/or teachers have a considerable responsibility for establishing student assessment policies. Meanwhile, principals and/or teachers in Finland, Singapore, and South Korea have more influence over textbook selection.

Assessment Practices

Student performance assessment is a common practice in many countries. However, PISA data indicates the rationale for assessments and the nature of instruments used vary greatly across the countries. It is important to note that grade-by-grade standardized testing, an educational strategy most popular in the United States, is absent in the countries with the most successful educational systems. Some of them only administer national testing at gateways, such as the end of primary, lower secondary, and upper secondary school. Schools and teachers are expected to assess their students' learning on a regular basis as an integrated part of quality instruction. Furthermore, other countries use gateway assessments for accountability purposes to a lesser extent than the United States. For example, in Finland, the only external assessment is given on a sampling basis and is designed to provide information on the functioning of the school as a whole. Assessment is a classroom responsibility. Teachers monitor student progress by assessing them on an ongoing basis, using the assessment guidelines in the national core curriculum and textbooks. While Finnish schools do not assess for school accountability purposes, they do an enormous amount of diagnostic or formative assessment at the classroom level.[106] Another major focus in Finnish classrooms is promoting students' self-assessment skills.

Extant literature has documented both positive and negative impacts of standardized assessments widely adopted in the United States on teachers' instruction and assessment at the classroom level. Table 16 summarizes some highlights of both.

Table 16

Pros and Cons of Standardized Assessment Uses

Evidence indicates that standardized tests motivate teachers to:[107]	**Research reveals that high-stakes assessments force teachers to:**[108]
Align their instruction to standards	Narrow the curriculum
Maximize instructional time	Focus on memorization, drills, and worksheets
Work harder to cover more material in a given amount of instructional time	Allocate less time to higher-order skills
Adopt a better curriculum or more effective pedagogical methods	Restrict their teaching to formulated approaches of instruction

[106] OECD. (2010). *PISA 2009 results: What makes a school successful?* (Volume IV).

[107] Borko, H., & Elliott, R. (1999). Hands-on pedagogy versus hands-off accountability. Phi Delta Kappan, 80(5), 394-400.
Shepard, L. A., & Dougherty, K. C. (1991). Effects of high-stakes testing on instruction. Paper presented at the annual meeting of the American Educational Research Association and National Council on Measurement in Education, Chicago.
Thayer, Y. (2000). Virginia's Standards make all students stars. Phi Delta Kappan, 57(7), 70-72.
Vogler, K. E. (2002). The impact of high-stakes, state-mandated student performance assessment on teachers' instructional practices. Education, 123(1), 39-56.

[108] Hamilton, L., & Stecher, B. (2004).Responding effectively to test-based accountability. Phi Delta Kappan, 85(8), 578-583.
Jones, B. D., & Egley, R. J. (2004).Voice from the frontlines: Teachers' perceptions of high-stakes testing. Educational Policy Analysis Archives, 12(39). Retrieved from http://epaa.asu.edu/epaa/va12n39.
Jones, G., Jones, B. D., Hardin, B., Chapman, L., Yardrough, T, & Davis, M. (1999). The impact of high-stakes testing on teachers and students in North Carolina. Phi Delta Kappan, 81(3), 199-203.
Stecher, B. M., & Mitchell, K. J. (1995). Portfolio driven reform: Vermont teachers' understanding of mathematical problem solving. CSE Technical Report 400. Los Angeles: National Center for Research on Evaluation, Standards, and Student Testing.

The PISA study pointed out a sharp divergence between the forms of testing used in the United States and those used in higher-achieving countries. Whereas United States tests rely primarily on multiple choice items evaluating evaluate recall and recognition of discrete facts, most high-achieving countries use open-ended, performance-based items that require students to analyze, apply knowledge, and write extensively. Furthermore, a growing emphasis on higher-order thinking in the curriculum and project-based, inquiry-oriented learning activities in classroom instruction have led to increasing prominence of school-based tasks. Such school-based tasks include research projects, science investigations, development of products, and reports or presentations. These influence the day-to-day work of teaching, learning, and assessment practices.[109]

B. EDUCATIONAL OUTCOMES

This section discusses outcomes, in particular, student achievement.

Scores on Standardized Assessments

China and Singapore show mean mathematics scores much higher than those other countries or economies participating in PISA 2009. As shown in Table 17, Shanghai, China is furthest ahead, with students more than half a proficiency level, on average, above those in any other country or economy. Canada, Finland, and South Korea all perform at between one-half and one proficiency level above the OECD average in mathematics. For example, PISA shows that, on average, Canadian 15-year-olds are over one school year ahead of the 15-year-olds in the United States in mathematics and more than half a school year ahead in reading and science.[110]

Table 17

PISA 2009 Assessment Performance of 15-Year-Olds, Mean Scores

	Reading	Math	Science
Canada	524	527	529
Shanghai	556	600	575
South Korea	539	546	538
Singapore	526	562	542
Finland	536	541	554
The Netherlands	519	526	522
United States	500	487	502

Tables 18 and 19, based on PISA data, reveal that the United States had a larger share of at-risk students and a smaller share of top-performing students than other countries.[111]

Table 18

PISA Data Share of At-risk Students (not reaching PISA baselines Level 2)

	Canada	Shanghai	South Korea	Singapore	Finland	The Nether-lands	United States
Reading	10%	4%	6%	12%	8%	14%	18%
Mathematics	11%	5%	8%	10%	8%	13%	21%
Science	10%	3%	6%	11%	6%	14%	18%

[109] Darling-Hammond, L., & McCloskey, L. (2008). Assessment for learning around the world: What would it mean to be "international competitive?" *Phi Delta Kappan, 90*(4), 263-272.

[110] OECD. (2010). PISA 2009 results: What students know and can do—Student performance in reading, mathematics and science (Volume I). Retrieved from http://dx.doi.org/10.1787/9789264091450-en. Note: PISA assessment on reading, mathematics, and science would scale student outcomes on six levels. Level 6 and Level 5 are considered as high-performing, and Level 2 is the baseline level for proficiency (2010).

Table 19

PISA Data
Share of Top-performing Students
(reaching PISA Level 6 and Level 5)

	Canada	Shanghai	South Korea	Singapore	Finland	The Nether-lands	United States
Reading	13%	19%	13%	16%	15%	10%	10%
Mathematics	18%	50%	26%	36%	21%	20%	10%
Science	12%	24%	12%	20%	19%	12%	9%

Students who did not surpass the most basic performance level were not a random group; the PISA data indicated that socio-economic disadvantage has a particularly strong impact on student performance in the United States. In fact, 17 percent of the variation in student-learning outcomes was explained by students' socio-economic background. In other words, in the United States, two students from different socio-economic backgrounds vary much more in their academic achievement than in other countries.

Table 19 indicates that the United States is behind other leading countries in producing advanced-achieving students. The other industrialized countries in the comparison have proportionally more students reaching advanced achievement levels in reading, mathematics, and science than the United States. Researchers have noted that "the percentages of high-achieving students in the United States—and in most of its individual states—are below those of many of the world's leading industrialized countries."[112] Researchers also noted that recent educational initiatives within the United States focused on bridging the gap of low-performing students, but lacked a similar focus on enhancing the education of talented students.[113]

Table 20 compares countries on equity in the distribution of learning opportunities, spending on education, and the economic context of the country. Once again, here is proof of a global achievement gap. The data show that socio-economically disadvantaged students in Canada and Finland are much less at risk for poor educational performance than their counterparts in the United States. The relationship between students' socio-economic background and learning outcomes is stronger in the United States than in other high-performing countries. To illustrate, only 20 percent of American 15-year-olds enrolled in socio-economically disadvantaged schools reached the average performance standards of Finland in PISA.

In the 2009 PISA study, 15-year-olds in the United States performed about average in reading and science, and below average in math. Of the 34 countries that took the test, the United States ranked 14th in reading, 17th in science, and 25th in math. The United States' standing dropped progressively in the last decade and is continuously losing ground in international comparison.[114] The TIMSS showed better results: eight of 35 countries scored better than the United States on the fourth-grade level tests, and only five of 47 countries scored better on the eighth grade level test in the area of mathematics.

[112] Hanushek, E. A., Peterson, P. E., & Woessmann, L. (2010). Teaching math to the talented. Which countries and states are producing high-achieving students? *Education Next*, *11*(1). Retrieved from http://educationnext.org/teaching-math-to-the-talented.
[113] Konstantopoulos, S., Modi, M., & Hedges, L. V. (2001). Who are America's gifted? *American Journal of Education, 109*(3), 344-382.
[114] National Science Board. (2010). *Science and engineering indicators: 2010.* Arlington, VA: National Science Foundation.

The differences in the content and format of the tests can help account for the differences in results. The tests differ in their overarching purposes, the content assessed, and the format used.[115] For instance, in mathematics, the TIMSS seeks more to assess "curricular attainment," or how much the student knows. To that end, it is organized by topics in mathematics such as number, measurement, geometry, data, and algebra. The purpose of the PISA, on the other hand, is to measure students' ability to apply what they have learned in science and technology, and it has been designed to assess the kinds of skills needed in today's workplace. Therefore, PISA is arranged not by content areas but by large themes like "space and shape." The format of each reveals its purpose: about two-thirds of the TIMSS is in multiple choice format, and one-third is constructed-response. The PISA, conversely, is about two-thirds constructed response and one-third multiple choice format, which is well-suited for emphasizing problem-solving and application.

Education is and always has been the fastest way to climb the socio-economic ladder. The unemployment rate for college graduates is just four percent, but for high school dropouts it is 14 percent; the United States has a 25 percent dropout rate.[116] There is a high correlation between the number of teenagers who are not in school or not working and lowered mobility. In Virginia, the percentage of teenagers between ages 16-19 who neither attended school nor worked was four percent, compared to nine percent nationally.[117]

Table 20

Equity in Learning Outcomes[118]

	Equity	**Coherence**	**Efficiency**	**Income**	**Equality**
	Percentage of the variance in student performance	Total variance between schools expressed as a percentage of the total variance within the country	Annual expenditure per student on educational core services (below tertiary)	GDP per capita	Gini index*
Canada	8.6	22	7,609	36,397	0.30
Finland	7.8	9	6,430	35,322	0.26
Shanghai	12.3	38	42,062	11,361	0.42
Singapore	15.3	35	23,699	51,462	0.42
South Korea	N/A	N/A	61,104	26,574	N/A
United States	16.8	36	9,932	46,434	0.36

*Gini index is a standard economic measure of income distribution. The Gini coefficient is rated on a scale ranging between 0 and 1. A score of 0 on the Gini scale means perfect equality in income distribution – everyone has the same income, while 1 corresponds with perfect inequality – one person has all the income while others have nothing. Higher the number above 0 denotes higher inequality.

Underperformance of Students in Virginia

Under the *No Child Left Behind Act of 2001*, states have considerable control in setting their own passing scores on state assessments, e.g., Virginia's Standards of Learning (SOLs). [119] While this makes

[115] National Center for Educational Statistics. (2006). Comparing mathematics content in the National Assessment of Educational Progress (NAEP), Trends in International Mathematics and Science Study (TIMSS), and Program for International Student Assessment (PISA) 2003 assessments. Retrieved from http://nces.ed.gov/pubs2006/2006029.pdf.
[116] Zakaria, F. (2011, November 6).
[117] Federal Interagency Forum on Child and Family Statistics. (2011). *America's children: Key national indicators of well-being, 2011.* Washington, DC: U.S. Government Printing Office.
The Annie E. Casey Foundation. (2011). *State profiles of child well-being: 2011 Kids count data book.* Baltimore, MD: Author.
[118] OECD. (2010). *Strong Performers and Successful Reformers in Education*.
[119] U.S. Department of Education. (2001).

it more difficult to compare students state to state, the National Assessment of Educational Progress (NAEP) is increasingly used as the most reliable performance standard throughout the United States.

When Virginia's students are measured against the NEAP standard, their performance is limited. While 89 percent of Virginia's 4th graders passed the state reading test, only 38 percent met the NAEP proficient level. Similarly, only 43 percent of Virginia's students were at the NAEP proficient level in 4th-grade math, compared with 88 percent who passed the SOL test. Ninety percent of 8th graders passed the SOL reading test, while only 32 percent were at the NAEP proficient level; in math, 87 percent of 8th graders passed the SOL, but only 36 percent were at the NAEP proficient level. Similarly, TIMSS found that just 44 percent of Virginia's students met their standards.[120] Tables 21 and 22 outline findings from Virginia State Snapshot.[121]

Table 21

Virginia Reading Achievement

	4th Graders			8th Graders		
	% Proficient on State Test: 2009-10	% Basic on NAEP: 2008-09	% Proficient on NAEP: 2008-09	% Proficient on State Test: 2009-10	% Basic on NAEP: 2008-09	% Proficient on NAEP: 2008-09
All	88.1	74	38	89.7	78	32
White	91.7	82	47	92.9	85	40
Black	79.7	56	18	82.6	61	14
Hispanic	84.7	60	26	84.9	70	22
Low Income	80.3	56	18	81.5	63	15

Table 22

Virginia Math Achievement

	4th Graders			8th Graders		
	% Proficient on State Test: 2009-10	% Basic on NAEP: 2008-09	% Proficient on NAEP: 2008-09	% Proficient on State Test: 2009-10	% Basic on NAEP: 2008-09	% Proficient on NAEP: 2008-09
All	88.1	85	43	86.9	76	36
White	92.0	93	54	90.8	84	44
Black	80.5	69	16	79.1	59	14
Hispanic	80.9	80	28	80.9	65	23
Low Income	80.8	74	23	78.4	60	15

C. LESSONS LEARNED IN YEAR I

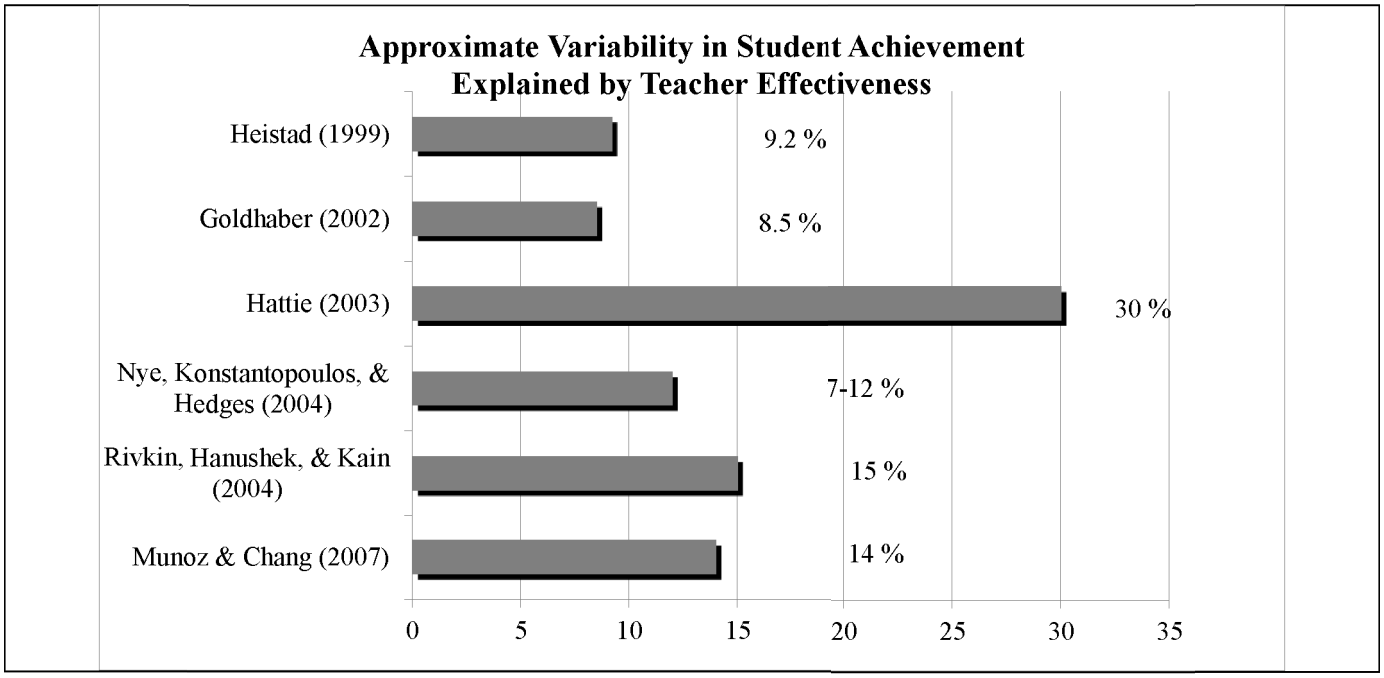
Consistent with U.S. studies of teacher effectiveness, quality teachers are a critical factor when attempting to improve students' performance. Having a highly effective teacher has a greater effect that class size reduction and a number of other structural changes that have been attempted. Simply stated, teachers matter.

[120] Anumdson, K. (2010). *National education standards: The right answer for Virginia.* Retrieved from http://www.educationsector.org/publications/national-education-standards-right-answer-virginia.
[121] ED Data Express. (n.d.). Virginia State Snapshot. Retrieved from http://www.eddataexpress.ed.gov/state-report.cfm/state/va.

