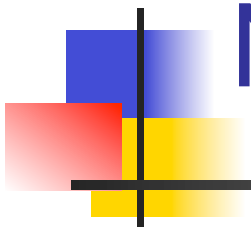
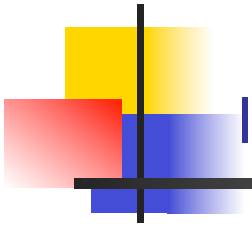


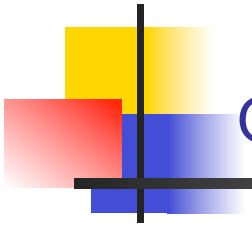
NAS/NAE/IOM/NRC Study

The Impact of Information Technology on the Future of the Research University



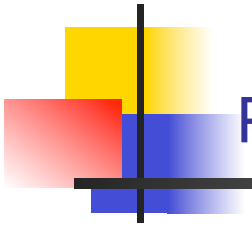
ITFRU Panel

- James Duderstadt (Chair), President Emeritus, Univesity of Michigan
- Daniel Atkins, Professor of Information and Computer Science, University of Michigan
- John Seely Brown, Chief Scientist, Xerox PARC
- Marye Anne Fox, Chancellor, North Carolina State University
- Ralph Gomory, President, Alfred P. Sloan Foundation
- Nils Hasselmo, President, Association of American Universities
- Paul Horn, Senior Vice President for Research, IBM
- Shirley Ann Jackson, President, Rensselaer Polytechnic Institute
- Frank Rhodes, President Emeritus, Cornell University
- Marshall Smith, Professor of Education, Stanford; Program Officer, Hewlett Foundation
- Lee Sproull, Professor of Business Administration, NYU
- Doug Van Houweling, President and CEO, UCAIC/Internet2
- Robert Weisbuch, President, Woodrow Wilson National Fellowship Foundation
- William Wulf, President, National Academy of Engineering
- Joe B. Wyatt, Chancellor Emeritus, Vanderbilt University
- Raymond E. Fornes (Study staff), Professor of Physics, North Carolina State University



Objectives

- To identify those information technologies likely to evolve in the near term (a decade or less) that could ultimately have major impact on the research university.
- To examine the possible implications of these technologies for the research university: its activities (teaching, research, service, outreach); its organization, management, and financing; and the impact on the broader higher education enterprise.
- To determine what role, if any, there was for the federal government and other stakeholders in the development of policies, programs, and investments to protect the valuable role and contributions of the research university during this period of change.

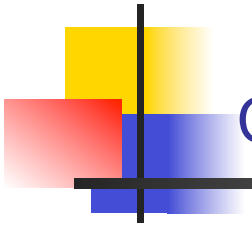


Phase 1

- Meetings of study panel
- Site visits (Bell Labs, IBM Research Labs)
- National workshop at NAS (100 leaders from industry, higher education, foundations, government)
  - Available on the Research Channel
  - http://www.research.channel.com/programs/na/itfru.html

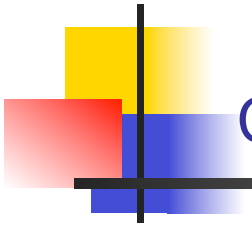
Phase 1: Conclusions

- There was a consensus that the extraordinary evolutionary pace of information technology is likely to continue for the next several decades and even could accelerate on a superexponential slope. Photonic technology is evolving at twice the rate of silicon chip technology (e.g., Moore's Law), with miniaturization and wireless technology advancing even faster, implying that the rate of growth of network appliances will be incredible. For planning purposes, we can assume that within the decade we will have infinite computer power, infinite bandwidth, and ubiquitous connectivity (at least compared to current capabilities).
- The event horizons for disruptive change are moving ever closer. There are likely to be major technology surprises, comparable in significance to the appearance of the personal computer in the 1970s and the Internet browser in 1994, but at more frequent intervals. The future is becoming less certain.



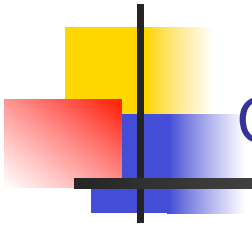
Conclusions (continued)

- The impact of information technology on the university will likely be profound, rapid, and discontinuous–just as it has been and will continue to be for the economy, our society, and our social institutions (e.g., corporations, governments, and learning institutions). It will affect our activities (teaching, research, outreach), our organization (academic structure, faculty culture, financing and management), and the broader higher education enterprise as it evolves into a global knowledge and learning industry.
- Yet, for at least the near term, meaning a decade or less, the university will continue to exist in much its present form, although meeting the challenge of emerging competitors in the marketplace will demand significant changes in how we teach, how we conduct scholarship, and how our institutions are financed. Universities must anticipate these forces, develop appropriate strategies, and make adequate investments if they are to prosper during this period.
- Over the longer term, the basic character and structure of the university may be challenged by the IT-driven forces of aggregation (e.g., new alliances, restructuring of the academic marketplace into a global learning and knowledge industry) and disaggregation (e.g., restructuring of the academic disciplines, detachment of faculty and students from particular universities, decoupling of research and education).



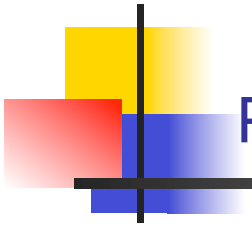
Conclusions (continued)

- Although information technology will present many complex challenges and opportunities to university leaders, we suggest that procrastination and inaction are the most dangerous courses of all during a time of rapid technological change. Just as it has in earlier times, the university will have to transform itself once again to serve a radically changing world if it is to sustain these important values and roles.
- Although we feel confident that information technology will continue its rapid evolution for the foreseeable future, it is far more difficult to predict the impact of this technology on human behavior and upon social institutions such as the university. It is important that higher education develop mechanisms to sense the changes that are being driven by information technology and to understand where these forces may drive the university.
- Because of the profound yet unpredictable impact of this technology, it is important that institutional strategies include: 1) the opportunity for experimentation, 2) the formation of alliances both with other academic institutions as well as with for-profit and government organizations, and 3) the development of sufficient in-house expertise among the faculty and staff to track technological trends and assess various courses of action.



Conclusions (continued)

- In summary, for the near term (meaning a decade or less), we anticipate that information technology will drive comprehensible if rapid, profound, and discontinuous change in the university. For the longer term (two decades and beyond), all bets are off. The implications of a million-fold or billion-fold increase in the power of information technology are difficult to even imagine, much less predict for our world and even more so for our institutions.



Phase 2

- **Steering Panel Activities (expanded)**
  - Monitoring technology evolution
  - IT Strategy Roadmapping Effort
  - Policy Development
- **National Workshops (2002-2003)**
  - University Presidents and Board Chairs
  - Foundation Presidents and Technology Officers
- **National Workshops (2003-2004)**
  - Presidents, Provosts, Deans, Faculty Governance
  - Impact on education, research, service
- **Regional Workshops (2004-2005)**
- **Campus Workshops (2003-2005)**