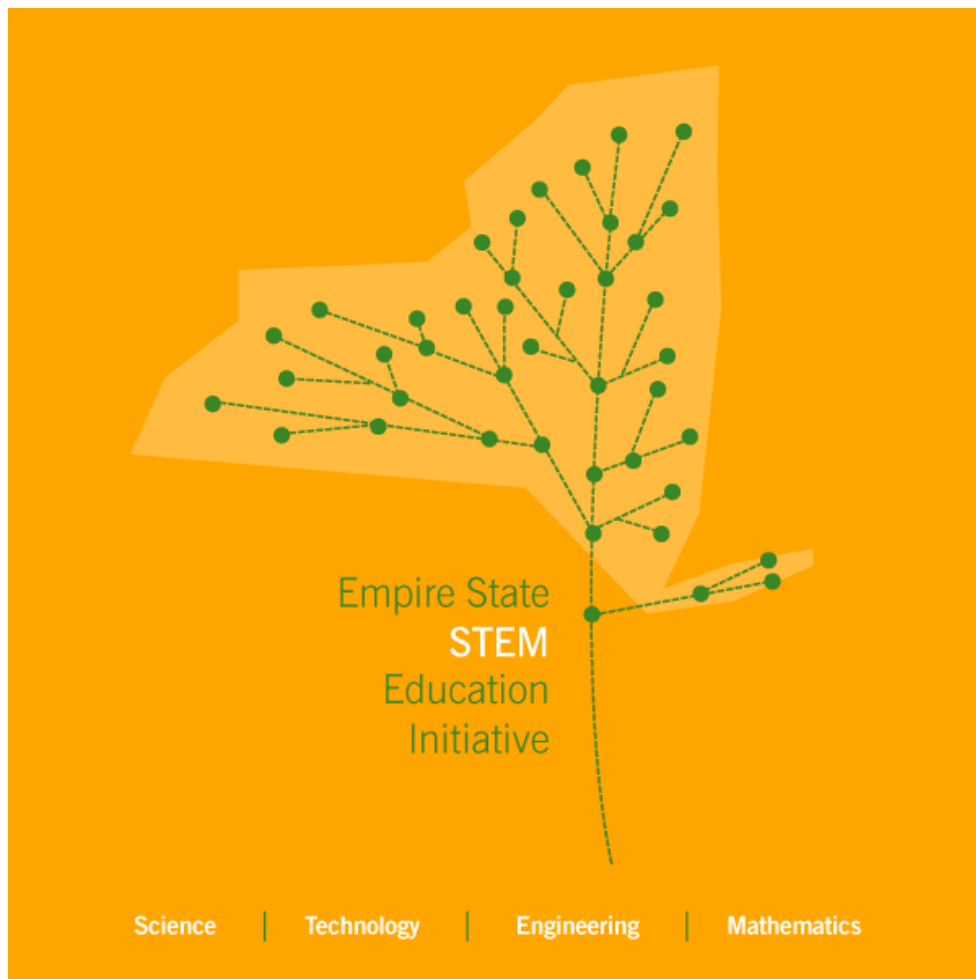


Empire State STEM Education Initiative

Regional Progressive Dialogue Overview for Invitees

October - December, 2009



Introduction

The pipeline of qualified men and women prepared to step into the workforce as technically competent problem solvers and innovators has reached a critical point. It is no longer about when the shortage occurs, but about its magnitude and impact on national security, environmental sustainability, and the industrial preeminence of the United States on a global level. Without a workforce well grounded in science, technology, engineering and mathematics (STEM), the economic and innovation drivers accepted as the way of life in the U.S. will be lost for future generations.

Yet the future is still malleable and open to influence. Education remains the strongest suit of American democracy and its innovation capacity. Education is the means to create a sustainable, technically competent workforce by establishing a solid foundation in mathematics and science for all youngsters and increasing access to the study of STEM disciplines at advanced levels. Education can fill the pipeline by broadening participation in STEM education to include a large and diverse segment of the U.S. population historically underrepresented in the science, technology and engineering professions.

An education well-grounded in STEM creates an informed and scientifically literate citizen. In order to understand and fully engage in the democratic process of 21st century America, our children need to be proficient in fundamental problem solving, be able to critically assess and discern truth from fiction, and become more fully immersed in the economic, political and social dynamics of the global marketplace. Education in general and STEM education in particular levels the playing field, assuring that all citizens have the tools and knowledge to create and improve their quality of life.

Investments in STEM education and policy are made at the federal, state, and sometimes local level. Businesses, foundations, museums, libraries, professional societies, and other organizations also support STEM education with a variety of resources. However, investments and leadership commitments fluctuate in a volatile and unforgiving economic environment. More often, given limited resources, collaboration across the ecosystem of stakeholders is underutilized as a means to develop innovative approaches to improving the talent pipeline from PK-20.