Various studies have estimated how much of the variability in student achievement can be explained by the quality of the teacher. Understanding factors which account for variability in student academic performance plays a central role in educational research design.[122] Figure 6 summarizes selected studies regarding variability in student achievement attributed to teacher effectiveness.

Figure 6

Student Achievement Accounted for by Teacher Effects[123]



As seen in the countries studied which were able to turn around weak student performance, a major theme was government policy of identifying and nurturing quality teachers. The comparison countries provide a variety of possible actions to enhance teacher selectivity, training, and professional development. The roles of compensation and public perspective regarding the profession also vary across the nations reviewed and offered further potential solutions. The challenge is to ensure that recommendations adopted maintain what is most valued in the U.S. education system. Top-performing schools around the world emphasize "American" skills, such as creativity and problem-solving; meanwhile, the United States has been emphasizing more discrete knowledge and testing. The ongoing question is, "How does America 'Americanize' American Schools?"

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[122] Gall, M. D., Gall, J. P., Borg, W. R. (2007). *Educational research: An introduction* (8th ed.). Boston: Pearson.

[123] Heistad, D. (1999). *Teachers who beat the odds: Value-added reading instruction in Minneapolis 2nd grade.* Paper presented at the Annual American Educational Research Association Conference, April, Montreal, Canada.
Goldhaber, D. (2002). The mystery of good teaching. *Education Next, 2*(1), 50-55. Retrieved from http://www.hoover.org/publications/ednext/3368021.html.
Hattie, J. (2003). *Teachers make a difference: What is the research evidence?* Retrieved from http://www.leadspace.govt.nz/leadership/pdf/john_hattie.pdf.
Nye, B., Konstantopoulos, S., & Hedges, L. V. (2004).
Rivkin, S. G., Hanushek, E. A., & Kain, J. F. (2005). Teachers, schools, and academic achievement. *Econometrica, 73*(2), 417-458.
Munoz, M. A., & Chang, F. C. (2007). The elusive relationship between teacher characteristics and student academic growth: A longitudinal multilevel model for change. *Journal of Personnel Evaluation in Education, 20*, 147-164.

IX. Findings and Recommendations

As the world becomes smaller through globalization and modernization, policymakers are seeking a broad and balanced perspective on the goals and purposes of education. There are lessons to be learned from top-performing countries on international assessments. These are outlined in the following listing.

- Recognizing the importance of nurturing students' knowledge base and their ability to conduct higher-level thinking;
- Recruiting the most talented young people to the profession of teaching;
- Preparing teachers in both subject matter and pedagogy;
- Establishing policies that provide both accountability and autonomy; and
- Fostering collaborative structures for professional development.

A. TEACHER PREPAREDNESS AND EFFECTIVENESS

Teachers are the most powerful school-related factor and must be considered when looking at student-learning outcomes and school performance. The 2007 McKinsey report on leading PISA countries emphasized that one key factor in school and student success was teacher quality.[124] As noted in *How the World's Best-Performing School Systems Come Out on Top*, an international study comparing data from OECD's PISA, "the quality of an education system cannot exceed the quality of its teachers."[125] In order to improve the quality of schools and positively affect the lives of students, the quality of teaching must be addressed. This is the best hope to systematically and dramatically improve education. Curriculum can be reformed but ultimately it is teachers who implement it. Professional development on new instructional strategies can be provided but ultimately, it is teachers who must incorporate them into their instruction. There can be an increasing focus on data analysis of student performance but ultimately, it is teachers who produce the results.[126]

The available evidence suggests that the main driver of the variation in student learning is teacher quality. Consistent with this premise, this international comparative study noted above found three factors matter most for school reform and improvement:[127]

- Getting the right people to become teachers;
- Developing them into effective instructors; and
- Ensuring that the system is able to deliver the best possible instruction for every child.

Teacher Recruitment

Findings

The top-performing countries do two things to maintain their high quality teacher workforce: they maintain a high level of selectivity for individuals interested in entering the teaching profession and they compensate first-time teachers well. The hiring decision is viewed as extremely important, considering that the hiring of an individual could result in 30 years of either effective or inferior teaching. Only one in ten applicants is accepted to the teacher-training programs in Finland and one in six applicants is accepted in Singapore. Top-performing school systems recruit their teachers from the top third of each cohort who graduate: the top 5% in South Korea, the top 10% in Finland, and the top 30% in Singapore and Hong Kong. Forty-seven percent of teachers in the United States graduated in the bottom third of their college classes, 30% in the middle third, and only 23% in the top third.

[124] Barber, M., & Mourshed, M. (2007).
[125] Barber, M., & Mourshed, M. (2007). p. iii.
[126] Stronge, J. H. (2010). *Teacher effectiveness = Student achievement: What research says*. Larchmont, NY: Eye on Education.
[127] Barber, M., & Mourshed, M. (2007). p. 13.

Finnish teacher education programs are able to attract ten applicants for every opening, despite the teacher compensation not being as high as some other countries. How has Finland managed to make teaching the most desirable career choice? The major reasons teaching is such an attractive profession for talented young people are the autonomy, respect, and trust that the profession receives.[128]

In the United States, the teaching profession ranks in the middle range of occupational prestige, well below traditionally higher-status professionals such as physicians, engineers, and attorneys, and well above blue collar occupations such as police, plumbers, and carpenters. Competitive high salaries, comprehensive training, and high social status standing make teaching a sought-after career option in Singapore, South Korea, and Finland. Teaching has been considered a less attractive and less desirable line of work. Teachers rank in the middle range in surveys of occupational prestige—well below traditional higher-status professionals such as physicians, engineers, and attorneys, and well above blue collar occupations such as police, plumbers, and carpenters.[129]

Recommendation 1

Raise the value of the teaching profession in Virginia.

a. **Request the Governor and the Secretary of Education develop and implement approaches to make teaching a more attractive career choice.**
b. **Request the Governor and the Secretary of Education develop and implement promotional programs and marketing which addresses the value of the teaching profession.**

Recommendation 2

Develop and implement a rigorous teacher recruitment mechanism.

a. **Request the Governor and the Secretary of Education develop and implement a rigorous teacher recruitment mechanism.**
b. **Recruit top academic achievers who are rising college freshman or are already enrolled in college.**

Findings

There are 37 colleges and universities in Virginia with approved teacher preparation programs. The Virginia Teaching Scholarship Loan Program (VTSLP) provides financial support to students who are preparing to teach in one of Virginia's critical shortage teaching areas. A selection panel representing teachers, college and university faculty, professional organizations, and Department of Education personnel chooses recipients and they may receive a scholarship-loan for as much as $3,720. Upon completion of the teacher preparation program, the scholarship recipient shall begin teaching in the public schools of the Commonwealth in the first full academic year after becoming eligible for a teaching license and fulfill the teaching obligation by teaching continuously in Virginia for the same number of years that he was the beneficiary of such scholarship.

In 2007, the Two-Year College Transfer Grant Program (CTG) was passed into law in Virginia. Under this program, qualifying students completing their Associate's Degree at a Virginia two-year public college and then transferring to a participating Virginia four-year college or university may receive the new CTG award.

[128] OECD. (2010). *PISA 2009 results: What makes a school successful?* (Volume IV).
[129] Ingersoll., R. (2001). The status of teaching as a profession. In J. Ballantine and J. Spade (Eds.), *Schools and society: A sociological approach to education* (pp. 115-129). Belmont, CA: Wadsworth Press.

Recommendation 3

Provide incentives for early identification and attraction of high-performing, high ability candidates.

a. **Request the State Council of Higher Education in Virginia (SCHEV) and the Virginia Community College System (VCCS) review Virginia's existing scholarship programs such as the Virginia Teacher Scholarship Loan Program and Virginia's College Transfer Grants, and make recommendations for building awareness for recruiting highly qualified candidates into the teaching profession.**
b. **Develop dual enrollment and articulation agreements to establish a career pathway model in Virginia for recruiting high-performing teacher candidates and facilitating their entry into the teaching profession. Such a review will include dual enrollment, Virginia's two-year associates degree programs, articulation agreements with Virginia's teacher preparation programs, and master's degree program requirements that acknowledge teacher candidates who meet other criteria of highly qualified teachers.**

Quality of Teacher Preparation Programs

Findings

Various studies have explored how much of the variability in student achievement can be explained by the quality of the teacher. Ineffective teachers have negative longitudinal effects on student learning. If students have a less effective teacher in the first year and the highest level teachers for remaining years, their achievement would never exceed that of students who are assigned effective teachers for all years. Teacher education and preparation are significantly correlated with increases in student achievement. Generally, all educational systems require prospective teachers to complete both educational and professional preparation requirements in both subject matter and pedagogy, or expertise in knowing what and how to teach. Leaders in Finland attribute their students' success in learning to intensive investments in teacher education; all teachers receive three years of high-quality graduate level preparation. Most teachers in Finland hold master's degrees in both their content area and in education. In addition, their preparation is aimed at learning to teach diverse learners—including special needs students—with a strong focus on how to use formative performance assessments to enhance student learning.

In Virginia, an alternative route to licensure is available through the recommendation of the individual's employing Virginia school division or nonpublic school. A three-year nonrenewable license can be issued through satisfying endorsement course work, experiential learning, or by meeting the provisional-special education requirements.

Recommendation 4

Raise the rigor of teacher preparation programs.

a. **Require all student teachers to be supervised and jointly evaluated by an experienced teacher, principal, and university advisor.**
b. **Request the State Council of Higher Education of Virginia (SCHEV) to review teacher practicums to ensure the inclusion of a variety of experiences in addition to classroom teaching, such as observation of lessons, conferences with teacher, or participation in extracurricular and professional development activities.**
c. **Strengthen the exit requirements of teacher education programs to include criteria such as completion of required courses, examinations, project assignments, and teacher practicum.**
d. **Expand the use of performance-based assessments proposed in the *Virginia State Board of Education Guidelines for Uniform Performance Standards and Evaluation Criteria for Teachers* for beginning teacher licensing as a means of determining effectiveness before a teacher receives a professional license.**

e. Request that the Board of Education be advised of the findings from the Commission's study regarding the importance of quality teacher preparation programs and include Virginia's alternative licensing provisions as part of its comprehensive review of *Virginia's Licensure Regulations for School Personnel.*

Teacher Support and Development

Findings

One of the most critical findings from this comparative study is the importance of not only recruiting effective teachers but also sustaining the quality of the teaching force. There is evidence that teachers who receive substantial high-quality professional development can help students achieve more.[130] *High-quality professional development refers to a focus on content and pedagogy, in-depth active learning, extended duration, and collective participation.*[131] *As an example, based on the findings of one meta-analysis, teachers who received substantial professional development (49 hours) boosted their students' achievement by 21 percentile points; this effect size was fairly consistent across all content areas.*[132] *Such research suggests that for professional development to support an increase in student learning outcomes, sufficient time must be coupled with high-quality development.*

Franke and others found that when teachers engaged in meaningful, effective professional learning activities, they were inclined to: [133]

- *View children's thinking as central to their instruction;*
- *Possess detailed knowledge about children's thinking;*
- *Perceive themselves as creating and extending their own knowledge about children's thinking; and*
- *Collaborate with other colleagues who possess knowledge about children's thinking.*

Critical factors that may directly impact professional development include the level of support provided by the school and district, the culture of learning within the school, and the resources and materials available, the facilities and teachers having sufficient time to plan for classroom activities. Quality staff development has evolved in high-performing countries from a remedial support system which focused on individual improvement into a dynamic, reflective, and continuous improvement process.

In their international study, Barber and Mourshed argued that substantial increases in spending and popular reforms, most noticeably class-size reduction and decentralization of decision-making, have failed to budge student achievement.[134] *In contrast, high-performing school systems like those in Canada, Finland, Japan, and Singapore, maintained a strong focus on improving daily classroom instruction because of its direct impact upon student learning. As an example of supporting investment in classroom teachers, some high-performing East Asian countries found that mechanisms to encourage high levels of student achievement are policies which target classroom teachers, including ongoing professional development and the equalization of instructional*

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[130] Little, J. W. (1993). Teachers' professional development in a climate of education reform. *Educational Evaluation and Policy Analysis, 15*(2), 129-151.

[131] Desimone, L.M., Porter, A.C., Garet, M.S., Yoon, K.W., & Birman, B.F. (2002). Effects of professional development on teachers' instruction: results from a three-year longitudinal study. *Educational Evaluation and Policy Analysis, 24* (2), 81-112.

[132] Yoon, K. S., Duncan, T., Lee, S., Scarloss, B., & Shapley, K. L. (2007). *Reviewing the evidence on how teacher professional development affects student achievement.* Washington, DC: Regional Educational Laboratory Southwest.

[133] Franke, M. L., Carpenter, T. P., Levi, L., & Fennema, E. (2001). Capturing teacher' generative change: A follow-up study of professional development in mathematics. *American Educational Research Journal, 38*(3), 653-689.

[134] Barber, M., & Mourshed, M. (2007).

resources.[135]*Not much advancement could be accomplished in student learning and school performance unless there is a dramatic improvement in "what teachers know and are able to do — their talent level."*[136]

Top-performing countries have developed rigorous systems to connect professional development to classroom teaching. In Singapore, teachers receive 100 hours of professional development and, in The Netherlands, they receive more than a month's worth. In South Korea, all third-year teachers must complete a formal training program for four consecutive weeks, six days a week, during their winter or summer break, with some financial aid available.

Examples of strong teacher collaboration can be seen in Shanghai. There has been an increase in formal in-service education based on the existing collaborative, professional-development model embedded in the school structure. Chinese teachers, even at the primary level, are organized into teacher research groups, in which all members teach the same subject. The teachers share office workspace, schedule common planning and meeting time, and have rich opportunities for interaction with others. Each teacher research group is led by a teacher identified as one of the best in that subject. With a focus on improving their practices, members of teacher research groups discuss ways to teach the subject, observe one another in class, organize in-service education, and mentor new and pre-service teachers. The groups meet after students have completed their exams to determine where the weak points were and how to improve those areas. Novice teachers teach public lessons that are critiqued by their colleagues.[137]

Over the years, a number of teacher development practices have emerged in China, many of which have become standard practice; for instance, "lesson research," which includes collective lesson preparation, lesson observation, and post-observation conferencing; "open lessons," which are demonstration lessons; and one-on-one "the old guiding the young" mentoring practice.[138] *However, in the United States, mentoring and induction systems often are narrow and sporadic add-ons to non-collaborative organizational structures.*[139] *American teachers work in "egg-crate" classrooms and have less time to interact with their peers or with mentors.*[140] *Mentors frequently do not teach the same subject or grade level as their novice teachers and may not even teach in the same building. All of these factors affect the kinds and depth of collaboration that is possible.*[141]

Finally, teachers in high-achieving countries spend less of their time teaching classes; therefore, they have more time to do collaborative planning and engage in professional development.

Recommendation 5

Improve Virginia's teacher professional development practices/programs.

a. Request Virginia's teacher preparation programs include best practices which translate to high quality professional development to match teacher's training needs.

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[135] Akiba, M., LeTendre, G. K., & Scribner, J. P. (2007). Teacher quality, opportunity gap, and national achievement in 46 countries. *Educational Researcher, 36*(7), 369-387.
[136] Ibid.
[137] Preus, B. (2007).
[138] Tsui, A. B. M. & Wong, J. L. N. (2009). In Search of a Third Space: Teacher Development in Mainland China. In C. K. K. Chan & N. Rao (Eds.), *Revisiting the Chinese Learner: Changing Contexts, Changing Education* (pp. 281-311). Hong Kong: Comparative Education Research Centre/Springer Academic Publishers.
[139] Preus, B. (2007).
[140] Strauss, V. (2011). *Teacher training: U.S. vs. Finland, Singapore, & China.* Available at http://gideonlearning.wordpress.com/2011/03/28/teacher-training-us-vs-finland-singapore-china.
[141] Preus, B. (2007).

b. **Recommend additional time be committed to professional development, and identify options for providing professional development within existing mechanisms.**
c. **Provide state funding for school divisions to provide high quality professional development opportunities corresponding with teachers' professional needs.**
d. **Create policies that encourage school divisions to hold public instruction workshops to demonstrate exemplary teaching practices.**

Teacher Evaluation

Findings

All countries in this study (except Finland) tend to use students' achievement data to monitor teacher practices, but supplement this information with qualitative assessments, such as peer reviews and classroom observations. Teacher appraisal policies vary greatly country to country. In Singapore, teachers' performance is appraised annually against 16 different competencies. Competencies include teacher contribution to the academic and character development of the students in their charge, their collaboration with parents and community groups, and their contribution to their colleagues and the school as a whole. Teachers who do outstanding work receive a bonus from the school's bonus pool. It is important to note this individual appraisal system is not based solely on student test scores, but is developed and implemented within the context of the school's overall goal for educational excellence and a strong system of professional accountability.

