

# Preparing for The Perfect Storm\*

## A Perspective on STEM

By:

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### **Framing the Issue.**

On September 7, 2006, 146 leaders in business, education, government and civic society met at a forum of *Taking Action Together* at the National Academy of Engineering in Washington, D.C. The focus of the forum was to address the “T&E” of STEM. (Science, Technology, Engineering and Math). Keynote addresses at the forum were delivered by Michael Golden, Pennsylvania Department of Education, Richard Rosen of Battelle and Commissioner Alice Seagren, of the Minnesota Department of Education.

The 146 leaders had a common quest, to support the implementation of STEM across the nation, and to ensure that “**Technology & Engineering**” are given equal support as STEM programs are implemented in k-12 schools. This forum confirmed that strong science and mathematics programs are essential to the future of our society. Likewise, as they went on record for the strengthening of science and mathematics, they called out four major goals to move our nation to action in providing technology and engineering into our schools:

- 1) **Raise awareness among policy-makers, practitioners, and the general public.** Communicate the importance of design and innovation to our society, and share successful examples.
- 2) **Strengthen the pipeline of technology & engineering talent.** Develop consensus around both a coherent set of standards and actions aligned to those standards, so that all students will have a basic understanding of T&E and be able to make educated decisions about careers in these areas.
- 3) **Enhance technology & engineering workforce education through research.** Develop a national research agenda that provides data for decision-making.
- 4) **Develop partnerships to focus resources.** Aggressively partner with key stakeholders in business and government to collaboratively engage and mobilize the education community to create models that provide strategies for STEM teacher recruitment, retention, and continued professional development, and provide replication of best practice that can be transferred to education.

### **Why is this Important?**

Our standard of living, lifestyle, and quality of place all rest on a strong, competitive and growing economy. Our economy in the past rested upon our wheat fields, dairy farms, mines, and forests, along with a labor force that had a tremendous work ethic. We added value to our natural resources and prospered together. This effort generated a strong economy that could, in turn, support commerce, finances, recreation, arts and education.

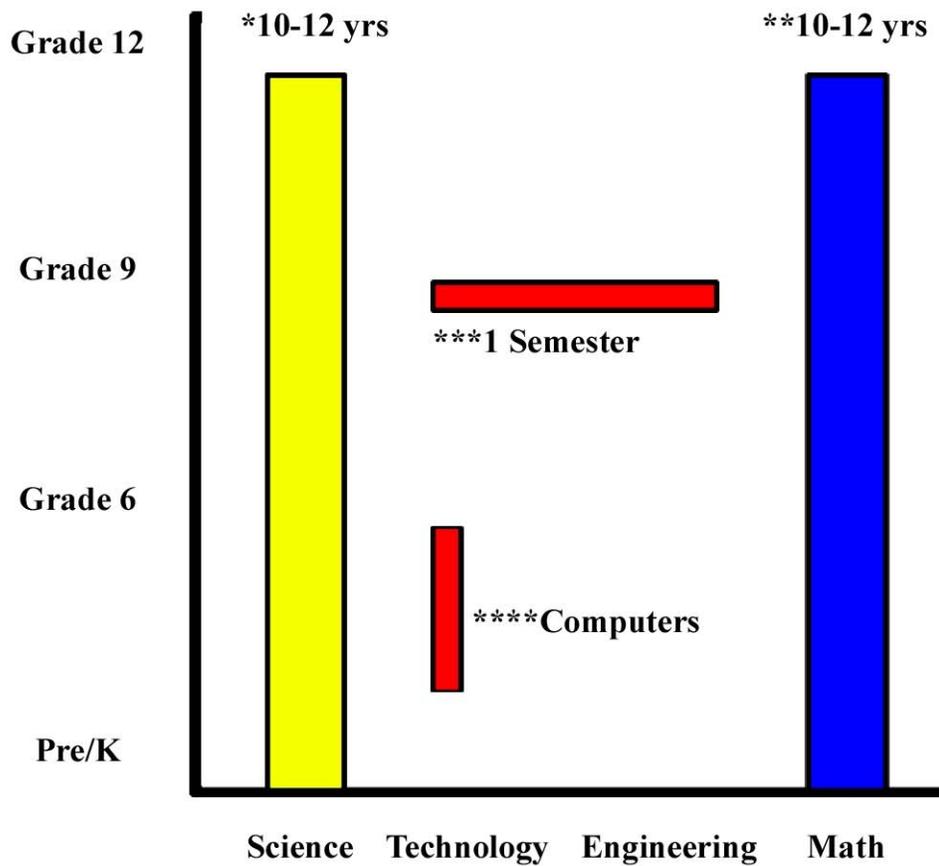
Tomorrow, however, our key economic resource will be people and the talent and creativity that they bring to their enterprises. Ideas will be a premium and entrepreneurs will generate and sustain the new economy. Carefully designed, balanced, and robust STEM programs that provide us with a free flow of talented people that will be the key to our well being! Our future rests in “know-how”!

### **The Challenge.**

This effort will take a united commitment to redesign our schools to make this happen. Currently we **require** between ten to twelve years of science and math in our schools but **fall woefully short in requiring technology and engineering**. Outside of an introduction to computer use in elementary school and usually one semester of technology and engineering in middle/junior high school, we virtually ignore this critical competency as a requirement for graduation. Standards are in place for science & math in Minnesota’s schools but the existing International Standards for Technological Literacy are still on the shelf.