A National Mandate

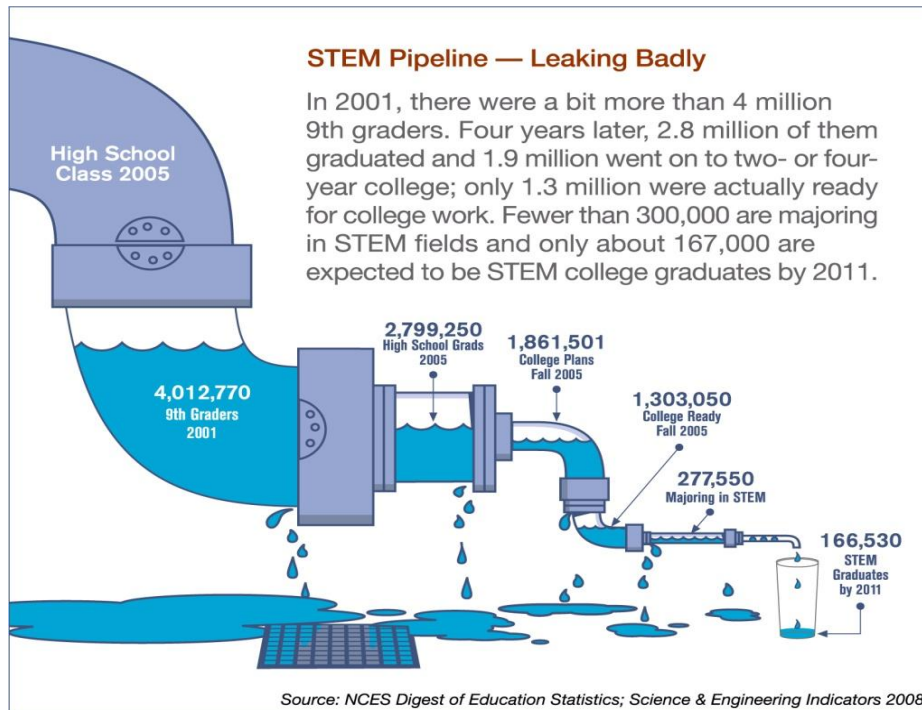
In his widely-respected book The World is Flat – A Brief History of the 21st Century, Thomas Friedman concludes that technology, innovation, and digitization have driven globalization to a new reality. It has essentially flattened the world by leveling the playing field so that any individual, regardless of race, culture, language or geographic location can fully engage in an economic surge in commercial prosperity and global collaboration. Technology has transformed world communication and real-time information transfer into manageable bits and bytes such that any transaction occurs in an almost transparent manner.

Dr. Shirley Ann Jackson, President of Rensselaer Polytechnic Institute, describes the “quiet crisis” generated by the supply and demand imbalance that has arisen with the globalized economy. The *demand* for a diverse group of engineers, scientists, researchers, and technologists prepared to function in a global economy far exceeds the *supply* of such college graduates emerging from the education pipeline today. The United States must act now to attract, educate, recruit and retain the best talent in STEM disciplines if it is to remain competitive in the global innovation and research environment.

The current administration has acknowledged the decline in the nation’s investment in research and development over the past 50 years and the lagging performance of American students in math and science when compared to other nations. In his September 21, 2009 speech on innovation and sustainability delivered at Hudson Valley Community College, President Barack Obama observed that “We know that the nation that out-educates us today will out-compete us tomorrow. The ability of new industries to thrive depends on workers with the knowledge and know-how to contribute in those fields. Yet, today, our primary and secondary schools continue to trail many of our competitors, especially in key areas like math and science. Hundreds of thousands of high school graduates who are prepared for college do not go to four-year or two-year schools because of the high cost of doing so. And roughly 40 percent of students who start college don't complete college. All along that education pipeline, too many slip through the cracks. It's not only heartbreaking for those students; it's a loss for our economy and our country.”

Despite thirty years of intervention efforts to improve access and equity in postsecondary education, a college education remains an unrealized dream for many young men and women in New York State. While the college going rate for all population categories has increased, fewer choose careers in STEM professions. Low income and underrepresented minority group members, despite comprising a majority of high school graduates, have not kept pace as have

other groups enrolling in college. Finally, even though high school graduate rates have increased, it does not translate into a proportional increase in college graduation rates.



Statewide STEM Initiatives

Statewide STEM innovation initiatives are underway elsewhere in the nation. The current portfolio illustrates a variety of solutions with a common denominator: partnerships which span the stakeholder ecosystem.

- [T-STEM](#) (Texas Science, Technology, Engineering and Math) launched in December 2005 as a program of the Texas High School Project (THSP). The THSP was announced in November 2003 as public-private alliance of the Texas Education Agency (TEA) and a number of foundations and other organizations. To date, T-STEM has helped launch 46 T-STEM Academies and 7 T-STEM Centers.
- [OSLN \(Ohio STEM Learning Network\)](#), managed by the Battelle Memorial Institute in cooperation with the STEM subcommittee of the Partnership for Continued Learning at Ohio Board of Regents and other local entities, was established in June 2007 with funds from the Bill & Melinda Gates Foundation, Battelle, and the state of Ohio. OSLN was launched to create an innovation network that would support regional STEM schools across Ohio. To date, eight STEM schools have been organized and one launched in 2008.