Recommendation 6

Implement teacher evaluation policies which encourage educational excellence and professional accountability.

a. **Implement faithfully and institutionalize, through appropriate funding, the revised teacher evaluation system policy guidelines in the Virginia Board of Education's Guidelines for Uniform Performance Standards and Evaluation Criteria for Teachers. Also, provide financial support to implement the Board of Education's Guidelines for Uniform Performance Standards and Evaluation Criteria for Principals and for Superintendents.**

Teacher Compensation

Findings

Most of the high-achieving countries have policies that align teacher compensation rates with other highly regarded professions. Annual earnings for South Korean lower secondary teachers are almost twice the level of national income. In contrast, teachers in the United States earn less than the national per capita income with an average teacher salary ratio of .97 to GDP per capita. This ratio is 2.0 in South Korea. In the United States, teachers earn an average starting salary of about $36,000, lower than the averages of $43,635 for computer programmers, $44,668 for accountants, and $45,570 for registered nurses. Teacher pay is not only lower than other occupations requiring the same level of education, but has also been falling farther and farther behind the past 60 years. Teacher salaries are related to class size: if spending levels are similar, school systems make trade-offs between smaller classes and higher salaries for teachers. However, the Programme for International Student Assessment (PISA) data show that higher teacher salaries, not smaller class sizes, are associated with better student performance.

Teachers in Shanghai and Singapore receive extra pay and promotions for high student achievement. Conversely, Finland and Canada have rejected merit pay due to the lack of an empirical research base supporting the value of such an approach. However, these two countries encourage extensive dialogues between principals and teachers about student progress.

Strategic compensation is an approach to professional pay for teachers that emphasizes not only accountability and rewards for student learning, but also for teacher learning and teacher leadership. By incorporating student achievement, professional development, collaboration, teacher leadership and measures of teaching effectiveness into compensation decisions, strategic compensation seeks to reward the most effective teachers and teacher leaders for using, and spreading, their expertise to other teachers in their schools and districts.

In Virginia, Salem City has implemented the Growth Project to measure and report academic growth for all students, to use student growth as the centerpiece in teacher and leader evaluations, and to research strategic compensation models. The Salem City Schools Growth Project is a highly participatory process in which teachers and leaders collaboratively design systems to: measure and report student growth in all grade-levels/content-areas; align professional evaluation systems to ensure that student growth is the centerpiece of teacher and leader evaluations; and research strategic compensation models.

Recommendation 7

Study/revise Virginia's teacher compensation system to include components that foster excellence in teaching.

a. **Provide funding for teacher salary increases.**
b. **Provide funding based on a strategic compensation model such as Salem's City Schools Growth Project.**
c. **Provide funding for establishing a differentiated compensation system based on teacher performance.**

B. STRUCTURE AND SUPPORT OF THE EDUCATIONAL SYSTEM

International comparisons make it possible to compare the quality of educational outcomes across educational systems. They also reveal differences in these countries' educational structures as well as the investments made in education. International comparisons provide insights for improving educational efficiency. The educational systems reviewed in this study often had intentional procedures to nurture leadership skills among its top-performing teachers and would target their strongest leaders to work with lower-performing schools. This systematic identification of top-performers and subsequent grooming for leadership positions is consistent with research that demonstrates the importance of high quality, effective leadership in shaping high-performing schools with a positive school culture and engaged, achieving students.

In addition to the role of effective leaders, the study explored differences in instructional time and time spent learning. The length of the school day in Virginia is similar to many high performing countries. With the exception of Finland, where the length of the school year is shorter. Teachers spend more time in instruction in the United States and have less planning time and time for individual student assistance. Another key consideration is the amount of time beyond the school day that students receive supplemental instruction, often at the parents' expense. This added time learning is estimated to be as much as two years of additional learning by the time the student graduates.

Principal Quality

Findings

The international comparison indicated that the top performers have paid attention to principal quality and leadership development. For instance, Ontario, Canada (the largest school system in Canada) initiated a leadership strategy in 2008 that delineated the skills, knowledge, and attributes of effective leaders. Among the elements were a strong mentoring program reaching over 4,500

principals and vice principals and a new province-wide appraisal programs for school leaders.[142] *Another illustration of principal quality can be found in Shanghai. A major undertaking in Shanghai has been the improvement of the overall school system by turning around low-performing schools. One of the strategies, which is relatively new and has gained increasing attention, is commissioned administration.*[143] *It is a special leadership program in which the government commissions the administration from high-performing schools to take over the administration of low-performing ones. The high-performing schools appoint their experienced leaders (such as deputy principals) to be the principals of the low-performing schools and send a team of experienced teachers to lead the instruction. This demonstrates a trust in the competence and professionalism of the leadership force as an essential component in school turnaround.*

The education policies and practices in Singapore exemplify a clear understanding that high-quality teaching and strong school performance require effective leaders. The key is that Singapore has a unique approach to identifying and developing talent. Throughout Singapore, talent for leadership is identified and nurtured rather than being left to chance. After three years of teaching, teachers are assessed annually to see which of three career paths would best suit them: [144]

- *Teaching track (including steps of Senior Teacher, Lead Teacher, Master Teacher and finally, Principal Master Teacher);*
- *Senior specialist track (specialists in areas such as curriculum, instructional design, educational research, and statistics); and*
- *Leadership track (including trajectory of Subject Head/Level Head, Head of a Department, Vice Principal, Principal, Superintendent, and Director).*

Teachers with potential as school leaders are moved to middle management teams and receive training paid by the government. Middle managers' performance is assessed for their potential to become vice principals, and later, principals. Each stage involves a range of experience and training to prepare candidates for their new roles in school leadership and innovation.[145] *In Singapore, young teachers are continuously assessed for their leadership potential and given opportunities to demonstrate and learn; for example, they can serve on committees and later be promoted to head of a department at a relatively young age. After these experiences are monitored, potential principals are selected for interviews and go through leadership situational exercises.*[146]

In the United States, there are no policies to create a high-quality talent pool. Any teacher can apply to train as a principal or school head, and later for a position in a school.[147] *Despite this, there soon may be a shortage of qualified individuals to fill school leadership positions and promote school improvement. A study funded by the National Association of Elementary School Principals and the National Association of Secondary School Principals found that approximately half of the surveyed school divisions reported a shortage in the labor pool for K-12 principal candidates, regardless of the schools' grade level or whether they were rural, suburban, or urban schools.*[148] *The major factors that keep those teachers identified by their school principal as leaders or having leadership*

[142] OECD. (2010). *Strong performers and successful reformers in education*.
[143] Ibid.
[144] Tucker, M. S. (2011).
[145] OECD. (2010). *PISA 2009 results: What makes a school successful?* (Volume IV).
[146] Ibid.
[147] Ibid.
[148] Education Research Service. (1998). *Is there a shortage of qualified candidates for openings in the principalship? An exploratory study.* Arlington, VA: Author.

potential from choosing to be school principals are testing/accountability pressures, job stress, the amount of time required, and societal problems that make it difficult to focus on instruction.[149]

Research has consistently revealed that school leadership has an important impact on student achievement gains or progress over years.[150] *In addition to this influence, research indicates that effective school leadership also has a significant positive effect on reduced student absenteeism, student engagement, student academic self-efficacy, staff satisfaction, and collective teacher efficacy.*[151] *Waters, Marzano, and McNulty conducted a meta-analysis of research on effects of principal leadership practices on student achievement.*[152] *After analyzing studies conducted over a 30-year period, they found that the effectiveness of a school's leadership is significantly associated with increased student academic performance. For instance, a number of leader behaviors, such as establishing clear goals and fostering shared beliefs, were associated with student learning. They found the average effect size between leadership and student achievement is .25. That means a one standard deviation improvement in leadership effectiveness can translate into an increase of ten percentile points in student achievement on a standardized, norm-referenced test.*

In the United States, there is no well-defined "teacher-to-leader" career path, nor are there policies to cultivate a high-quality talent pool. Any teacher can train as a principal or school head, and then apply for a position in a school. Despite this, there are concerns that soon there may be a shortage of qualified individuals to fill school leadership positions and promote school improvement. Approximately half of the school divisions surveyed reported a shortage in the labor pool for K-12 principal candidates, regardless of the schools' grade level or if they were located in rural,

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[149] Hewitt, P. M., Denny, G. S., & Pijanowski, J. C. (2011). Why teacher leaders don't want to be principals. *AASA Journal of Scholarship and Practice, 8*(1), 13-23.

[150] Bamburg, J. D., & Andrews, R. L. (1991). School goals, principals, and achievement. *School Effectiveness and School Improvement, 2,* 175-191.

Brewer, D. J. (1993). Principals and student outcomes: Evidence from U.S. high schools. *Economics of Education Review, 12*(4), 281-292.

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Leithwood, K., & Jantzi, D. (2006). Transformational school leadership for large-scale reform: Effects on students, teachers, and their classroom practices. *School Effectiveness and School Improvement, 17*(2), 201-227.

Leitner, D. (1994). Do principals affect student outcomes? *School Effectiveness and School Improvement, 5*(3), 219-238.

Witziers, B., Bosker, R. J., & Krüger, M. L. (2003). Educational leadership and student achievement: The elusive search for an association. *Educational Administration Quarterly, 39*(3), 398-425.

[151] Leithwood, K., & Mascall, B. (2008). Collective leadership effects on student achievement. *Educational Administration Quarterly, 44*, 1-34.

Cheng, Y. C. (1994). Principal's leadership as a critical factor for school performance: Evidence from multi-levels of primary schools. *School Effectiveness and School Improvement, 5*(3), 299-317.

Griffith, J. (2004), Relation of principal transformational leadership to school staff job satisfaction, staff turnover, and school performance. *Journal of Educational Administration, 42*(3), 333-356.

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Pounder, D. G., Ogawa, R. T., & Adams, E. A. (1995). Leadership as an organization-wide phenomena: Its impact on school performance. *Educational Administration Quarterly, 31*, 564-588.

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[152] Waters, T., Marzano, R. J., & McNulty, B. (2003). *Balance Leadership: What 30 Years of Research Tells U.S. About the Effect of Leadership on Student Achievement*. Retrieved February 25, 2008, from http://www.mcrel.org/PDF/LeadershipOrganizationDevelopment/5031RR_BalancedLeadership.pdf.

suburban, or urban areas. The major factors that keep those who were identified by their school principal as leaders or having leadership potential from choosing to be school principals are testing/accountability pressures, job stress, amount of time required, and societal problems that make it difficult to focus on instruction.

Recommendation 8

Develop leadership mentoring and development programs targeting the skills, knowledge, and attributes of effective leaders.

a. **Implement, fund, and ensure professional development provisions are included in the *Guidelines for Uniform Performance Standards and Evaluation Criteria for Principals* adopted by the Virginia Board of Education in 2012.**
b. **Develop leadership policies and practices, in partnership with Virginia's education associations, to identify promising teachers to prepare them for official leadership positions.**
c. **Request the Department of Education develop a Request for Proposal (RFP) to create a Center for Research on Teacher and Leader Excellence to promote best practices in instructional leadership developed by Virginia's institutions of higher education; and coordinating with other states' leadership programs across Virginia's school divisions.**

Instructional Time and Time Spent Learning

Findings

Teachers in the United States spend more time per week engaged in instruction than teachers in any of the compared countries, all of which outperform the United States on international comparative assessments. The OECD found that primary teachers in the United States spent an average of 1,097 hours a year on instruction (or six daily lessons of 50 minutes), while South Korean teachers spent a total of 840 hours on instruction and Finnish teachers provided instruction for an average of 677 hours a year (or about four daily lessons of 45 minutes).[153]

One of the most striking features of Finnish schools is that their students have fewer hours of instruction than students in other countries, yet they score near the very top on international tests. Finnish students do not follow the Asian model of study: study and more study. Instead, they start school a year later than most countries, emphasize creative work, and shun tests for most of the academic year.

Thirty-six states have enacted policies allowing students to receive academic credit based on what they know, instead of how much time they spend in class with the goal of making it easier for struggling students to catch up, exceptional students to race ahead, and students facing geographic and scheduling barriers to take the courses they need. In 2005, New Hampshire became the first state to eliminate seat-time requirements. Michigan allows waivers for seat-time requirements on a district-by-district basis.

In addition, United States' students have a shorter school year, although with schools days of similar length to those in comparison countries. In many of the top performing Asian countries, compulsory instruction during the school day is often supplemented by after-school lessons. An estimated 45% of students in South Korea and Shanghai spend up to four hours per week on supplemental after-school lessons; an additional 20% spend more than four hours a week. It is estimated that children in South Korea will spend almost two years more in learning than United States students by the end of high school.

[153] OECD. (2010). *Education at a glance 2010: OECD indicators.*

Recommendation 9

Investigate the Commonwealth's school day structure and school year structure.

a. **Request the Governor and the Secretary of Education review best practices in structuring adequate planning time for teachers.**
b. **Request the Governor and the Secretary of Education study ways to maximize the instructional learning time for students including the allocation of the time in school day and the school year.**
c. **Request the Governor and the Secretary of Education review the waivers of seat-time requirements and make recommendations to allow students to earn credit based on demonstrating course mastery.**

C. EDUCATIONAL INNOVATIONS

Educational initiatives that complement high-performing educational systems were studied by the convened Advisory Group. For Virginia's school divisions to broaden the array of courses they offer, reach out to more non-traditional students and provide more educational options for families, the Commission on Youth looked at the roles for virtual learning and Science, Technology, Engineering, and Math–Health (STEM-H) academies, and programs that address students at risk of not graduating and high ability students. The Commission on Youth acknowledged the leadership that Virginia has taken in virtual learning and noted that Shanghai and China are implementing more virtual learning initiatives to reach more of their students, ensuring that training is provided to teachers to implement such programs effectively. At-risk and high-ability students would benefit from revisiting how high school credits are accrued to focus on knowledge rather than "seat time."

Further, the TIMSS indicates the current difficulty students in the United States have in the global competition in STEM-H. Strong skills in these fields are critical in global economic competition. Ensuring teachers, especially in high-poverty communities, have the knowledge base in STEM-H to adequately prepare our students for further study is a current challenge. One result is that students in the United States are less likely to pursue higher education in these needed fields.

Virtual Learning

Findings

Virtual learning is a means to provide students with more opportunities to learn.

The Commonwealth of Virginia has been recognized as a leader in virtual learning. The Virtual Virginia initiative currently offers 40 different online courses, including 24 Advanced Placement (AP) courses, foreign languages, and other core course. Approximately 2,500 students from 238 Virginia middle and high schools are enrolled and the reach of the program extends to 5,700 students who receive remedial instruction through online tutorials hosted by Virtual Virginia. This application of virtual learning will provide more college level opportunities for students as well as increase graduation rates.

According to a study conducted by the International Association for K-12 Online Learning, China is planning to educate 100 million more students virtually over the next ten years. China is also training masters-level teachers how to teach online and has digitized their K-12 content curriculum since 2004. Singapore has blended online learning in 100% of their secondary schools. Every teacher knows how to utilize a learning management system and digitalized curriculum. In Canada, Ontario has four online versions of every high school class.

