Indiana’s Future: Economic Development and the High School Connection  
November 17-18, 2005

The November 17-18 statewide conference, “Indiana’s Future: Economic Development and the High School Connection,” launched the Center of Excellence in Leadership of Learning (CELL)’s State Leadership Development work. The goal of this initiative is to raise awareness and develop leadership capacity for improving statewide P-16 education.

The conference presented innovations essential to high school transformation: Science, Technology, Engineering, and Mathematics (STEM) education, school improvement planning, and high school design models. Attendees heard from state, national and international education reformers who discussed high-end systems, policy work and the practical steps that need to be taken to implement high performing high schools that emphasize rigor and relevance in their curricula. This paper captures important themes and some of the best thinking from this convening.

Why Change?
There are moral and economic imperatives that must be addressed in high schools across the state of Indiana if our students are going to be prepared to prosper and succeed in the global community.

A New Era – Innovative and Competitive
With the economy moving rapidly from industrial and informational to one driven by innovation, the skills required to facilitate collaboration and promote innovation become vital to personal prosperity and Indiana’s economic development. The coming “Conceptual Era” belongs to creators and empathizers, pattern recognizers, and meaning makers and places heavy demands on individuals to be able to communicate, use numbers and data, solve problems, process information, work in teams, and use systems of technology.

In this era, the importance of higher order thinking skills and application of knowledge is paramount. Knowledge that is acquired in one discipline must be applied across all disciplines and to both predictable and unpredictable real-world situations. The rigor/relevance framework for learning is missing from much of the current curriculum used in high schools.

The New World – Interdependent and Collaborative
Thomas Friedman described the “New World” in his book The World Is Flat: A Brief History of the Twenty-First Century. This new era is arriving as the global marketplace has been “flattened” by forces like off-shoring, open-sourcing, supply-chaining, and in-sourcing. The new global marketplace requires students to possess 21st century competencies including information, financial and civic literacy, critical thinking, and communication, problem solving, and interpersonal skills. Personal learning traits such as creativity, intellectual curiosity, self-direction, accountability, adaptability, and social
responsibility are learning traits to be fostered if students are to be ready for work, college and life.

The realities and challenges presented by the new era and new world make it imperative that our graduates possess the skills that allow them to collaborate with individuals locally, nationally and globally in the key disciplines of STEM. If our high schools are to be successful in developing students who are competent in these skills and areas, then these skills must be developed in the current leadership of our schools.

**How Ready is Indiana for both the New Era and the New World?**
The “2003 Trends in International Mathematics and Science Study (TIMSS),” designed to track changes in mathematics and science achievement of fourth- and eighth-grade students, is administered to students in the United States and 45 other countries. The current test results show Asian countries leading the world in both math and science achievement.

Indiana’s fourth- and eighth-grade students ranked ninth and 10th in the world in mathematics on the 2003 TIMSS. A deeper analysis of the results shows that even though Indiana’s student ranking does not change significantly between the fourth and eighth grade, the gap between scores in Indiana and Singapore, the international leader in both math and science results, grew over 30 points. While the ranking had not changed, Indiana’s standing certainly had declined. An analysis of the teacher role and questioning techniques in mathematics reveal the typical U.S. pattern has the teacher providing answers and content. This approach is vastly different from top scoring nations, which pose questions that allow students to engage in conversation and postulate solutions.

Indiana fourth-grade students ranked second in the world in science in 2003. Yet by eighth grade, the Indiana students had dropped to ninth place while the scores of other nations remained stable. When the curriculum and teaching techniques used in top scoring nations are compared to those used in the United States, a significant difference appears. American curricula tend to focus on depth rather than breadth. This pays off initially on the fourth-grade tests, but fails students when they are asked to demonstrate mastery learning in eighth grade. A focus on depth rather than breadth is not true in the top scoring nations.

Indiana’s average scores are higher than national and international averages and demonstrate that math and science education are potential areas of strength if efforts are made to build on what is known about effective STEM education. Otherwise, the gap between the top scoring nations and Indiana will persist.