- The North Carolina STEM Community Collaborative was initiated in May 2008 with a foundation grant to MCNC (Microelectronics Center of North Carolina) to create a unified vision for STEM education in North Carolina among state policymakers. The Collaborative is serving as a convener and facilitator of networks linking the many STEM-related assets inside and outside North Carolina, and will support policy innovations with the support of community, cross-sector, and leadership networks directly engaged with STEM in North Carolina. Three regional [NC STEM Community Collaboratives](#) were launched in September, 2009.
- Cal Poly (California Polytechnic State University, San Luis Obispo), representing the California State University, in collaboration with the California Council on Science (CCST) has embarked on a discovery and planning initiative to design a California STEM Innovation Network that will facilitate expanded regional and statewide networks for improving STEM for all California's schools. The initiative is also developing a blueprint for STEM education reform and advocacy to raise STEM education transformation to the top of California's public policy agenda.
- The Washington Partnership for Learning at the Washington Business Round Table received a foundation grant in March, 2009 to begin design and development of a statewide STEM initiative.

A number of partnerships and networks have been forged to advance STEM education at the state and local level in New York State, however some are not inter-connected. The Empire State STEM Education Progressive Dialogue will engage leaders of stakeholder communities from across the state of New York in developing a set of recommended strategies focused on increasing the number of students – from all backgrounds – aspiring to and prepared for STEM disciplines while providing an innovation platform to enable STEM education for all New York students.

Design Principles

The foundation of the Progressive Dialogue includes design principles for building the pipeline of engineering and science talent recommended by the BEST (Building Engineering & Science Talent) initiative of the Council on Competitiveness. To date, these principles include:

- Defining outcomes, measured in both quantitative and qualitative terms, that drive the intervention

- Building sustained commitment in leadership, funding, and steadfastness in the face of setbacks
- Recognizing and honoring individual differences, uniqueness and diversity
- Fostering challenging content and availability of appropriate remediation when necessary
- Developing a community of engaged adults who actively support and inspire students, from multiple roles (e.g. educators, parents, mentors, counselors, employers)

The Progressive Dialogue

The Empire State STEM Education Initiative, led by Rensselaer Polytechnic Institute and supported by grants from the Bill & Melinda Gates Foundation and the AT&T Foundation, has initiated a “progressive dialogue” to identify ways to advance PK-20 education in science, technology, engineering, and mathematics (STEM) across New York State, and thereby prepare the next generation of New York’s graduates to innovate and compete in the global economy. The progressive dialogue is engaging a statewide network of leaders in the design of a strategic public policy roadmap for increasing the number of students – from all backgrounds – aspiring to and prepared for STEM disciplines. Advice and participation in this work is being sought from stakeholders who span the ecosystem of education providers, influencers and beneficiaries.

The first dialogue was held on June 25-26, 2009 on the Rensselaer campus in Troy, New York. Over 100 thought leaders came together, representing sectors including PK-20 education, government, industry, corporate and private foundations, and other non-profit organizations. Participants discussed, debated, envisioned, and exchanged ideas for an initial set of recommendations that establish a platform for expansion through regional dialogues to follow in October – early December, 2009. Themes emerged around alignment, teacher preparation, collaborative communities and partnerships, open source models, and access. A detailed report accompanies this overview.

A series of eight regional dialogues will provide the forum for additional stakeholders and partners to engage in designing the strategic roadmap and building a network of supporters. One-day dialogues will be held in Buffalo, Rochester, Syracuse, Yonkers/Lower Hudson, New York City, Long Island, the Capital region, and the Southern Tier. These dialogues are being hosted by leaders at the local and state level, with additional support provided by the AT&T Foundation.

At the conclusion of the regional dialogues, recommendations will be synthesized into an integrated strategic roadmap for stakeholder review and implementation.

Attachment

Refer to PDF file “NYS STEM June 2009 Dialogue Findings”

Background Reading

Commission on Mathematics and Science Education. *The Opportunity Equation – Transforming Mathematics and Science Education for Citizenship and the Global Economy*. New York: Carnegie Corporation of New and Institute for Advanced Study. 2009

Jackson, Shirley Ann. *The Quiet Crisis: Falling Short in Producing American Scientific and Technical Talent*.

Building Engineering & Science Talent (BEST). *What it Takes: Pre-K-12 Design Principles to Broaden Participation in Science, Technology, Engineering and Mathematics; A Bridge for All: Higher Education Design Principles to Broaden Participation in Science, Technology, Engineering and Mathematics; The Talent Imperative: Diversifying America’s Science and Engineering Workforce*. 2004

New York R&D 2008 – Meeting the Global Challenge for Innovation