Recommendation 10

Explore virtual learning opportunities in Virginia.

a. **Investigate multiple sources of funding, such as enrollment tuition, federal or state grants, or external funders, to ensure the sustainability of the virtual schools.**
b. **Develop a plan to ensure equitable access to virtual learning resources, in particular, for the at-risk student population.**
c. **Request more research in the field of virtual learning to have more knowledge base about what makes virtual learning effective.**
d. **Develop a plan to create more virtual elementary, middle, and remediation courses. Currently, more courses offered are high school courses, including AP or college level courses geared toward high-achieving students working toward college credits.**
e. **Consider and plan teacher professional development to require a thorough knowledge of virtual teaching strategies and the workings of specific virtual teaching platforms.**
f. **Investigate partnerships with other states to attain the most qualified teachers in specialized fields.**
g. **Explore the best use of virtual learning and what works with ensuring access, success, and accountability.**
h. **Recommend the expansion of virtual learning in Virginia based on the evidence of what works.**

Science, Technology, Engineering, and Mathematics–Healthcare (STEM-H)

Findings

The primary driver of future global knowledge economy and concomitant creation of jobs is innovation, largely derived from advances in science and engineering.[154] *In the foreseeable future, increasing numbers of jobs in all fields will require knowledge of STEM-H.*[155] *A successful K-12 STEM-H education is essential to sustainable scientific leadership and economic competitiveness.*[156] *However, research suggests many Virginia students are not prepared for the demands of today's economy or that of the future; the state of STEM-H learning in Virginia warrants concern. For example, according to the National Assessment of Education Progress, about 57 percent of Virginia 4th graders are not proficient in mathematics when they complete 4th grade, and about 68 percent of 8th graders do not meet proficient levels when they complete 8th grade. Moreover, the achievement gaps between student population groups (black/white, Hispanic/white, and high-poverty/low-poverty) are close to one standard deviation in size.*[157] *The overall supply of mathematics and science teachers has been rising to meet total demand, but there are local imbalances, with many schools struggling to fill openings in STEM-H subjects with qualified teachers. In particular, schools in high-poverty communities often do not have access to knowledgeable teachers in these fields.*[158] *There are many mathematics and science teachers who lack the level of preparation in the subject areas and in teaching them that the professional community deems adequate. Too many middle and*

[154] National Academy of Sciences, National Academy of Engineering, & Institute of Medicine. (2007). *Rising above the gathering storm revisited: Rapidly approaching category 5.* Washington, DC: The National Academies Press.
[155] Lacey, T. A., & Wright, B. (2009). Occupational employment projections to 2018. *Monthly Labor Review, 132*(11), 82-123.
[156] President's Council of Advisors on Science and Technology. (2010). *Prepare and inspire: K-12 education in science, technology, engineering, and math (STEM-H) for America's future.* Washington, DC: Author.
[157] National Research Council. (2011). *Successful K-12 STEM-H Education: Identifying Effective Approaches in Science, Technology, Engineering, and Mathematics. Committee on Highly Successful Science Programs for K-12 Science Education.* Board on Science Education and Board on Testing and Assessment, Division of Behavioral and Social Sciences and Education. Washington, DC: The National Academies Press.
[158] President's Council of Advisors on Science and Technology. (2010).

high school teachers teach STEM-H subjects out of their field.[159] *For instance, a 2008 study indicated that 40 percent of mathematics classes in high-poverty schools were taught by out-of-field teachers.*[160]

Employers in many industries lament that job applicants lack the needed mathematics, computer, and problem-solving skills to succeed. International students fill an increasing portion of elite STEM-H positions in the United States. In 2007, international students constituted more than a third of the students in United States science and engineering graduate schools, and more than 70 percent of those students remain in the United States after earning their degrees to work.[161]

In order to expand the number of students who ultimately pursue advanced degrees and careers in STEM-H fields, the action must start at the K-12 level. Inadequate preparation in STEM-H subjects in basic education has major consequences in higher education. STEM-H degrees only account for about a third of all first university degrees awarded in the United States, compared with more than a half of degrees in China, India, and Japan.[162]

In addition, the problem of out-of-field teaching, where teachers are educated and trained in one field, but assigned to teach classes in another field, is much more severe in the United States, especially in secondary STEM-H subject areas.[163]

- *Over one-third of all secondary school mathematics teachers in the United States do not have a major in mathematics, mathematics education, or a related discipline such as engineering, statistics, or physics.*
- *Over one-third of all those teaching secondary school English classes do not have a major in English or related subjects such as literature, communications, speech, journalism, English Education, or reading education.*
- *Twenty-nine percent of all those teaching secondary school classes in any science do not have a college major in any one of the sciences or in science education.*

Recommendation 11

Develop a plan to implement rigorous and coherent STEM-H curriculum that deepens STEM-H learning over time.

a. **Strengthen science education at elementary and middle school level. Teachers can cover less material, but cover it in depth. For example, separate science into sub-subjects like biology, physics, and chemistry starting at middle school level.**
b. **Enhance Virginia's STEM-H curriculum to promote mastery.**
c. **Develop gender-specific student programming to encourage participation in STEM-H-related classes.**
d. **Build cooperation with STEM-H-related business and industry where students can obtain "real life" experiences in the technology sectors.**
e. **Increase the proportion of in-field STEM-H teachers, particularly in Title I schools.**

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[159] Ingersoll, R., & Perda, D. (2010). Is the supply of mathematics and science teachers sufficient? *American Educational Research Journal, 47*(3), 563-594.

[160] Ingersoll, R. (2008). *Core problems: Out-of-field teaching persists in key academic courses and high-poverty schools.* Washington, DC: Education Trust.

[161] National Academy of Sciences, National Academy of Engineering, & Institute of Medicine. (2007).

[162] Kuenzi, J. J. (2008). *Science, technology, engineering, and mathematics (STEM-H) education: Background, federal policy, and legislative action.* Congressional Research Service. Retrieved from http://www.fas.org/sgp/crs/misc/RL33434.pdf.

[163] National Research Council. (2011).

D. THE INTERNATIONAL ACHIEVEMENT GAP

According to international assessments, students in the United States lag in academic performance when compared with students in other industrialized countries, particularly in science and mathematics. The 2009 Organisation for Economic Co-operation and Development Programme for International Student Assessment indicated that, of the 34 countries evaluated, the United States ranked 14th in reading, 17th in science, and 25th in mathematics. The U.S. falls behind the highest scoring countries, including South Korea, Finland, Singapore, Shanghai in China, the Netherlands, and Canada.

Today's U.S. high school graduates compete in a global job market where highly skilled workers are in increasing demand. While other countries have made significant improvements in education, the U.S. has made only incremental improvements. The decline in the academic achievement of American students has been prominent among national and state concerns about our ability to compete internationally. Standards and curriculum must be compared to the level of skill and rigor expected in other nations if we wish to be competitive. Several states have participated in the international assessments as independent "countries" to provide a more tailored measure of their students' performance on the global stage. It is critical to evaluate academic achievement of Virginia's students relative to other countries in order to strengthen Virginia's schools and learning opportunities.

The International Baccalaureate (IB)

Findings

The IB program, founded in 1968, is offered in 3,464 schools in 143 countries. It serves over 1,049,000 students ages 3 to 19 years. The IB program has a challenging curriculum and rigorous assessment standards aligned with the recommendations of the Commission on the Skills of the American Workforce, including international citizenship, language skills, and technological literacy.

Currently, there are 1,373 IB schools in the United States. There are 327 schools that offer the Primary Years Program (PYP) for students ages 3 to 12; 468 schools which offer the Middle Years Program (MYP) for students ages 11 to 16; and 778 schools that offer the Diploma Program (DP) for students aged 16 to 19. Virginia has eight PYP schools, 36 MYP schools; and 36 DP schools.

Recommendation 12

Support, financially and otherwise, the expansion of IB programs.

a. **Support the expansion of IB programs at the elementary, middle, and high school levels.**
b. **Request more schools with IB programs to have dual credentials (having sister schools in other countries).**
c. **Request more research on IB curriculum and assessment in order to develop and implement a similar but cost-effective system in every public school.**

More Rigorous Middle School Curriculum

Findings

International data indicates that the majority of United States students receive less rigorous content coverage than those in other higher performing nations. Secondary students in the United States rank lower compared to the rankings of elementary students on international tests. Consider the following findings:

- *United States students' international standing was stronger at the fourth grade level than at the eighth grade level in both mathematics and science relative to the 25 countries that participated in the Trends in International Mathematics and Science Study (TIMSS) at both grade levels.*

- *United States students' international standing was stronger in eighth grade than in twelfth grade in both mathematics and science relative to the international averages for the other 19 countries that participated in TIMSS at both levels.*
- *United States students' attitudes about science decline during the middle and high school years. Research has shown that students' attitudes about science drop dramatically at age 12 after attending middle school for six weeks.*
- *Almost half of all Chinese teachers emphasized prior knowledge while only 7% of teachers in the U.S. reviewed prior knowledge before introducing a new math concept.*
- *Chinese teachers give better explanation and instruction in solving math programs. As a result, Chinese students have a better understanding of math concepts.*

Singapore has moved from a purely knowledge-transmission education model to one that emphasizes creativity and self-directed learning. Having been very successful as a knowledge transmission education system, Singapore is now working on curriculum, pedagogy, and assessments that value high-level, complex skills, as exemplified by their national education slogans, "Thinking Schools, Learning Nation" and "Teach Less, Learn More." In contrast, the reform in the United States is driving its educational system toward centralization of elementary and secondary education and is becoming increasingly more test-oriented.

Recommendation 13

Continue to examine and improve Virginia's academic standards to ensure the rigor and quality of standards.

a. **Develop more advanced math/science curriculum for grades 6, 7, and 8. For example, offer age-appropriate courses in biology, chemistry and physics in grades 6-8.**
b. **Conduct more research on the best math/science textbooks and pedagogical instruction practices in other countries. Suggest conducting an in-depth examination of the math curriculum developed by Singapore's Ministry of Education. This curriculum emphasizes extensive coverage of a relatively small number of concepts at early stages, and integrates math concepts, such as algebra and geometry, in secondary grade levels.**
c. **Request a comprehensive development of middle school math and science textbooks, including electronic and interactive versions.**
d. **Support the Virginia Board of Education's work in establishing rigorous, focused and coherent content at all grade levels, and reducing overlap and variation in implemented curricula across grades.**
e. **Offer students more opportunities to take challenging classes, beginning at the elementary school level.**
f. **Recommend schools review and revise curricula on a regular schedule, e.g., every five or ten years. Curricula should concentrate on the topics that must be mastered in order to understand the material presented in the following year.**

Assessing Virginia's Student Performance

Findings

Student performance assessment is a common practice in many countries. PISA data indicated that the rationale for assessments and the nature of instruments used vary greatly across the countries. Overall, the United States most pervasively uses achievement data for accountability purposes. It is found that grade-by-grade standardized testing, an educational strategy most popular in the United States, is absent in the countries with the most successful educational systems. Some of high-achieving countries only administer national testing at gateways, such as the end of primary, lower secondary, and upper secondary school. Schools and teachers are expected to assess student

learning on a regular basis as a part of quality instruction. Furthermore, other countries use gateway assessments for accountability purposes to a lesser extent than the United States.

The PISA study pointed out a sharp divergence between the forms of testing used in the United States and those used in higher-achieving countries. Whereas United States tests rely primarily on multiple-choice items that evaluate recall and recognition of discrete facts, most high-achieving countries use open-ended, performance-based items that require students to analyze, apply knowledge, and write extensively.

The educational reform initiatives in the top-performing Asian countries—Singapore, Shanghai, and South Korea—have become more "American", becoming increasingly decentralized and learner-centered. Meanwhile, the United States reforms are moving in precisely the opposite direction. There is abundant evidence both in the United States and around the globe that accountability through high-stakes standardized testing will not, in and of itself, promote the skills that are demanded by both today's economy and the economy of the future.

States are beginning to use international comparisons to benchmark their students' performance and determine whether they are challenging their students. Massachusetts and Minnesota participated in the 2007 TIMSS as independent "countries." Both Massachusetts and Minnesota scored well above the national and international average on the 2007 TIMSS; Massachusetts' fourth graders led peers in all 59 participating countries and states except Hong Kong and Singapore in math, and Minnesota students outperformed all but Hong Kong, Singapore, Chinese Taipei, and Japan in the same subject. Hong Kong and Shanghai, like Massachusetts, participate in the TIMSS as separate "countries. Massachusetts was able to conduct an item-by-item comparison of performance on test questions in its math and science curricula. The state noted that only 15% of students scored at the advanced level, compared with about 40% in Hong Kong and Singapore. Eight states in addition to Massachusetts participated in the TIMSS as independent "countries": Alabama, California, Colorado, Connecticut, Florida, Indiana, Minnesota and North Carolina.

Recommendation 14

Recommend Virginia consider additional methods to measure students' achievement.

a. **Request the Virginia Department of Education design a new generation of assessment to assess a broader range of student skills and knowledge. Instead of relying on multiple-choice, computer-scored tests, which educators and researchers believe cannot accurately measure higher-order thinking skills, the assessment should be diversified to include essay-type responses or even oral examinations.**
b. **Request the Virginia Department of Education to develop a plan for Virginia's participation in the 2015 TIMSS and/or PISA assessment as a "separate" country. The plan will discuss recommendations regarding the most appropriate assessment, implementation issues, and potential public and/or private funding sources. The Department will report on the status of this plan to the General Assembly and to the Commission on Youth prior to the 2014 General Assembly.**

X. Acknowledgments

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XI. Dedication

YVONNE B. MILLER
1934-2012

This report is dedicated to the late Senator Yvonne B. Miller, who served as chair of the Commission on Youth in 2010 and 2011. Her foresight led to the adoption of a two-year study conducted by the Commission comparing academic achievement of Virginia students with students in other leading industrialized countries. Senator Miller understood the value of education and knew that Virginia's future depended on investments in its young people.

As a founding member of the Virginia Commission on Youth (1991), Senator Miller served as a constant voice for children. She always supported and stood with families. She took great pride in speaking for those who did not otherwise have a voice. As a long-time supporter of kinship care, Senator Miller fought for families who were doing their best to take care of the children of other family members. She served on the Commission's Kinship Care Advisory Group, as well as kinship care committees of the Department of Social Services and Department of Aging. Her passing was not only a great loss to the Virginia Commission on Youth and the General Assembly, but also a great loss to all citizens of the Commonwealth.

Comparison of Economic, Demographic and Geographic Information - Part I

	UNITED STATES	VIRGINIA	CANADA	SHANGHAI	SOUTH KOREA	SINGAPORE	FINLAND	THE NETHERLANDS
Population	308.75 million[i]	8 million[ii]	33.7 million	20.5 million	48.8 million	5.8 million	5.4 million	16.8 million
Density[iii]	83.38 people/sq. mi	202.6 people/sq. mi	8.88 people/sq. mi	1,401 people/sq. mi	1309.2 people/sq. mi	2,751 people/sq. mi	42.24 people/sq. mi	1035.94 people/sq. mi
GDP[iv]	$14.5 trillion	$424 billion[v]	$1.6 trillion	$256.3 billion	$1.0 trillion	$223 billion	$238.8 billion	$709.5 billion (2012)
Poverty [vi]	15.1% (2010)	10.3%[54] (2010)	9.4% (2008)	N/A	15% (2006)	N/A	N/A	10.5
Government Structure[vii]	Constitution-based federal democratic republic	Constitution-based democratic republic	Parliamentary democracy, federation, and constitutional monarchy	Communist (China)	Republic	Parliamentary Republic	Republic	Constitutional monarchy
Population by race	White: 80.0% Black: 12.9% Asian: 4.4% Hispanic 15.1%	White: 68.6% Black: 19.4% Asian: 5.5% Hispanic 7.9% (2010)[viii]	British Isles origin: 28% French origin: 23% Other European: 15% American Indian: 2% Other: 6% Mixed background: 26%[ix]	Han: 99.4% Minorities: 0.6%	~100% Korean 20,000 Chinese	Chinese: 76.8% Malay: 13.9% Indian: 7.9% Other: 1.4%[x]	Finn: 93.4% Swede: 5.6% Russian: 0.5% Estonian: 0.3% Roma and Sami: 0.1%	Dutch: 80.7% EU: 5% Indonesian: 2.4% Turkish: 2.2% Surinamese: 2% Moroccan 2% Caribbean: 0.8% Other: 4.8%
Languages[xi]	English: 82.1% Spanish: 10.7% Indo-European: 3.8% Asian Pacific Island: 2.7%	English: 86.7% Spanish:5.9% Asian Pacific Island: 3.2%	English (official): 58.8% French (official): 21.6% Other: 19.6% (2006)	Mandarin English taught widely in elementary and secondary school.	Korean English taught widely in junior high and high school. (2011)	Mandarin (official): 35% English (official): 23% Malay (official): 14.1% Hakkinen: 11.4% Cantónese: 5.7% Teochew: 4.9% Tamil (official): 3.2% (2000) Other: 2%	Finnish (official): 91.2% Swedish (official): 5.5% Other (Sami/Russian): 3.3% (2007)	Dutch Frisian
Literacy Rate (15+)[xii]	99% (2003)	88%[xii]	99% (2003)	97.3% (2010)	97.9% (2002)	92.5% (2000)	100% (2000)	99%

i. U.S. Census Bureau. (2010). *U.S. Census Bureau announces 2010 Census population counts.* Retrieved from http://2010.census.gov/news/releases/operations/cb10-cn93.html.
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x. Central Intelligence Agency World Factbook. (2000).
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xii. Note individuals ages 16+ years. National Center for Education Statistics. (2003). *National assessment of adult literacy: State and county estimates of low literacy*. Retrieved from http://nces.ed.gov/naal/estimates/StateEstimates.aspx

Comparison of Economic, Demographic and Geographic Information – Part II

	UNITED STATES	VIRGINIA	CANADA	CHINA	SOUTH KOREA	SINGAPORE	FINLAND	THE NETHER-LANDS
Life Expectancy in Years (2012) [164]	78.49	78.5 (2007)[165]	81.48	74.84	79.3	83.75	79.41	81.01 (2013)
Unemployment [166]	9.6% (2010) 9.3% (2009)	6.9% (2009) 6.9% (2010)[167]	8.0% (2010) 8.3% (2009)	4.3% (2009)	3.7% (2010) 3.7% (2009)	2.2% (2010) 3.0% (2009)	8.4% (2010) 8.2% (2009)	6.8% (2012)
Average Size Household	2.59 (2010)[168]	2.54 (2010)[169]	3.0 (2006)[170]	2.49 (2011)[171]	3.4 (2005)[172]	3.5 (2011)[173]	2.8 (2009)[174]	2.2 (2011)
Rate of Home Ownership	66% (2011)[175]	68.9% (2010)[176]	68.4% (2006)[177]	N/A	N/A	88.6% (2011)[178]	64.6% (2000)[179]	N/A
Cost to Raise One Child to Age 18	$226,920 (2010)[180]	N/A	Girl: $166,549 Boy: $166,972[181]	N/A	N/A	N/A	N/A	N/A
Marital Dissolution per 1000[182]	4.95 (2012)[183]	3.7 (2009)[74]	2.24 (2003)	1.28 (2004)	2.90 (2004)	0.78 (2004)	2.53 (2004)	2.0
Population by religion[184]	Protestant: 52% Roman Catholic: 24% Mormon: 2% Muslim: 1% Jewish: 1% None: 10% (2002)	(2008)[185]Baptist: 27% Roman Catholic: 11% Methodist: 8% Lutheran: 2% Other Christian: 28% Jewish: 1% Buddhism: 1% Hinduism: 1% Unaffiliated: 18%	Roman Catholic: 44% Protestant: 29% Other Christian: 4.3% Muslim: 2% Jewish: 1.1% Buddhism: 1% Hinduism: 1% None: 17% (2011)[186]	Christian: 1.07% Muslim: 0.28%	None: 47% Christianity: 29% Buddhism: 23% Confuciani sm: 0.2% (2012)[187]	Buddhism: 33% Christianity: 18% Islam: 15% Taoism: 11% Hinduism: 5% Other: 0.7% None: 17% (2010)[188]	Lutheran: 77% Orthodox: 1% Other Christian: 1.5% None: 20.1% (2011)[189]	Roman Catholic: 30% Protestant: 20% Muslim: 5.8% None: 42% (2006)