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## Current Status of STEM Experiences Required in Most P-12 Education



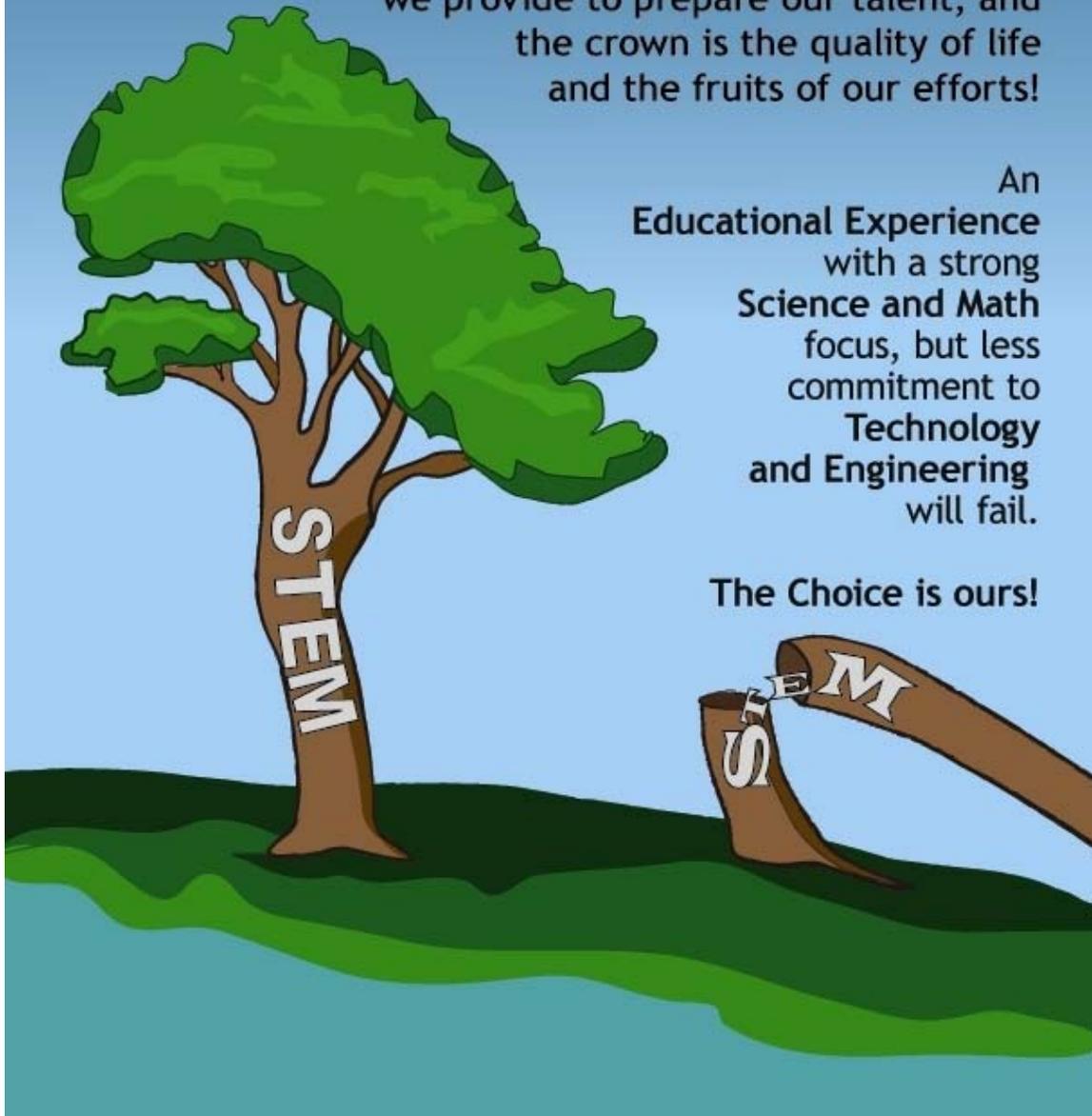
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It is acknowledged that when we were in the “mechanical age” of the 1940’s, 50’s & 60’s that technology was both observed and experienced in our daily lives. Technology was all around us. As a result, our youth streamed into our cities from our farms across the country and provided, at that time, the best workforce

in the world for industry. All this has changed as we engage in the new knowledge-based economy. To prosper in tomorrow's advanced and high technology enterprises it is imperative that we provide a relevant education. Our students must experience mathematical applications and **both the scientific method and design process of technology and engineering.** STEM programs with equal emphasis of the four elements is the key to our future.

## The Tree of a Prosperous Society!

In the context of a growing plant, the root represents our people, the STEM is the educational experience we provide to prepare our talent, and the crown is the quality of life and the fruits of our efforts!



An Educational Experience with a strong Science and Math focus, but less commitment to Technology and Engineering will fail.

The Choice is ours!

### **The Solution.**

Lead by such efforts as the Ingenuity Frontier, Project Lead the Way; Engineering by Design; Technology, Innovation, Design & Engineering; (TIDE), Innovation & Inquiry; etc., we have realized tremendous success in providing our youth the experiences that they need to be leaders in tomorrow's society.

We have the leadership in our state to make this happen through our State Department of Education, the Minnesota Technology Education Association, MnSCU Centers of Excellence, and the Technological Studies Department of Bemidji State University. Our leaders, researchers, and practitioners are recognized at the national and international level for their expertise and accomplishments. In addition, we have a virtual “train-load” of curriculum ready to implement and vendors have developed state-of-the-art laboratory equipment to support experiential learning for our students.

**The Charge.**

For great things to happen, bold action is imperative! We are in a new era, challenged by a global market, world-wide competition and an exploding knowledge-based economy. It is time to step out and lead the world rather than follow with timid steps of those who are at the head of the class. A extraordinarily strong STEM is absolutely essential in building the “tree of prosperity” for our the future!

Support your schools and promote the implementation of STEM programs!

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\*The full report can be seen, reviewed and down loaded from the web-site of the International Technology Education Association.

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