Indiana’s need for graduates who possess a strong background in science, technology, engineering, and math is illustrated by the following data from “Indiana Life Science Landscape” prepared by BioCrossroads:

- Indiana gained jobs in life sciences at more than twice the rate of the nation from 2001 to 2003, rising 4.5 percent compared with the two percent national increase.
• Indiana has the second-highest concentration of biopharmaceutical jobs in the nation.
• In 2003, Indiana ranked eighth in the nation for employment in biopharmaceuticals.
• Indiana ranks 10th in the nation for projected biopharmaceuticals.
• Indiana has the fifth largest pharmaceutical industry in the country in terms of total sales, shipments, receipts, and revenue.
• Collier's International Life Sciences Group recognized Indiana as a top emerging bio cluster.
• Clusters of life science activity can be found all over the state including the cities of Warsaw, Fort Wayne, Greater Lafayette, Indianapolis, Bloomington, Evansville, and many places in between.
• Nine percent of Indiana jobs and 11 percent of Indiana wages can be attributed to the Health Industry.

To capitalize on the promise of opportunity and economic security, STEM education has never been timelier, but the challenge from abroad for the top positions in related fields has never been greater. The Honorable James B. Hunt, Jr., former governor of North Carolina, noted in his keynote address:

• Of the 30 employees in a North Carolina engineering firm located in a small town, two are from the United States and 28 are from India.
• Software engineers in China are employed by the Nortel Corporation for one-fifth of what is paid to American software engineers and “are every bit as good as those we have in the United States.”
• Bill Gates, Microsoft’s CEO, has noted that the most productive research center Microsoft has anywhere in the world is in Beijing, China.
• In a recent edition of the *Economist*, the head of the U.S. patent office said that each year China and India receive twice as many patents from the U.S. patent office as people in the United States do.

The Honorable James B. Hunt, Jr. also noted that people are concerned about what has to be done so that their children will have good jobs. He shared, “People believe that cheap labor is the problem, but this is not our only problem…The greater problem our country faces is the developing brain power in Asia. It is not the intention of Asian nations to build their future on cheap labor but rather to build their future on brain power and education. They want high paying jobs in higher technology and industries that sell more. They want those jobs that develop new and better products and services. Things that sell for a high price will improve their standard of living.”

The U.S. will share and compete for these high-paying positions. Add to this the sharing of information and technologies, which heightens the level of global economic interdependence and competition simultaneously. With this international perspective in mind, what must be done to prepare for Indiana’s future economic development?

**International Perspective**

While Asian countries score much higher than the U.S. in international comparative studies, a challenge has been issued to look at the limitations of the kind of learning
emphasized and consider the conditions that enable the achievement of others. The Asian system is noted to result in a lack of commitment, enthusiasm, devotion, creativity, and sense of responsibility in its students. A lack of practical knowledge and skills also is evident. These shortcomings are driving educational reform in Asian countries. After considering cultural and systemic curriculum and teaching and student learning differences between Asian countries and the United States, it is advisable that Indiana schools envision high schools that:

1) Prepare “the creative class” which is characterized by diversity, flexibility and second chances.
2) Prepare “good neighbors” who possess cross cultural competencies, global awareness and foreign language aptitude.
3) Prepare citizens for the digital world, which has morality in virtuality and integrates available information rather than surfing the Web.
4) Leave no child behind by focusing on rigorous standards, accountability, coherent curriculum, teacher professionalization, and social capital in schools.

Promising results have been obtained in England by employing innovative leadership structures that enhance leadership capacity. In this structure, leadership roles are shared at the building level and leadership experience is shared across a federation or network with support from an information technology (IT) platform.

The leadership roles that are shared are management and leadership. Management roles include problem solving to bring order and consistency through structures, systems, procedures, and routines. Leadership requires identifying strategic ways forward, deciding on direction, and communicating vision in a way that wins the hearts and minds of the staff so that all are aligned and working in the same direction. It also involves “inspiring staff to believe that they can overcome hurdles and achieve success.” Freed from management responsibilities, school leaders can focus on sustaining a climate that supports change at their own school and have the capacity to share their leadership experience and talent with other schools.

This sharing between schools is supported by dividing leadership activities based on whether they are internal or external to the school. The school leader or executive head leads the implementation of an agreed upon strategy using resources to positively impact standards and ethos. The executive head, on the other hand, works with other schools, building on the school’s reputation for success, influences national policy and practice, and attracts additional resources and opportunities. The school head serves as the link between management and the executive head. This formerly failing school is able to form a federation and export its model for change to two other schools, which in turn, experience similar dramatic turnarounds in student achievement and teacher job satisfaction.
Lessons to be Learned from the United States: North Carolina and Colorado

North Carolina
North Carolina was selected by *Site Selection Magazine* as the best place to locate an industry in the United States. The state has held this standing for four out of the past five years. This is significant given the state’s economic history, which is similar to Indiana’s. North Carolina’s economy once was based on agriculture and non-technology related industries and was losing tens of thousands of jobs prior to initiatives developed in the last 20 years.