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Listing of Tables and Figures

TABLES

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Appendix C

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Appendix D

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Richmond, Virginia

Susan L. Hogge
Legislative Fiscal Analyst
House Appropriations Committee
Richmond, Virginia

Nancy R. Hoover, Ph.D.
Coordinator
Virginia Governor's Academy for Engineering Studies
Lloyd C. Bird High School
Chesterfield, Virginia

Stephen Horton
Senior Vice President/Director, Grassroots Issue Management
McGuire Woods Consulting, LLP
Richmond, Virginia

K12.com
Herndon, Virginia
Thomas M. Bolvin, Director of Government Affairs
Suzanne Sloane, Head, Virginia Virtual Academy

Andrew Kanu, Ph.D.
Interim Dean
School of Liberal Arts and Education
Virginia State University
Petersburg, Virginia

Ashby Kindler
Principal
Murray High School
Charlottesville, Virginia

Cathy Martin
Executive Director, Human Resources
Boehringer Ingelheim Chemicals, Inc.
Petersburg, Virginia

John Morgan
Executive Director
Voices for Virginia's Children
Richmond, Virginia

Bet Neale
Director of Government Relations
Virginia Association of Secondary School Principals
West Point, Virginia

Susan Patrick
President
International Association for K12 Online Learning (iNACOL)
Vienna, Virginia

The Hon. Christopher K. Peace
Chair, Virginia Commission on Youth
Virginia House of Delegates
Mechanicsville, Virginia

Wendell C. Roberts, Esq.
Staff Attorney
Virginia School Board Association
Charlottesville, Virginia

James E. Ryan
Director, Program in Law and Public Service
University of Virginia School of Law
Charlottesville, Virginia

Kirk T. Schroder, Esq.
Schroder & Fidlow, PLC
Richmond, Virginia

Javaid Siddiqi
Deputy Secretary of Education
Office of the Secretary of Education
Richmond, Virginia

The Hon. Anne Crockett-Stark
Member, Virginia Commission on Youth
Virginia House of Delegates
Wytheville, Virginia

The College of William and Mary
School of Education
Williamsburg, Virginia
Patricia A. Popp, Ph.D., Clinical Associate Professor/State Coordinator, Project HOPE-VA

James H. Stronge, Ph.D.
Heritage Professor in the Educational Policy, Planning, and Leadership Area

Patrick H. Tolan, Ph.D.
Director, Youth-Nex
The UVA Center to Promote Effective Youth Development
University of Virginia Curry School of Education
Charlottesville, Virginia

Lola Tornabene
Account Executive
Enterprise Solutions and Assessment Team
Houghton Mifflin Harcourt
Canonsburg, Pennsylvania

Tony Valentino
Hanover County Public Schools
Mechanicsville, Virginia

Virginia Association of School Superintendents
405 Emmet Street
Charlottesville, Virginia
Andy Stamp, Associate Executive Director
Executive Director, Virginia School-University Partnership
Thomas Smith, Ed.D., Legislative Liaison

Virginia Department of Education
Richmond, Virginia
Patty Pitts, Asst. Superintendent for the Division of Teacher Education and Licensure
Linda Wallinger, Asst. Superintendent for the Division of Instruction
Anne Wescott, Asst. Superintendent for Policy and Communications

Appendix E

ADVISORY GROUP MEETING MINUTES

May 9, 2012
Speaker's Conference Room
General Assembly Building
1:00 p.m.

Advisory Group Members Attending:
Delegate Christopher Peace, Paula Fisher, Meredith Gunter, Sarah Gross, Meg Gruber, Mark Herzog, Sarah Herzog, Andrew Kanu, Nancy Hoover, Catherine Finnegan, Barry Glenn, John Morgan, Patricia Popp, Wendell Roberts, James Ryan, Kirk Schroeder, Patrick Tolan, Lola Tornabene, Linda Wallinger, Emily Webb for Javaid Siddiqi, Anne Wescott, Michelle Vucci

Guests:
Ellen Davenport, Tommy McNeil, Augustine Kang

Monitoring:
Susan Patrick

Absent:
Karin Addison, James Baldwin, Jean Braxton, Pam Brott, Barry Duval, David Foster, Susan Hogge, Stephen Horton, Ashby Kindler, Bet Neale, Suzanne Sloane, Thomas Smith, James Stronge, Patty Pitts, D. Patrick Lacy

Staff Attending:
Leah Hamaker, Joyce Garner, Meg Burruss

Welcome and Introductions
The Honorable Christopher K. Peace, Chair
Delegate Peace welcomed the Advisory Group asked the members and guests to introduce themselves. He noted that it was appropriate that everyone was gathered during this time because it was both Foster Care Awareness Month and Teacher Appreciation Week. Delegate Peace asked Leah Hamaker to give the Advisory Group members the background about the study.

Study Overview
Leah Hamaker, Senior Legislative Policy Analyst
Ms. Hamaker gave an overview of the study and presented on how Virginia students rank on the international and national assessments which measure student achievement. She noted that, in year one of the study, the Commission conducted research and identified attributes from the educational systems of leading industrialized countries, as evidenced by the performance of students from these countries on specific international assessments. She noted the overarching goal of this study was to compile these best practices and present findings to the Commission prior to the 2013 General Assembly Session. Delegate Peace asked staff to provide information to the Advisory Group that identified Virginia's recent educational accomplishments including legislative actions such as the top jobs bills and reading goals. Several of these initiatives were previously reported to the Governor's Commission on Higher Education. Ms. Hamaker said that staff could provide the Advisory Group with a synopsis of these activities prior to the June 26 Advisory Group meeting.

Comparison of Academic Achievement in Virginia with Leading Industrialized Countries
Patricia A. Popp, Ph.D., State Coordinator, Project HOPE-VA
Clinical Associate Professor, School of Education, College of William & Mary
Dr. Popp followed with a presentation on the preliminary findings from the literature review. Dr. Popp first outlined the methodology used in selecting the comparison countries. She then shared preliminary findings, including the comparative and contrasting data from these countries. Of the top performing countries on the

Programme for International Student Assessment (PISA) and Trends in International Mathematics and Science Study (TIMSS) assessments, factors such as region, population, population density, and gross domestic product (GDP) were used to narrow the list of countries used in the comparison.

Dr. Popp noted that the review attempted to identify attributes that explain/support the positive educational outcomes in the selected countries. The next step would be identifying the policies and practices that could be adopted for use in Virginia.

The Advisory Group members asked which high-performing countries were excluded from the review and Dr. Popp stated that Japan, Australia and New Zealand were not included. Another member inquired whether the demographic makeup of a country was considered. Dr. Popp stated the review was limited to countries that were consistently high performing on the international assessments and that demographic makeup was not a factor. The Advisory Group discussed whether the subgroups in the United States were actually outperforming the total population of students in these countries. Dr. Popp noted that high performing subgroups in U.S. are still being outperformed. She stated that there were discrepancies between those students being tracked and those students whose scores were actually reported.

A member inquired whether there was any study or literature from these countries that gauged the impact of role of the family, involvement of community, and other similar factors, such as the cultural impact of parental expectations. A follow up question was raised about the amount of after-school instruction offered to students the selected countries.

The Advisory Group discussed findings from the data. Further questions and items that the Commission may wish to consider are outlined below.

- The rate that the comparison countries retain teachers, as well as the types of teacher preparation/training programs; Dr. Popp noted that teachers remain in their field because their role is more respected in the comparison countries. There is no research on content of teacher training programs but there is information about the level of education teachers are required to possess.
- Further investigation into whether teachers in the target countries have advanced degrees in education or in the topic that they teach.
- The comparison countries' commitment to early education. Dr. Popp stated that the U.S. might have lower numbers of children that participate in early education programs but definitely do not have the lowest numbers. Canada has the highest percentage of students that participate in early education programs.
- Research on the demographics of schools in the comparison countries, for example, how do middle-income schools in the U.S. compare to schools in other countries and what is included in educational spending for these countries compared to the U.S.
- The role that school plays in the comparison countries' communities; in the U.S., schools provide more than an education. It was noted that schools in several of the comparison countries did not provide extracurricular activities or sports.
- The impact the unionization of teachers has had upon the teaching.
- Acknowledging whether the comparison countries' data includes private educational systems. In the U.S., only public education data will be used.
- In different countries, some school systems classify by age and not grade level. This factor should be considered.
- The data does not tell the entire story. In the U.S., the "input" consists of the entire country of children. This philosophy may not be the same in comparison countries. For example, children with developmental disabilities are treated differently in some countries.
- The belief that every student must attend college needs to be re-evaluated.
- The focus of this study must be narrow and the Advisory Group should agree on basic concepts to establish a baseline for this study.

The Advisory Group discussed the objective of the study. Members questioned whether the objective was ensuring that students in Virginia were prepared for the workplace, preparing students for college or

replenishing STEM-H careers. Ms. Hamaker noted that the Commission was examining what other countries with high-performing educational systems have implemented and whether these practices would be appropriate and/or useful for Virginia. Questions were also raised about whether staff would evaluate other states' practices to see if these would be helpful or useful. Ms. Hamaker noted that Commission staff would provide information about other states' initiatives to the Advisory Group.

Delegate Peace encouraged the Advisory Group to ask the following question, "What would you do if you knew you couldn't fail?" He stated that the Advisory Group should keep this question in mind, particularly when evaluating a practice that was not perceived to be feasible but may be the right thing to do. Delegate Peace noted that the Advisory Group needed to remain objective but also willing to confront difficult issues. Additionally, Virginia's educational system is controlled by multiple hands and very dependent on political parties. Politically sensitive issues would also need to be acknowledged.

One Advisory Group member asserted that Thomas Jefferson believed that Constitution needed to be reviewed every 30 years. However, our educational system/structure has not been evaluated or revised in 40 years. One of the comparison countries, Finland, accomplished change with a comprehensive approach rather than a piecemeal approach. While the Virginia Department of Education has a strategic plan, it is not universally followed.

Another Advisory Group member stated that the burden for providing an education has shifted to the localities. In addition, classroom teachers have been subjected to the mandates imposed by fragmented, piecemeal, and *ad hoc* strategies. There is a need to look at this issue holistically; legislation comes with good intentions but may not always consider the "big picture."

Study Subcommittees

Advisory Group Discussion

The Advisory Group was introduced to the subcommittees of the study, which were created to focus discussion and recommendations on the common findings from the literature review. The four subcommittees are:

- The International Achievement Gap – Ms. Hamaker noted that this subcommittee would focus on the research findings and help determine which practices would be appropriate or useful for further consideration.
- Structure and Support of the Educational System – This subcommittee will evaluate Virginia's educational structure and develop recommendations that may improve educational achievement.
- Teacher Preparedness/Effectiveness – A great amount of research points to teacher effectiveness as a primary factor that influences student achievement. This subcommittee will review findings from comparison countries to determine whether they can be employed in Virginia.
- Future Considerations – This subcommittee would discuss issues that were broader than this study and offer recommendations. These issues include STEM-H, students at-risk, high ability students, and virtual learning.

A question was raised whether the "Future Considerations" subcommittee ought to be renamed "Other Considerations." Ms. Hamaker stated that the Advisory Group could certainly rename it because the issues that this subcommittee would be addressing were potentially large enough in scope to constitute separate study.

Ms. Hamaker asked the members to complete the blue sheet in their packets to rank their choice of subcommittee. She noted that it was likely that the subcommittees would be meeting simultaneously and that staff would try to accommodate the members' preferences. The subcommittees will convene during the June 26 Advisory Group meeting.

Delegate Peace discussed several books that the Advisory Group may wish to consider for summer reading. He recently read the following books:

The Republic by Plato
Hot, Flat and Crowded by Thomas Freedman
The Global Achievement Gap by Tony Wagner

Drive by Dan Pink
The Coming Jobs War by Jim Clifton (suggested by Patrick Tolan)

Delegate Peace also referenced a recent Richmond Forum which he attended. The topic was "Revolutionizing Education." Sir Ken Robinson and Rafe Esquith were the speakers. Delegate Peace asked staff to investigate whether this forum was available online so that it could be shared with the Advisory Group. Ms. Hamaker stated that she would investigate this for the June 26 Advisory Group meeting.

Next Steps and Adjournment
Ms. Hamaker advised the Advisory Group that information about future Advisory Group and subcommittee meetings would be sent via email. The meeting adjourned at 2:45 p.m.

The Advisory Group meets next for a Roundtable Discussion on June 26, 2012 at 10:00 a.m. in House Room 3, the Capitol.

October 2, 2012

House Room 3
The Capitol
9:30 a.m.

Advisory Group Members Attending:
Karin Addison, William C. Bosher, Catherine Finnegan, Paula Fisher, Barry Glenn, Sarah Gross, Meg Gruber, Sarah Herzog, Nancy Hoover, Andrew Kanu, Dominic Melito for Sarah Gross, John Morgan, Bet Neale, Susan Patrick, Patty Pitts, Patricia Popp, Wendell Roberts, Javaid Siddiqi, Thomas Smith, James Stronge, Patrick Tolan, Lola Tornabene, Tony Valentino, Linda Wallinger, Emily Webb, Anne Wescott

Guest Participants:
Ellen Davenport, Michelle Hienki, Michael Malloy, Genera Peck, Grant Rissler, Lawrence D. Wilder, Jr., Otissa Williams, Xianxuan Xu, Jingzhu Zhang

Staff Attending:
Amy Atkinson, Joyce Garner, Leah Hamaker

Welcome and Introductions
Amy M. Atkinson
Ms. Atkinson welcomed the Advisory Group asked the members and guests to introduce themselves. She informed the members that the Advisory Group would not take a formal break in order to accomplish the goals set out on the meeting agenda. She noted Delegate Peace had another meeting but was hopeful he would be joining the meeting later.

Ms. Atkinson reminded the Advisory Group members of the major points about the Commission on Youth's study, *Comparison of Academic Achievement in Virginia and in Leading Industrialized Countries*. She noted that, during the 2011 Virginia General Assembly Session, Senator Yvonne B. Miller introduced Senate Joint Resolution 320, which directed the Commission on Youth to study how Virginia schoolchildren compare academically to students in other countries. While Senator Miller's resolution did not pass the Virginia General Assembly, the Commission on Youth adopted a two-year study plan to explore this issue. Ms. Atkinson noted this was an extremely important issue to the Commonwealth and that the Commission was currently in the second year of the study.

Ms. Atkinson stated that the Commission decided it would be beneficial to partner with William and Mary's School of Education. William and Mary already had the subject matter expertise. Moreover, the Commission could utilize the doctoral level students to assist the Commission with the research. Moreover, the faculty had

already visited China and was able to share their findings from their work in China. The Commission would gain from the expertise that the team from William and Mary already possessed.

Ms. Atkinson noted during the first year of the study, William and Mary assisted the Commission in conducting research and identified attributes from the educational systems of leading industrialized countries, as evidenced by the performance of students from these countries on specific international assessments. The Commission selected five countries because of their performance on international assessments. Ms. Atkinson stated that the Advisory Group should have received via email, the Commission's draft report from the first year of the study. This report outlined the selected countries and the preliminary findings from the first year. She noted that, while Virginia did not necessarily want to be like Finland or China, the Commonwealth could certainly learn about policies and practices in these countries.

Ms. Atkinson stated that, as noted in the study plan, the Advisory Group would meet to discuss the preliminary findings from year one of the study. An initial meeting of the Advisory Group was convened on May 9, 2012 to introduce the members to the study, generate additional questions, and request participation in subgroups around identified themes. Ms. Atkinson informed the Advisory Group that Delegate Peace felt it was important to dedicate the report to Senator Miller and to acknowledge her wisdom and leadership on this topic.

On June 26, 2012, the Commission convened a Roundtable to follow up on the discussion from the May 9 Advisory Group. During the Roundtable, there were over 70 participants divided into four subcommittees. Attendees then reconvened and the Commission staff shared key discussion points from the subcommittee breakout sessions so that all the participants could provide feedback

Ms. Atkinson informed the Advisory Group that staff would be presenting the findings and recommendations at the Commission on Youth meeting scheduled for November 7. The Commission would then be soliciting public comment. The Commission would then vote on the recommendations at the Commission meeting scheduled on December 3.

