The Future of Engineering Education

Georgia Tech President G. Wayne Clough

Johns Hopkins University
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Predicting the Future

“We may need six computers worldwide, for government and so forth.”

T.J. Watson, IBM

“There is no reason for any individual to have a computer in their home.”

Ken Olsen, Digital Equipment Corp.
Constraining Assumption #1

The university within which engineering education is taught is a static entity.
“The next big killer application for the Internet is going to be education. Education over the Internet is going to be so big it is going to make e-mail look like rounding error.”

John Chambers
CEO, Cisco Systems
Constraining Assumption #2

Engineering education is the sum of its curricular parts.
“Everything has changed and I’m changed and I can’t tell what’s my name or who I am.”

Rip Van Winkle
“The pace and the nature of the changes have become so rapid, so profound that social institutions which are characteristic of the past, and I include in that corporations, governments, and educational institutions like universities, are having increasing difficulty in sensing, understanding and preparing for change.”

James Duderstadt
President Emeritus, University of Michigan
Restless Customer Base

- Employers looking for new skills in engineering graduates
- Traditional students who learn differently
- Nontraditional students with growing needs for new skills
f u cn rd ths, u cn gt a gd jb n cmptr prgmng
“Thirty years from now the big university campuses will be relics. Universities won’t survive. It’s as large a change as when we first got the printed book.”

Peter Drucker

Forbes magazine
The future of engineering goes beyond the question of how to juggle disciplinary ingredients and becomes a question of how teaching and learning will occur in an era different from any we have known.
Our challenge is to make engineering education relevant, to use new technology to improve learning and access, and to engage our engineering faculties in helping our universities to renew their compact with society.
The skill sets engineers need for the future are interdisciplinary, engaging business, policy, science and architecture.
“The environment is not a competing interest; it is the playing field on which all other interests intersect.”

Peter Dunne

*New York Times*
The New Economy

- Entrepreneurial
- Rapid product cycles
- Globally networked
- Technology driven
Information Technology

• Exponential power curve
• Instant information access
• Unlimited communication
• Unique graphics, visualization capabilities
“Our students… need more exposure to the integrative aspects of engineering design and practice, and to the analysis and management of large-scale, complex systems.”

Charles Vest
President, MIT
The University: Do we get IT?

- Internet delivery
- Web-based course materials
- Powerful communications tool
- Expanded reach of educational delivery
- What difference does it make
The Practice of Engineering

- Not new, but neglected and important
- Tell ‘em the world is messy
- Tell ‘em that hundreds of years of experience will help them get through the mess
- Ethics, professionalism, time management, and civic responsibility count
“Our system of education and training must... equip tomorrow’s engineering and science professionals to shoulder growing responsibilities and pursue emerging opportunities.”

Joseph Bordogna
NSF, NAE
The Future of Engineering Education

• Facing up to significant challenges
• Finding solutions within the university context
• Seeing the opportunities
• Educating the leaders of tomorrow
“We are confronted with insurmountable opportunities”

Pogo