Education was seen as vital to renewal efforts especially given that economic leaders had noted they were ready to generate 1,000 new jobs but found that the current education system did not produce the science, technology, engineering, and math skills needed by these firms. Key components of North Carolina’s efforts were:

1. **Setting high and rigorous standards for what students need to know and be able to do, measuring attainment of these standards accurately, and reporting fully to the public how students performed and how much growth they demonstrated.** Tools like schoolmatters.com were utilized in this effort.

2. **Focusing on how kids perform when they come to school and organizing a 501(c)3 called Smart Start to ensure that all children come to school ready to learn.**

3. **Focusing on improving teaching staff by offering incentives to become board certified.** Of the 47,504 board certified teachers, 9,815 of them live in North Carolina, more than any other state. In contrast, Indiana only has 126 board certified teachers.

4. **Developing leadership.** The most important thing 5,000 board certified teachers said they would need to teach in a failing school is to teach under a good principal. Using board certified teachers as a cadre to assist teachers in turning around schools holds promise.

The New Schools Project in North Carolina led to the adoption and development of 68 high schools based on the work and models of the following groups: New Tech High, Asia Society, Big Picture Company (The Met), Expeditionary Learning, College Board, and the International Center for Leadership in Education-Successful Practices Network.

Colorado
In an effort to expand choice, Mapleton, Colorado, located just outside of Denver, adopted an uncompromising position that new, exciting education choices for high school students would center on academic rigor, college preparation, and real-life experience leading to higher student achievement and stronger retention rates. After investigating research-based “solutions” or proven practices, expanded educational opportunities were developed. Rather than offer a single comprehensive high school, the district now offers five small high schools within one large building. These schools are dramatically different from each other and utilize models that are predictive of student success. They include: Expeditionary Learning, Big Picture, Early College, Coalition of Essential High
Schools Academy, Expeditionary Learning through the Arts, and New Technology High Schools.

**Next Steps**
- Participate in the second Indiana’s Future Conference in 2006.
- Explore participation in the national Breaking Ranks II initiative in cooperation with the National Association of Secondary School Principals (NASSP), the National Governors Association (NGA) and CELL.
- Consider regional opportunities for the innovation of high schools co-sponsored by CELL and the Governor’s Office.
  - More information will be made available about each of these opportunities in January 2006.
- Join statewide STEM coalition efforts. Contact Ron Meeusen at (317) 238-2459 or meeusen@biocrossroads.com.
- Engage in the school improvement planning process with the Indiana Student Achievement Institute (InSAI). Contact Sue Reynolds at (812) 349-4142.
- To learn more about high school redesign work in Indiana, contact Nancy Sutton at (317) 791-5912 or nsutton@uindy.edu.

**Contributors**
Charlotte Cinacio, Superintendent of Mapleton Public Schools in Colorado, shared her experiences leading a district through school redesign to increase opportunities for students to succeed.

The Honorable James B. Hunt, Jr., former governor of North Carolina and chairman, James B. Hunt, Jr. Institute for Educational Leadership and Policy, and key representatives from the statewide initiative spoke about leading the effort that raised North Carolina from economic decline to its current status as *Site Selection Magazine*’s best place to locate an industry in the United States.

Sir Dexter Hutt, executive head of the Ninestiles Federation in England, spoke of a new model for leadership based on the Harvard Balanced Leadership Model, which separates the role of leadership and management.


**Co-Sponsors and Partners**
The conference was co-sponsored by CELL, InSAI, and the Science Education Foundation of Indiana (SEFI) in partnership with the Office of Indiana Governor Mitch Daniels, the Indiana Department of Education (DOE), the Indiana Department of Workforce Development (DWD), and the Indiana Commission on Higher Education.
National consultants including Elaine Berman, president of Denver Public Schools and officer of the School Board Association; Pete Gerber, chairman of the CELL Advisory Board; Ray McNulty of the International Center for Leadership in Education; Bob Pearlman of the New Tech High Foundation; and Jerry Wartgow, superintendent of Denver Public Schools, and past president of the high-performing Colorado College System assisted in the development of the fall conference.