Ms. Atkinson thanked William and Mary for partnering with the Commission to compile the research from the literature review. She also thanked Senator Miller, Delegate Peace, and the Governor and his staff for their leadership on this topic. Secretary Fornash and Secretary Siddiqi have been actively involved as well. Ms. Atkinson stated that she attended the Governor's K-12 Education Reform Summit and was amazed how the presentations mirrored the findings in the Commission's report. Ms. Atkinson stated that education was the number one factor driving economic development. Finally, Ms. Atkinson thanked the Advisory Group members for providing the expertise and good ideas to the Commission.

Ms. Atkinson informed the Advisory Group that everyone was going to participate in a working session and not breakout into the subcommittees. Dr. James Stronge is going to walk through the proposed findings and recommendations. She noted the draft findings and recommendations discussed were formulated based on the literature review and from the June 26 Roundtable.

Presentation of Study Report, Draft Findings, and Recommendations

Ms. Atkinson

James H. Stronge, Ph.D.

Dr. Stronge asked the Advisory Group to refer to the Decision Matrix in the meeting packets. He noted that the Advisory Group would focus on the right column, which outlined the draft recommendations of the Decision Matrix because there had been much discussion already about the draft findings. He also suggested the Advisory Group keep two points in mind while reviewing the proposed recommendations. The first was the question as to what must be done to improve the educational system in the Commonwealth. This may require the Advisory Group members to "think outside of the box". The second is to remember that the draft recommendations endorsed by the Advisory Group should also be practical. Thus, the Advisory Group should filter what is desirable and practical while reviewing the draft recommendations. This process would be similar to a gap analysis. The Advisory Group may wish to focus on what needs to be done to bring the best jobs to Virginia. Dr.

Stronge said he would present the draft recommendations to the Advisory Group as outlined in the Decision Matrix and would proceed in order.

TEACHER PREPAREDNESS/RECRUITMENT

Finding 1 – Teacher Recruitment

Dr. Strong discussed that Virginia was not recruiting teacher candidates who were the best and the brightest in math and science. The Advisory Group members stated that, in order to accomplish this, the perception teaching profession should be elevated. The Advisory Group asserted that the Commission should first offer recommendations that promoted the positive aspects of the teaching profession. Funding should also be addressed to ensure this would not become an unfunded mandate.

The Advisory Group requested that Recommendation 1 be changed to Recommendation 2 and that a new Recommendation 1 be developed which marketed teaching as a viable profession and encouraged more students to consider teaching as a profession. Discussion ensued that while Science, Technology, Engineering, and Mathematics (STEM-H) had become a priority, teaching has never been a highly valued profession.

An Advisory Group member noted that a strong teaching force could be used by the Commonwealth as an economic development strategy. The Commonwealth may wish to establish a long-term goal to promote the teaching profession and demonstrate that teaching is a valued profession.

The Advisory Group requested the Commission develop Recommendation 1 that would raise the value of the teaching profession in Virginia. The Advisory Group suggested the following language:

1. *Raise the value of the teaching profession in Virginia.*
    a. *Request the Governor and the Secretary of Education develop and implement approaches to make teaching a more attractive career choice.*
    b. *Request the Governor and the Secretary of Education develop and implement promotional programs and marketing which addresses the value of the teaching profession.*

For Recommendation 2 (formerly Recommendation 1), the Advisory Group stated that class ranking should be included in recruitment efforts, not SAT or ACT scores. The Advisory Group asked that the Commission rework the options to reflect the following:

2. *Develop and implement a rigorous teacher recruitment mechanism.*
    a. *Request the Governor and the Secretary of Education develop and implement a rigorous teacher recruitment mechanism.*
    b. *Recruit top academic achievers who are rising college freshman or already enrolled in college.*

For Recommendation 3 (formerly Recommendation 2), the Advisory Group stated that one approach would be to make an education degree a "bargain" for highly qualified candidates. This would be similar to the loan repayment programs for physicians who agree to work in underserved areas. The Advisory Group asked that the Commission reference career pathways, dual enrollment and existing Virginia programs and scholarships. The language discussed by the Advisory Group for Recommendation 3 is:

3. *Provide incentives for early identification and attraction of high-performing, high ability candidates.*
    a. *Request the State Council of Higher Education in Virginia (SCHEV) and the Virginia Community College System (VCCS) review Virginia's existing scholarship programs, such as the Virginia Teacher Scholarship Loan Program and Virginia's College Transfer Grants, and make recommendations for building awareness for recruiting highly qualified candidates into the teaching profession.*
    b. *Develop dual enrollment and articulation agreements to establish a career pathway model in Virginia for recruiting high-performing teacher candidates and facilitate their entry into the teaching profession. Such a review will include dual enrollment, Virginia's two-year associates degree programs, articulation agreements with Virginia's teacher preparation programs, and master's degree program requirements that acknowledge teacher candidates who meet other criteria of highly qualified teachers.*

The Advisory Group asked that the Commission remove former Recommendation 3, which requested school divisions develop rigorous hiring processes, because the other recommendations adequately addressed this finding.

Finding 2 – Quality of Teacher Preparation Programs

The Advisory Group concurred that teacher preparation, alternative licensure provisions, and classroom management requirements in teaching education programs should be reviewed. The Advisory Group noted that, if more was going to be expected of school divisions, then more should also be required of teacher preparation programs. The Board of Education's Alternative Licensure study was discussed by Advisory Group and the members requested that the study be included in the recommendation options. The Advisory suggested the following:

Raise the rigor of teacher preparation programs.

a. *Require all student teachers to be supervised and jointly evaluated by an experienced teacher, principal, and university advisor.*
b. *Request the State Council of Higher Education of Virginia (SCHEV) review teacher practicums to ensure the inclusion of a variety of experiences in addition to classroom teaching, such as observation of lessons, conferences with teacher, or participation in extracurricular and professional development activities.*
c. *Strengthen the exit requirements of teacher education programs to include criteria such as completion of required courses, examinations, project assignments, and a teacher practicum.*
d. *Expand the use of performance-based assessments proposed in the Virginia State Board of Education Guidelines for Uniform Performance Standards and Evaluation Criteria for Teachers for beginning teacher licensing as a means of determining effectiveness before a teacher receives a professional license.*
e. *Request the Board of Education be advised of the findings from the Commission's study regarding the importance of quality teacher preparation programs and include Virginia's alternative licensing provisions as part of their comprehensive review of Virginia's Licensure Regulations for School Personnel.*

Finding 3 – Teacher Support and Development

The Advisory Group concurred that professional development opportunities needed to be appropriate, rewarding, and interactive. Moreover, there was also a need for meaningful induction for apprentice teachers. There should also be regularly dissemination of best practices to veteran teachers. The Advisory Group stated that the Shanghai model should not be included in the recommendations. The Advisory Group asked that funding for professional development be included. In addition, there was discussion about the need to link professional development standards with expressed training needs. The Advisory Group endorsed the following:

Improve Virginia's teacher professional development practices/programs.

a. *Request Virginia's teacher preparation programs include best practices that translate to high quality professional development to match teachers' training needs.*
b. *Recommend that additional time be committed to professional development and identify options for providing professional development within existing mechanisms.*
c. *Provide state funding for school divisions to provide high quality professional development opportunities that correspond with teachers' professional needs.*
d. *Create policies that encourage school divisions to hold public instruction workshops to demonstrate exemplary teaching practices.*

Finding 4 – Teacher Evaluation

An Advisory Group member stated that data should be used not only for accountability but also to improve teacher and student outcomes. Funding the evaluation system would be important to ensure its success. The Advisory Group asked that financial support for evaluation programs be included in the recommendation. Moreover, the Advisory asked that a similar recommendation be developed which addressed school leadership.

The Advisory Group concurred with the following language:

Implement teacher evaluation policies which encourage educational excellence and professional accountability.

a. *Implement faithfully and institutionalize, through appropriate funding, the revised teacher evaluation system policy guidelines in the Virginia Board of Education's Guidelines for Uniform Performance Standards and Evaluation Criteria for Teachers. Also, provide financial support to implement the Board of*

Education's Guidelines for Uniform Performance Standards and Evaluation Criteria for Principals and for Superintendents.

Finding 5 – Teacher Compensation

The Advisory Group stated that, before considering differentiated compensation and other types of reward systems, Virginia teachers' salaries should be raised. The Advisory Group also discussed whether a master's degree significantly influenced educational outcomes. It was noted that Finland and Canada require a Master's Degree. Discussion ensued about career switchers and teacher recruitment.

The Advisory Group concurred with the following:

Study/revise Virginia's teacher compensation system to include components that foster excellence in teaching.

a. Provide funding for teacher salary increases.

b. Provide funding based on a strategic compensation model such as Salem's City Schools Growth Project.

c. Provide funding for establishing a differentiated compensation system based on teacher performance.

STRUCTURE AND SUPPORT OF THE EDUCATIONAL SYSTEM

Finding 1 – Principal Quality

The Advisory Group noted that funding for mentoring and development programs should be included. There should also be mention of Virginia's existing school programs, as well as the mentoring programs from Virginia's professional associations. Collaboration among the Commonwealth's existing programs was critical. The Advisory Group requested the Ontario Leadership Model be removed from the first option so that Virginia's existing programs could be emphasized.

The Advisory Group concurred with the following:

Develop leadership mentoring and development programs that target the skills, knowledge, and attributes of effective leaders.

a. Implement, fund, and ensure professional development provisions are included in the Guidelines for Uniform Performance Standards and Evaluation Criteria for Principals adopted by the Virginia Board of Education in 2012.

b. Develop leadership policies and practices, in partnership with Virginia's education associations, to identify and develop promising teachers to official leadership positions.

c. Request the Department of Education develop a Request for Proposal (RFP) for a Center for Research on Teacher and Leader Excellence to promote best practices in instructional leadership developed by Virginia's institutions of higher education; and to coordinate with other states' leadership programs across Virginia's school divisions.

Finding 2 – Instructional Time and Time Spent Learning

The Advisory Group requested that Finding 2 be combined with Finding 3 – Time Spent Learning. The Advisory Group stated that combining the two would allow for more detailed study as to how Virginia school divisions are utilizing instructional time, school day structure, and the school year. The combined recommendation should also emphasize the most appropriate options for Virginia and address school divisions' need for flexibility and the need for increasing planning time for teachers. The Advisory Group discussed how school divisions were currently allocating time for teacher planning. Chesterfield County's approach was discussed with members noting that Chesterfield scheduled a half day for students one day each month to allow teachers to use that additional time for planning.

The Advisory Group suggested the following changes:

Investigate the Commonwealth's school day structure and school year structure.

a. Request the Governor and the Secretary of Education review best practices in structuring adequate planning time for teachers.

b. Request the Governor and the Secretary of Education study ways to maximize the instructional learning time for students including the allocation of the time in school day and the school year.

EDUCATIONAL INNOVATIONS

Finding 1 – Virtual Learning

The Advisory Group discussed virtual learning and the need for accountability. In addition, information about what works is needed, including information about access and success in existing virtual learning programs. An Advisory Group member stated there was a study conducted by the International Association for K12 Online Learning, which found that China is planning to educate 100 million more students virtually over the next ten years. China is also training masters' level teachers how to teach online and have digitized their K-12 content curriculum. Singapore has blended online learning in 100 percent of their secondary schools. Ontario has four online versions for every high school class.

The Advisory Group requested that the Recommendation be reworded to "explore virtual learning opportunities" in lieu of "supporting the expansion of virtual learning opportunities". This would allow for further study.

The Advisory Group suggested the following:

Explore virtual learning opportunities in Virginia.

a. *Investigate multiple sources of funding, such as enrollment tuition, federal or state grants, or external funders, to ensure the sustainability of the virtual schools.*
b. *Develop a plan to ensure equitable access to virtual learning resources, in particular for the at-risk student population.*
c. *Request more research in the field of virtual learning to have a larger knowledge base about what makes virtual learning effective.*
d. *Develop a plan to create more virtual middle, elementary, and remediation courses. Currently, more courses offered are high school courses, including AP or college level courses geared toward high-achieving students working toward college credits.*
e. *Consider and plan teacher professional development to require a thorough knowledge of virtual teaching strategies and the workings of specific virtual teaching platforms.*
f. *Investigate partnerships with other states to attain the most qualified teachers in specialized fields.*
g. *Explore the best use of virtual learning and what works with ensuring access, success, and accountability.*
h. *Recommend the expansion of virtual learning in Virginia based on the evidence of what works.*

Finding 2 – Science, Technology, Engineering, and Mathematics–Healthcare (STEM-H)

The Advisory Group discussed SOLs and noted that SOLs must be considered when there is discussion about strengthening science education, particularly in covering less material but in greater depth. Consideration must also be given to the impact SOL testing has on how STEM-H courses are taught and whether the standardized tests used reflect best practice.

The Advisory Group concurred with the following:

Develop a plan to implement rigorous and coherent STEM-H curriculum that deepens STEM-H learning over time.

a. *Strengthen science education at elementary and middle school levels. Teachers can cover less material, but cover it in depth. For example, separate science into sub-subjects e.g., biology, physics, and chemistry starting at middle school level.*
b. *Enhance Virginia's STEM-H curriculum to promote mastery.*
c. *Develop gender-specific student programming to encourage participation in STEM-H-related classes.*
d. *Build cooperation with STEM-H-related business and industry where students can obtain "real life" experiences in the technology sectors.*
e. *Increase the proportion of in-field STEM-H teachers, particularly in Title I schools.*

Closing and Next Steps

Dr. Stronge noted the Advisory Group would not have sufficient time to discuss the remaining recommendations in the Educational Innovations Section and the entire International Achievement Gap Section. Dr. Stronge requested that the Advisory Group review these recommendations and email comments to Commission on Youth staff by Monday, October 15th. Ms. Atkinson noted that she and Dr. Stronge were providing a study overview at

the upcoming Commission on Youth meeting scheduled for Wednesday, November 7 at 1:00 p.m. in House Room C of the General Assembly Building. Suggestions and comments from the Advisory Group would be shared with the Commission members at this meeting. All Commission on Youth meetings are open to the public.

Ms. Atkinson informed the Advisory Group that the Commission would not vote on the study recommendations until the final meeting of the study year, scheduled for December 3 at 10:00 a.m. Staff would contact the Advisory Group members after the November 7 meeting to discuss the how to provide public comment for the December 3 meeting.

The meeting adjourned at approximately 12:35 p.m.

Appendix F

Comparison of Academic Achievement in Virginia with Leading Industrialized Countries

ROUNDTABLE AGENDA

Hosted by the Virginia Commission on Youth

House Room 3, The Capitol
June 26, 2012 – 9:30 a.m. to 2:00 p.m.

Overview

According to international assessments, students in the United States lag in academic performance when compared with students in other industrialized countries, particularly in science and mathematics. The 2009 Organisation for Economic Co-operation and Development (OECD) Programme for International Student Assessment indicated that, of the 34 countries evaluated, the United States ranked 14th in reading, 17th in science, and 25th in mathematics. The U.S. falls behind the highest scoring countries, including South Korea, Finland, Singapore, Shanghai in China, the Netherlands, and Canada.

Today's U.S. high school graduates compete in a global job market where highly skilled workers are in increasing demand. While other countries have made significant improvements in education, the U.S. has made only incremental improvements. The decline in the academic achievement of American students has been prominent among national and state concerns about the United States' ability to compete internationally. It is critical to evaluate academic achievement relative to Virginia's students relative to other countries in order to strengthen Virginia's schools and learning opportunities.

In 2011, the Virginia Commission on Youth adopted a two-year study plan, *Comparison of Academic Achievement in Virginia with Leading Industrialized Countries.* The two-year plan directs the Commission to:

- compare the academic achievement of Virginia's students with that of students internationally, especially in reading, mathematics, and science;
- identify features in the education systems of countries which rank higher than the United States that may contribute to academic success;
- determine whether any of these features may be adapted for use in Virginia; and
- consider other matters related to the objectives of this study and recommend feasible and appropriate options.

9:30 – 10:00 **Registration and Networking**
Coffee/tea service will be provided.

10:00 – 10:15 **Welcome and Introductions**
Amy M. Atkinson, Executive Director
Virginia Commission on Youth

Javaid Siddiqi, Deputy Secretary of Education
Office of the Secretary of Education

10:15 – 11:00 **Updates from the Virginia Department of Education**

Virginia Educational Initiatives
Anne Wescott, Assistant Superintendent for Policy and Communications

Preparing Virginia's Youth for the Future: College and Career Readiness
Deborah Jonas, Ph.D., Executive Director for Research and Strategic Planning

11:00 – Noon **Comparison of Academic Achievement in Virginia with Leading Industrialized Countries**
James H. Stronge, Ph.D., Heritage Professor in the Educational Policy, Planning, and Leadership Area, The College of William and Mary

Noon – 12:15 **Working Lunch** (*on site*)
Attendees will take lunches to breakout sessions of their choice.

