

ENGINEERING EDUCATION IN A RAPIDLY CHANGING WORLD:

Some Things Old, Some Things New

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Current Issues in Engineering Education – Suggested Reading

- ▣ National Academies. 2010. *Rising Above the Gathering Storm, Revisited: Rapidly Approaching Category 5*. Washington, DC: The National Academy Press.
www.nap.edu/catalog/12999.html
- ▣ National Academy of Engineering. 2008. *Changing the Conversation: Messages for Improving Public Understanding of Engineering*. Washington, DC: The National Academy Press.
<http://www.nae.edu/Publications/Reports/24985.aspx>

Recommendations from *The Gathering Storm*

- ▣ *Recommendation A: Increase America's talent pool by vastly improving K-12 science and mathematics education.*
- ▣ *Recommendation B: Sustain and strengthen the nation's traditional commitment to long-term basic research.*
- ▣ *Recommendation C: Make the United States the most attractive setting in which to study and perform research.*
- ▣ *Recommendation D: Ensure that the United States is the premier place in the world to innovate.*

Changing the Conversation: Repositioning Statement

No profession unleashes the **spirit of innovation** like engineering. From research to real-world applications, engineers constantly discover how to **improve our lives** by creating bold new **solutions** that connect science to life in unexpected, forward-thinking ways. Few professions **turn so many ideas into so many realities**. Few have such a **direct and positive effect on people's everyday lives**. We are counting on engineers and their **imaginations** to help us meet the needs of the 21st century.

Messages That Tested Well

ENGINEERS MAKE A WORLD OF DIFFERENCE

From new farming equipment and safer drinking water to electric cars and faster microchips, engineers use their knowledge to improve people's lives in concrete, meaningful ways.

ENGINEERS ARE CREATIVE PROBLEM-SOLVERS

Engineers have a vision for how something should work, and are dedicated to making it better, faster or more efficient.

ENGINEERS HELP SHAPE THE FUTURE

Engineers use the latest science, tools and technology to bring ideas to life in forward-thinking ways.

ENGINEERING IS ESSENTIAL TO OUR HEALTH, HAPPINESS AND SAFETY

From the grandest skyscrapers to microscopic medical devices, it is impossible to imagine life without engineering.

“Tag Lines” That Tested Well

- ▣ *Turning Ideas into Realities*
- ▣ *Because Dreams Need Doing*

Some Things Old

What have we done well?

- ▣ rigorous base in math and science, strong engineering content
- ▣ the importance of design and experiential learning (labs, co-ops, internships)
- ▣ faculty quality
- ▣ emphasis on research and creativity
- ▣ effective use of reward structure
- ▣ student quality/accessible education

And not so well.....

- ▣ integration of knowledge – separation into lower and upper division; little interdisciplinarity
- ▣ communication skills
- ▣ preparation for global marketplace
- ▣ diversity
- ▣ efficiency (excessive bureaucracy)

A Few Axioms.....

- ▣ Axiom 1. Engineers serve society
- ▣ Axiom 2. Fundamentals are fundamental
- ▣ Axiom 3. Education and training are not synonymous, nor are teaching and learning
- ▣ Axiom 4. The public's view of education is "important, but not urgent"

Some Things New.....

- ▣ Increasing partnerships between engineering educators and learning scientists
 - An increasing emphasis on “learning” in contrast to “teaching”
 - Team learning and other learning innovations
 - Learning is not classroom-centric
 - The myth of e-learning:
(<http://campustechnology.com/articles/2011/01/19/the-myth-of-elearning.aspx>)
- ▣ Creating a culture of scholarly and systematic innovation in engineering education
- ▣ Increasing need for interdisciplinary education and motivating students by “Grand Challenges”

Implications to the Technological University?

- ▣ The next decades should be “our time”
- ▣ Connect engineering education to the aspirations of today’s youth
- ▣ Embrace the connection between engineering education and economic development
- ▣ Stress interdisciplinarity – engage with other colleges in the university
- ▣ Be innovative in exploring different ways of learning
- ▣ Align the reward system for faculty with desired outcomes

THANK YOU!

*And congratulations to
Professor Brown and Professor Prescott!*