12:15 – 1:15 **Concurrent Subcommittee Meetings/Breakout Sessions**
Attendees will divide into four parallel sessions facilitated by members of the Commission's Study Advisory Group. The breakout sessions will focus on the assigned subcommittee topics and identify barriers, as well as solutions and actions. Each session will discuss the following for each proposed solution:

- Key elements of the solution
- Short, medium, or long term timeframe
- Participants in the solution – leaders, supporters
- Immediate next steps

Facilitators in each group help participants identify solutions, record the ideas, and identify top priorities.

Breakout Session I – *Subcommittee on the International Achievement Gap*
One of the main ways to identify high-performing education systems is through international assessments, particularly the Programme for International Student Assessment (PISA) and Trends in International Mathematics and Science Study (TIMSS). For this study, an analysis of high-performing international educational systems was conducted to identify best practices that may be appropriate for inclusion in Virginia's educational system.

The successes of other countries can provide potential guidance for decision-making in Virginia. This session will discuss U.S. students' performance on international assessments and why students in the U.S. are lagging behind. Findings from consistent high-performers in these assessments (South Korea, Finland, Singapore, Shanghai in China, the Netherlands, and Canada) will be highlighted and discussed.

Facilitator: *Patricia Popp, Ph.D., Clinical Associate Professor/State Coordinator, Project HOPE-VA, School of Education, The College of William and Mary*
Location: *House Room 1*

Breakout Session II – *Subcommittee on Structure and Support of the Educational System*
International comparisons make it possible to compare the quality of educational outcomes across educational systems. They also reveal differences in these countries' educational structures as well as the investments made in education. International comparisons provide different insights for improving educational efficiency. Certain countries have demonstrated that excellence in education can be attained consistently at reasonable cost. By examining the educational systems and structures of high performing countries, Virginia policymakers

can obtain information about what works to bring about improvements in schooling and better preparation for young people during a time of deepening global interdependence. This session will discuss the system-wide reforms implemented by high-performing countries and how they may be applied in Virginia.

Facilitator: *William C. Bosher, Jr., Ed.D.*
Distinguished Professor of Public Policy and Education, Executive Director, Commonwealth Educational Policy Institute
Wilder School of Government and Public Affairs,
Virginia Commonwealth University
Location: *Senate Room 3*

Breakout Session III – *Subcommittee on Teacher Preparedness/Effectiveness*
Teachers are one of the most powerful school-related factors to be considered when looking at student learning outcomes and school performance. The 2007 McKinsey Report on leading PISA countries emphasized that a key factor in school success was teacher quality. In fact, among factors, teachers offer the greatest opportunity for improving the quality of life for students.

The highest achieving countries around the world have committed significant resources to teacher training and support over the last decade. A finding across studies is that teacher quality is the most significant school factors affecting student learning. This session will focus on leading countries' efforts to promote teacher quality and effectiveness, as well as Virginia's efforts. Barriers and recommendations will also be outlined and discussed.

Facilitator: *James H. Stronge, Ph.D., Heritage Professor in the Educational Policy, Planning, and Leadership Area, The College of William and Mary*
Location: *House Room 3*

Breakout Session IV – *Subcommittee on Educational Innovations*
This subcommittee encompasses educational initiatives that complement high-performing educational systems that enable Virginia's school divisions to broaden the array of courses they offer, reach out to more non-traditional students and provide more educational options for families. The issues covered by this subcommittee include Science, Technology, Engineering, and Math – Health (STEM-H) academies, programs that address students at risk of not graduating, high ability students, and virtual learning.

Facilitator: *Meredith Strohm Gunter, Ph.D., Outreach Director, Demographics & Workforce Weldon Cooper Center, University of Virginia*
Location: *Senate Room 2 (TBD)*

1:15 – 1:50 **Presentation of Subcommittee Discussion and Planning Session**
Roundtable participants will reconvene and the Subcommittees will present the barriers and recommendations developed during the breakout sessions. Roundtable participants will also provide final thoughts, and develop next steps based upon the strategies and recommendations discussed.
Facilitator: *Amy Atkinson*
Location: *House Room 3*

1:50 – 2:00 **Closing Remarks**
The Honorable Laura Fornash, Secretary of Education

ROUNDTABLE BIOS

Amy M. Atkinson

Amy Atkinson is the Executive Director of the Virginia General Assembly's Commission on Youth, which is charged with providing study and recommendations on a variety of issues affecting youth and their families. Prior to working for the Commission on Youth, Amy worked for the Department of Medical Assistance Services and the Department of Juvenile Justice. She has served on executive committees for the Governor's Right Choices for Youth, the Virginia Parent/Youth Mock Election Coalition, the Child Support Guideline Review Panel, Child Welfare Advisory Committee, and the Regional Advisory Board for the Foundation for Healthy Youth. She received her Bachelors of Arts in Economics from the University of Mary Washington and earned a Master of Public Administration from Virginia Commonwealth University. Amy is a native of Abingdon, Virginia and now lives in Mechanicsville with her husband, Stephen, eleven year old daughter, Madeline, eight year old son, Henry, and seven year old daughter, Meredith.

William C. Bosher, Jr., Ed.D.

Bill Bosher is a Distinguished Professor of Public Policy and Education and the Executive Director of the Commonwealth Policy Institute, a legislative entity created to focus on research, training, and policy analysis. In addition, he recently served three years as Dean of the School of Education at Virginia Commonwealth University (VCU). He has been a teacher, principal, state director, local superintendent of two districts with 35,000 to 50,000 students and the Superintendent of Public Instruction for the Commonwealth of Virginia (1,100,000 students).

He has served as a consultant in more than 35 states and a dozen foreign countries on topics related to educational law and finance, policy analysis, standards development, school evaluations and human relations. He has spoken to numerous state and national conventions including public sector school boards and administrators, as well as corporate organizations like AIG VALIC and S&K. He has served on boards and commissions as an appointee of Governors and legislatures as well as the Boards of Directors of the Education Commission of the States, AEL (regional lab), and the Boards Trustees of three colleges and universities. He is a fellow of SchoolNet and the Urban Health Initiative, a principal in a private consulting firm, Decision Research, and an organizing director of the River City Bank. He serves as the chair of the Board of Edvantia, a research and evaluation non-profit that generates $12 million in annual revenue.

He has been recognized by the University of Richmond, VCU and the University of Virginia as an outstanding alumnus and has been honored by statewide and national organizations for leadership and service. He was also inducted into the Raven Society and Lychnos Society of the University of Virginia. He is the only superintendent in Virginia to be named twice as the superintendent of the Year and was voted the Arts Administrator of the Year by the Kennedy Center. Bill has written more than 39 articles and has coauthored two books on school law and educational leadership (*Law and Education: Contemporary Issues and Court Decisions* and *The School Law Handbook, What Every Leader Needs to Know*). He provides two weekly commentaries on the morning and nightly news as the NBC-12 educational specialist and has been quoted in media throughout Virginia as well as the Wall Street Journal, Washington Times, New York Times, Washington Post, and the Merrow Report.

The Honorable Laura W. Fornash

Laura W. Fornash was appointed Secretary of Education by Governor Bob McDonnell on August 23, 2011. As a member of the Governor's Cabinet, the Secretary assists the Governor in the development and implementation of the state's education policy. In addition, Secretary Fornash provides guidance to the 16 public universities, the Virginia Community College System, five higher education and research center, the Department of Education and the state-supported museums. Prior to this appointment, she served as Deputy Secretary of Education and as the Executive Director of the Governor's Commission on Higher Education Reform, Innovation, and Investment.

Before joining the McDonnell administration, Mrs. Fornash spent 20 years with Virginia Tech in a number of different divisions including student affairs, continuing education, distance learning, and government relations. She most recently served as the Director of State Government Relations for the University. She

was the school's Restructuring Project Director with the responsibility of managing Virginia Tech's implementation of the 2005 Restructuring Act that created new levels of operational autonomy for all public higher education institutions in exchange for meeting certain academic performance measures. She was Director of the Virginia Tech Richmond Center, an extended campus center, where credit and noncredit programs were offered to working professionals.

In 1998, as the Director of Information Technology Programs, Mrs. Fornash launched an innovative web based interdisciplinary master's degree program to help transition professionals into the information technology field as result of research conducted for the International Technology Association of America.

Mrs. Fornash received her undergraduate and master's degree from Virginia Tech. She is a native of Chesterfield, Virginia and is a graduate of Virginia public schools. She is married and has three children.

Meredith Strohm Gunter, Ph.D.

Meredith Strohm Gunter represents the Weldon Cooper Center for Public Service at the University of Virginia as Outreach Director for the Demographics & Workforce Group. Meredith's career experience includes senior administrative posts at three institutions of higher education in Virginia; policy and special initiative development for the Governor's Office; international services and support for a major Virginia law firm; and a number of freelance writing, editing, and planning projects for private clients. She served as staff director, researcher, and writer for selected projects for the National Governors' Association, the Southern Governors' Association, the Southern States Energy Board, and the Southern Growth Policies Board, as well as serving as staff director for the Virginia International Trade Commission.

Meredith earned her B.A. from Miami University (Ohio), her M.S. from Indiana University, and her Ph.D. from the University of Maryland. She currently serves as a member of the Patients and Friends Research Fund (which she founded) for the University of Virginia Cancer Center; member of the Board of the Cancer Center for the University of Virginia Health System; and member of two advisory commissions to the Virginia General Assembly. She served on the Board of Visitors of James Madison University from 2002 - 2010, and as Rector of the University from 2008 - 2010. The Virginia State Bar Association awarded Meredith its coveted Hardy Cross Dillard Award in recognition of her leadership in international trade promotion for Virginia.

Deborah Jonas, Ph.D.

Deborah Jonas is the former Executive Director for Research and Strategic Planning for the Virginia Department of Education. She provided support and advice to the superintendent of public instruction, the executive leadership of the Department and Department staff. She conducted, coordinated and oversaw scientifically based research and analyses conducted by the Department and in cooperation with partner agencies and organizations. She also provided internal consultation services to Department staff on issues pertaining to research, analysis and program evaluation and supported the Department's strategic and operational process-improvement initiatives.

Patricia Popp, Ph.D.

Patricia A. Popp is the State Coordinator for the Education of Homeless Children and Youth, Project HOPE – Virginia, a collaborative initiative between The College of William and Mary and the Virginia Department of Education. Pat is a part-time professor for the Curriculum and Instruction Department at The College of William and Mary. She received her Ph.D. in Educational Policy, Planning, and Leadership with an emphasis in Special Education at The College of William and Mary, her master's degree in learning disabilities at Virginia Commonwealth University, and her bachelor's degree in elementary and special education at Boston University. Areas of interest and research include collaboration, children and youth experiencing homelessness and other forms of mobility, and students with disabilities. She is a past president of the Virginia Council for Learning Disabilities, past president of the National Association for the Education of Homeless Children and Youth (NAEHCY), and currently serves as chair for the LeTendre Education Fund with NAEHCY.

The Honorable Javaid Siddiqi

Javaid Siddiqi was appointed Deputy Secretary of Education by Governor Bob McDonnell in October 2011. Before joining the McDonnell administration, Javaid Siddiqi spent 12 years with Chesterfield County Public Schools. During his time in Chesterfield, Siddiqi served as a high school teacher, middle school assistant principal, and high school assistant principal. Most recently, he served as the principal of Robious Middle School, where he led the implementation of Expeditionary Learning, a nationally recognized school reform model.

Mr. Siddiqi received his undergraduate degree from Virginia Commonwealth University and his master's degree from Virginia State University. Currently, he is pursuing his doctorate in educational leadership from Virginia Commonwealth University. He is a native of Chesterfield and is a graduate of Virginia public schools. He is married and has two children.

James H. Stronge, Ph.D.

James H. Stronge is the Heritage Professor in the Educational Policy, Planning, and Leadership Area at The College of William and Mary, Williamsburg, Virginia. His research interests include policy and practice related to teacher quality, and teacher and administrator evaluation. He has worked with numerous school districts and other educational organizations to design and implement evaluation systems for teachers, administrators, and support personnel. His work on effective teachers focuses on how to identify effective teachers and how to enhance teacher effectiveness. Dr. Stronge has presented his research at conferences such as American Educational Research Association and Association for Supervision and Curriculum Development, conducted workshops for national and state organizations, and worked with local school districts. He has been a teacher, counselor, and district-level administrator. His doctorate is in the area of educational administration and planning from the University of Alabama.

Anne D. Wescott

Anne Wescott is the Assistant Superintendent for Policy and Communications at the Virginia Department of Education. The mission of the Division of Policy and Communications is to assist the Virginia Board of Education, the Governor and the General Assembly in the development of legislation, regulations and policies that promote student learning and achievement and to provide timely and accurate information about public education in the commonwealth. Ms. Wescott and her staff serve as liaison to the board, and support the board in promoting education reform. Ms. Wescott's division monitors federal policies and refers them to other divisions for oversight. She also maintains working relationships with the news media and educational organizations to ensure the timely distribution of accurate information about the agency and Virginia's public schools. Ms. Wescott's division also manages the Department's website and provides staff support to the board and the superintendent in developing and presenting information that communicates Board priorities and policies to the public and to other constituent groups.

ROUNDTABLE MINUTES

House Room 3
The Capitol
June 26, 2012
10:00 a.m.

Advisory Group Members:
Karin Addison, William C. Bosher, Catherine Finnegan, Paula Fisher, Barry Glenn, Sarah Gross, Meg Gruber, Meredith Gunter, Mark Herzog, Sarah Herzog, Nancy Hoover, Andrew Kanu, John Morgan, Susan, Patrick, Patty Pitts, Patricia Popp, Wendell Roberts, James Ryan, Kirk Schroeder, Javaid Siddiqi, James Stronge, Patrick Tolan, Lola Tornabene, Tony Valentino, Linda Wallinger, Emily Webb, Michelle Vucci, Anne Wescott

Guest Participants:
Tunya Bingham, Sandra Booth, Reginald Branch, Irene Carney, Martha Collier, Ellen Davenport, Blaire Denson, John Dougherty, John Eisenberg, Harold Fitrer, Belinda Friday, Secretary Fornash, Belinda Friday, Deborah Jonas, Kathy Gillikin, Vicky Greco, Shanee Harmon, Sarah Herzog, Krystin Husz, Robley Jones, Augustine Kang, Beverly Lammay, Emily Laux, Vicky Manugo Greco, Kimberly Mckay, Tommy McNeil, Michael Molloy, Letha Moore-Jones, Lady Moore, Kelli Parmley, Marcy Reedy, Duane C. Sergent, Matthew Stanley, Emily Thumma, Jennifer Wallace, Gerald Ward, Edith White, Lilla Wise, Xianxuan Xu, Jingzhu Zhang

Staff Attending:
Amy Atkinson, Leah Hamaker, Joyce Garner, Meg Burruss

Welcome and Introductions
Amy M. Atkinson
The Honorable Javaid Siddiqi

Ms. Atkinson welcomed Roundtable participants and recognized the Advisory Group members. Ms. Atkinson outlined the major points about the Commission on Youth's study, which seeks to address concerns that Virginia's students compete with not only their counterparts in other states but also internationally. Especially keen is competition with students in other industrialized countries, including China. Ms. Atkinson emphasized the commonly-held commitment to ensure that every student in Virginia graduate ready for either college or the workplace. She then turned the meeting over to Javaid Siddiqi for an update on activities in the Executive Branch.

Deputy Secretary Siddiqi welcomed the Roundtable participants, noting that the topic was very important to Secretary of Education Laura Fornash as well. The Secretary sends her regrets that she is unable to attend the morning session. Conversations about the global marketplace and student achievement in Virginia have been taking place in the K-12 arena, but there is not agreement about best steps to ensuring how best to position Virginia for these challenges. The Deputy Secretary stated that there are concerns that Virginia's students are not performing at the same level as students across the world. He noted that companies wanting to locate in Virginia were finding that the pool of candidates with the needed job skills is not available, thus the companies are going to other countries to hire workers and bring them here. Conversations about the challenges are extremely important and should include representatives from industry. The common theme of his meetings with industry representatives in Virginia in recent months is that Virginia students lack the math skills necessary to compete with students in other countries. He has encouraged them to discuss this issue with their local school board.

The Deputy Secretary announced that Governor McDonnell is convening a Science, Technology, Engineering and Math (STEM) summit on September 10. Industry representatives, CEOs, school boards, universities, and school administrators are being invited to be a part of this conversation.

Ms. Atkinson then introduced Delegate Peter Farrell, newly appointed member of the Commission on Youth. Delegate Farrell extended his welcome to Roundtable participants. He noted that, as the third youngest member of the General Assembly, he was closer in age to the students. He observed that the education system in Virginia is very diverse and that this study hit upon several issues critical to his district. There is great variability among school divisions, e.g., Henrico County Schools and Goochland County Schools. As a Commission member, Delegate Farrell noted that he looked forward to hearing more as the study proceeds.

Ms. Atkinson informed the attendees that, during lunch, they would be participating on a topic-specific subcommittee following presentations by the Virginia Department of Education and the College of William and Mary.

Updates from the Virginia Department of Education

Virginia Educational Initiatives
Anne Wescott, Assistant Superintendent for Policy and Communications

Ms. Wescott began the Department's presentation by providing information to the attendees identifying Virginia's recent educational activities, including recent legislative activity. She outlined the following statistics:

- 83 percent of 3rd grade students are reading on grade level.
- 48.8 percent of middle school students are enrolled in Algebra I or higher.
- Virginia's on-time graduation rate for 2011 was 86.6 percent.
- 47 percent of the graduates earned Advanced Studies Diplomas.
- 58 percent of the graduates enrolled in institutions of higher education nationwide.
- In 2011, students earned more than 36,000 industry credentials.

Ms. Wescott then discussed Virginia's progress on the National Assessment of Educational Progress (NAEP), otherwise known as the Nation's Report Card, and offered the following statistics from 2011:

- 39 percent of Virginia 4th graders met or exceeded the proficiency standard in reading, compared to 32 percent nationwide.
- 36 percent of Virginia 8th graders met or exceeded the proficiency standard in reading, compared to 32 percent nationwide.
- Only three states, Massachusetts, New Hampshire, and New Jersey, had statistically higher 4th grade reading scores on the 2011 test.

Ms. Wescott outlined the Board of Education's goals to ensure that Virginia's students are college and career ready. The Board is implementing more rigorous Standards of Learning assessments in English, mathematics, science, and history. Moreover, college and career performance expectations in reading and mathematics have been aligned to national and international standards. These standards have been reviewed by Achieve, the American Diploma Project, the College Board, and ACT. Ms. Wescott outlined other recent actions taken by the Board of Education (Board) as they applied to the Commission's identified study issues:

<u>Student Achievement</u>

- The accreditation benchmarks are increasing in English (from a pass rate of 70 percent to 75 percent in grades 6-12) and science and history (from a pass rate of 50 percent to 70 percent in grade 3).

- Students are now required to pass a course in economics and personal finance to graduate.
- The Board will consider emergency regulations to implement changes in the requirements for graduation later this week, which would include requiring an industry credential to earn a Standard Diploma, and folding the Modified Standard Diploma into the Standard Diploma with credit accommodations for students with disabilities.

Structure and Support

- The Board is conducting a review of the Standards of Quality (SOQ) this year, with presentations from stakeholders tomorrow and July 25, and statewide public hearings this fall.
- The General Assembly approved SOQ flexibility for reading specialists, mathematics specialists, data coordinators, and assistant principals.
- Standards of Learning (SOL) assessments are being administered online, and include technology-enhanced items to demonstrate content mastery.
- 30 school divisions have undergone efficiency reviews since 2004.

Teacher Quality

- The Board has approved *Guidelines for Uniform Performance Standards and Evaluation Criteria* for teachers and principals, and guidelines for superintendents will be coming before the Board later this year. The approved guidelines recommend that 40 percent of the evaluation be based on student academic progress.
- 25 Virginia schools are participating in performance pay pilot programs.
- There will be a teacher recruitment initiative this summer to recruit and retain high quality teachers to teach in STEM areas. A related initiative will recruit college students to major in mathematics and science to alleviate the shortage of qualified teachers in these areas.

Educational Innovations

- The Board of Education has developed criteria and application procedures for charter schools and college partnership laboratory schools.
- Two charter schools have met the Board's charter school criteria this year, and a third will be before the Board later this week.
- Four universities have been awarded college partnership planning grants: George Mason, James Madison, Longwood, and Virginia State.
- 14 Governor's STEM Academies have been approved, and the 15th will be before the Board later this week.
- Planning grants will be available this summer of the Governor's Health Science Academies.
- 18 multidivisional online providers have been approved.
- The Board has begun the process of promulgating regulations governing virtual schools, and will begin the process of revising licensure regulations for teachers who teach only online courses.
- This summer, there will be three Positive Youth Development Academies (a character education initiative) offered in Chesapeake, Manassas City, and Danville.

Preparing Virginia's Youth for the Future: College and Career Readiness
Deborah Jonas, Ph.D., Executive Director for Research and Strategic Planning

Dr. Jonas gave an overview of Virginia's graduation index and the issues surrounding college and career readiness. She noted that preparing Virginia's students for college and the workplace was critical. In 2008, college graduates earned, on average, twice as much as high school graduates, a disparity that has grown since 1980. By 2012, 63 percent of jobs in the United States workforce will require at least some postsecondary education or training. States collectively will need to produce an additional three million college credentials to meet the growing workforce demands.

Dr. Jonas stated that, in Virginia, there were still massive achievement gaps. Children of working parents with no college education are at increasing risk of living in poverty. In 20 years, poverty rates for children of parents who work full-time and have high school diplomas increased by 12 percent. She highlighted Virginia's research from the Virginia College and Career Readiness Initiative (CCRI). This initiative focuses on understanding high school indicators associated with enrollment in college, placement, and passing grades (C or better) in entry-level credit-bearing courses. Results are used to inform all aspects of the CCRI work and to communicate the achievement levels students need for college and career success.

In 2013, Virginia's standard diploma will include a career credential requirement. She noted that this was a very positive step but that it may not be enough to help improve students' math skills because diploma requirements remained unchanged. The independent indicators of college readiness in Virginia are:

- Completion of Algebra II and a lab science;
- Participation in college-level classwork like dual enrollment, advanced placement or IB programs;
- SOL outcomes of "Advanced proficient"; and
- Scoring college-ready on external assessments such as the SAT or ACT.

Dr. Jonas indicated that four-year institutions are not able to offer non-credit bearing "remedial" courses. Thus, it is imperative that students enter college ready for college-level course work. Dr. Jonas noted that, if students earned an advanced diploma and scored advanced proficient on the SOLs, then the likelihood of earning a C grade or better was significantly higher, regardless of ethnicity. Dr. Jonas asserted that high expectation for all of Virginia's students is a critical factor. Moreover, out-of-school time cannot replace teaching, but many youth need supports outside of school. This was evidenced by allowing students to have additional time to fulfill graduation requirements. For example, six percentage points were gained on the graduation index when Hispanic students given five years to graduate. A five-percentage point increase was seen for economically disadvantaged students. A nine-percentage point increase was seen for students with limited English proficiency. If the issue is time, then perhaps a traditional high school is not effective for these youth.

Comparison of Academic Achievement in Virginia with Leading Industrialized Countries

James H. Stronge, Ph.D. Heritage Professor in Educational Policy
School of Education, College of William & Mary

Dr. Stronge followed with a presentation on the preliminary findings from the literature review. He first outlined the methodology used in selecting the comparison countries and then noted that the review attempted to identify attributes that explain/support the positive educational outcomes in the selected countries. He noted that Canada was probably a better comparative country for purposes of the Commission's study. Shanghai was not the best; students with disabilities are not recognized in China and compulsory education ends at grade nine.

Poverty in the United States is not the same as that in China. Virginia's students are not competing against Massachusetts'; they are competing with the world's students. America's successes include quality of life, economic productivity, and number of Nobel awards. The United States has won 34 percent of the world's Nobel prizes. Dr. Stronge emphasized that 1.3 billion people in China want to be us!

Dr. Stronge noted that Virginia has 71,000 teachers. He reviewed the comparison countries' statistics for higher education teacher preparation, salary and class time and underscored his conviction that it was no longer enough to teach only the basics. This means that universities have to change in how they educate their students. He then offered the following statistics to the Roundtable attendees:

- Of all students who enter college, 40 percent must take remedial classes
- Sixty-five percent of college professors report students aren't prepared; blame focus on 9th and 10th grade achievement tests

Dr. Stronge stated that students in the U.S. are being prepared for achievement tests—not real world skills. He then offered the following recommendations, based on the review of these countries' best practices:

- Recruit potentially effective teachers and principals;
- Provide quality professional development;
- Utilized valid and credible evaluations;
- Ensure equal resource allocation;
- Establish educational policy that nurtures quality teachers; and
- Encourage a "STEM" focus.

Concurrent Subcommittee Meetings/Breakout Sessions

Participants then broke for a working lunch and attendees divided into four breakout sessions facilitated by members of the Commission's Advisory Group. The breakout sessions focused on each subcommittee's topic and attendees were asked to identify barriers, solutions, and action items. Upon completion, each subcommittee's designated reporter summarized the subcommittee's discussion for the Roundtable attendees.

SUBCOMMITTEE I – INTERNATIONAL ACHIEVEMENT GAP

Leader: Patricia Popp

Attendees: Meg Burruss, Deborah Jonas, Andrew Kanu, Emily Thumma, Jennifer Wallace, Xianxuan Xu

International comparisons make it possible to compare the quality of educational outcomes across educational systems. They also reveal differences in these countries' educational structures as well as the investments made in education. International comparisons provide different insights for improving educational efficiency. This subcommittee discussed what other countries' best practices can be considered for use in Virginia.

<u>Identified Issues</u>

- Community supports and what youth are doing out of school (Finland)
- What are expectations for parents?
- How are teachers selected? Pedagogy
- Importance of effective mentoring
- Remember, comparing apples with oranges, what the focus should be is what is important to the citizens of Virginia.

<u>Questions & Comments</u>

- Parenting styles and techniques – parental expectations for behavior at school; cultural expectations
- What are the children doing with the time they are spending out of school/classroom? – after school, "wrap around" activities
- How do the other countries work with their "at-risk" populations (i.e., poor and immigrant populations) – less discrepancy among socio-economic status (SES) – a funding difference in the schools
- At what age do children start school? What do they do before they start school?
- Quality of preschool programs
- Really strong teachers are able to effectively teach all levels of students (i.e., high performing and low performing students)
- How do other countries deal with ineffective teachers? The research focused on the recruitment of the teachers – more selective when hiring teachers

- What are the selection criteria in other countries? When and how do they weed out teachers?
    - What else is it beyond academic achievement that gets a teacher in the door in the other countries?
    - Content knowledge isn't enough; pedagogical skills
    - What is the preparation of the teachers? Coursework, clinical experiences, math and science training for primary teachers
- Mentorship, quality professional development
- What is the teaching approach in the classrooms? How does it vary across the countries? Good classroom management skills required
- What is actually in the assessments? What types of assessments are used? *Student and teacher assessments*
    - Assessment-driven society. However, how do Virginians use assessments compared to other countries?
    - When we do not know what's wrong or how to fix it, we tend to start measuring
- How do we sell teaching as a profession?
    - In Scotland, they increased teaching salary by $10,000 and it does not seem to have a real impact on their educational achievement
    - How do you change a long-term structure, and effectively?
    - Should teaching even be sold solely as a "profession"?
- How do we define "progress," particularly for different levels of students? What is progress for one child will not necessarily be progress for another.
- How are materials (i.e., textbooks) chosen for the classroom?
- Can we make policy that includes parental responsibility?

SUBCOMMITTEE II – STRUCTURE AND SUPPORT OF THE EDUCATIONAL SYSTEM
Leader: William C. Bosher
Attendees: Amy Atkinson, Ellen Davenport, Blaire Denson, Vicky Greco, Sarah Gross, Meg Gruber, Sarah Herzog, Michael Molloy, Wendell Roberts, Anne Wescott, Gerald Ward

By examining the educational systems and structures of high performing countries, Virginia policymakers can obtain information about what works to bring about improvements in schooling and better preparation for young people during a time of deepening global interdependence. This session will discuss the system-wide reforms implemented by high-performing countries and how they may be applied in Virginia.

- Need to identify variables
    - Year-round schools, how are they financed? How are they governed? Curriculum goals - where do you get the policies that drive decisions.
    - Role of parents in these countries
    - Class size in countries
    - How do countries group students
    - How do they organize students (elementary, middle high)?
    - Extracurricular activities
    - Nongovernment entities and role of private sector
    - Do they have career/technical education (CTE)?
    - Cultural differences in these countries
    - Expectations for K-12 and Higher Ed
    - What is done to train leaders?
    - Teacher prep institutions
    - How do the countries account for how students get in
    - Structure of the day
    - Account for differentiated instruction

- What if's
  - What are the constraints for lifting expectations?
  - Compensation
  - Reducing number of assessments and replace that funding in needed areas
  - How do you deal with joint services and collaborative work?
  - Be sure to look at Standards of Quality (SOQ); this is an issue.
  - Be sure good communication with critical stakeholders and COY
  - Look at new ways to engage parents
  - Look at new ways to engage homeowners

SUBCOMMITTEE III – TEACHER QUALITY AND EFFECTIVENESS

Leader: James Stronge

Attendees: Belinda Friday, Irene Carney, Nancy Hoover, Catherine Finnegan, Lola Tornabene, Kathy Gillikin, Lilla Wise, Patty Pitts, Robley Jones, Jingzhu Zhang, Lady Moore

Of all the factors in the educational enterprise, teacher quality matters most. There is no other school-related factor that will influence students as profoundly. Virginia must develop policies that ensure good teachers are selected and retained and develop teachers based on the qualities of teacher effectiveness.

Problems	Solutions
How do we get support to address teacher quality issues?	➢ Establish benchmark goals on teachers' salaries ➢ Engage the business community ➢ Awareness ➢ Conduct studies related to resources and teacher effectiveness
How do we recruit the best and brightest teachers?	➢ Recruit the top students from their high schools, provide financial and support incentives to become teachers ➢ Rebrand the profession ➢ Recruit high potential career switchers and support them prior to entering into classrooms
How do we best prepare best teachers in the pre-service programs?	➢ Require focused Master's or +1 year ➢ Provide deeper/richer experiential training ➢ Professors must have relevant and periodic school experience ➢ Restructure how teacher preparation programs are designed to be relevant and robust to effectiveness ➢ Restructure teachers/leader preparation programs from practitioners ➢ Use technology to share best practice around the world ➢ Align and collaborate with PK/workforce
How do we establish the rigorous admission to teacher/leader preparation programs?	➢ Implement high standards for admission statewide
How can the teachers' days be best structured to improve the teacher effectiveness?	➢ Change the proportion of teachers' planning and teaching time ➢ Use support personnel for non-teaching assignment
How do we nurture, support, and develop new teachers?	➢ Better assignments ➢ Mentor programs ➢ Creating master teacher programs that nurture new teachers
What makes the in-service professional development	➢ More individualized ➢ Relevant to needs

effective?	➢ Research based ➢ Provide in formats how adults learn ➢ Provide regional professional development centers ➢ Professional development on demand ➢ Track professional development to implementation/transfer of learning
How should teacher effectiveness be evaluated and what should be done with the results?	➢ Training, training ➢ Provide e-management to track data ➢ Use evaluation results for individualized professional growth ➢ Make personnel decisions
How can we ensure the presence of the high quality teachers/leaders in high need schools?	➢ Differentiated pay
What are the optimal conditions to support teaching and learning? To retain effective teachers?	➢ Use support personnel for non-teaching assignment ➢ Active teacher involvement in teacher selection and other facets of school environment

SUBCOMMITTEE IV – EDUCATIONAL INNOVATIONS

Leader: Meredith Gunter

Attendees: Shanee Harmon, Kim McKay, Matthew Stanley, John Dougherty, Beverly Lammay, Duane C. Sergent, Reginald Branch, Michelle Vucci, Marcy Reedy, Paula Fisher, Tunya Bingham, Leah Hamaker

This subcommittee discussed educational initiatives which compliment high-performing educational systems. These initiatives enable Virginia's school divisions to broaden the array of courses they offer, reach out to non-traditional students and provide more educational options for families. The issues covered by this subcommittee include Science, Technology, Engineering, and Math – Health care (STEM-H) academies, programs that address students at risk of not graduating, high ability students, and virtual learning.

<u>Barriers to STEM-H</u>

- Expensive (equipment, faculty, teachers); needs more money
- Create cross-divisional shared facilities for STEM-H
- Need to get students interested and to retain them
- A structured approach for mutual reinforcement
- Gender-free curriculum for female students
- STEM must be pertinent to careers and learning, specify pathways to education levels
- Build co-ops to allow students to obtain technology exposure

<u>Achievement Gap</u>

- Need calendar flexibility, increase summer learning opportunities
- Create a regional level model to address workforce needs (articulate workforce needs to child/parents)
- Build relationships with employers, incentives for employers, take some of the burden off of school divisions
- Must train great teachers for urban classrooms
- Prepare teachers with special training and differential pay for teachers
- State or nationwide reentry program for dropout prevention, creating longer length of stay in schools

Virtual Learning

- Questions need to be answered (research point of view, unbiased)
  - Whom does virtual learning serve best? (Teach to the child)
  - Models of virtual learning
  - How does this apply to the at-risk population? Is it or is it not advantageous for at-risk population
- Credentialing is a challenge.
- Equal access is an issue (internet capacity)

Three Takeaways

1. Reading is the number one indicator of academic success.
2. Do not forget soft skills! (Work ethic, showing up on time, communication skills)
3. Teach to the child, individualized instruction is critical.

Closing Remarks

The Honorable Laura Fornash, Secretary of Education

Secretary Fornash offered closing remarks. She thanked everyone for participating in the Roundtable. She noted that Governor Bob McDonnell was the Chair of the Southern Regional Education Board. Secretary Fornash stated that the Governor is focusing on school innovation and increasing students' college readiness, access and completion rates, as well as how Virginia can do a better job preparing more students for college and career training.

Secretary Fornash emphasized that the issues discussed today were very important ones and thanked everyone for their involvement.