THE NATIONAL ACADEMIES

Advisers to the Nation on Science, Engineering, and Medicine

Forum on Information Technology and Research Universities

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MEMORANDUM

June 27, 2003

TO: **Participants in the April 2003 University Presidents and Chancellors Summit on "Transforming Research Universities Through Information Technology" and Members of the National Academies Forum on IT and Research Universities**

cc: **Non-attending presidents and chancellors**

FROM: **James J. Duderstadt, Forum Chair**

SUBJECT: **Possible Areas for Follow Up and Continued Dialogue**

Thank you for your participation in the summit meeting on April 15-16, 2003. The strong attendance by research university leaders representing a mix of public and private institutions across the United States and Canada confirms the importance of the topic and the potential impact of our activity.

The purpose of this memo is to outline several areas for possible follow up activity and continued dialogue, drawing on themes and ideas that emerged during the meeting itself, in responses to the informal survey prior to the summit, and in follow up communications.

This memo is intended to assist the Forum in planning future interactions with research university leaders. Because forums and roundtables of the National Academies, such as ours, do not operate under the membership and open meetings rules that study committees are required to follow, they are restricted from publishing reports, but may prepare documents for internal use. Therefore, **please do not quote, copy, or circulate this memo. The views expressed here are mine. This is not a report of the Forum or of the National Academies.**

We would appreciate your reactions and suggestions regarding these ideas (including your willingness to be involved in follow up discussions), or other actions that we might consider. Also, please let us know if we have made any mistakes in rendering the comments attributed to you. Feel free to pass along your thoughts to me (jjd@umich.edu) and/or Forum staff director Tom Arrison (tarrison@nas.edu). The meeting agenda and participant roster are attached.

The Pressing IT Issues of Today

While noting Chuck Vest's (MIT) caution that today's most pressing concern is "that today's concerns might obscure our view of the future," the summit discussion and the informal survey revealed several "front burner" issues that presidents and chancellors are confronting.

Not surprisingly, university leaders are facing challenges in obtaining the necessary resources to support continued campus IT advances and in making choices among alternative IT investments. Alan Merten

(GMU) pointed out that universities face a "triple whammy" of increasing enrollment, declining state and philanthropic support, and rising expectations for higher education on the part of students and the broader public.

James Wright (Dartmouth) discussed the "myth of reduced cost" from IT investments. While IT may reduce costs in several functions of the university, it has not yet done so everywhere, especially in teaching and learning. Today there are no effective means of assessing student learning, which makes it harder to communicate the value of IT investments to board members from industry. They naturally wonder why it is difficult for universities to cut costs through IT when their companies have done so.

The discussion of the report on *Revolutionizing Science and Engineering through Cyberinfrastructure*, prepared by an advisory panel to the National Science Foundation (NSF), highlighted how cost challenges differentially affect university missions (e.g. education, research, and engagement). The transformative potential of IT for research across science and engineering is widely recognized. For example, cyberinfrastructure creates new scholarly environments clearly decoupled from the campuses. Individual faculty members, departments, institutions, and key funding agencies like NSF understand the need for new initiatives and approaches. This situation in the research mission contrasts sharply with that of the teaching and learning mission, where the utilization of technology is uneven, assessing outcomes is difficult, and coherent strategies have been slow to emerge from individual institutions and their constituents.

James Moeser (UNC-Chapel Hill) pointed out that not all the cost trends are negative. For example, the economics of wireless computing make certain types of campus technology upgrade much more affordable than they were just a few years ago. In addition, the downturn in the tech economy has enabled the university to hire and retain the IT staff that it needs, at least for now.

Besides budget and cost issues, other pressing concerns were mentioned in the survey responses and were invoked but not extensively discussed at the meeting, due to the limited time available. For example, several participants noted that "of course" security, privacy, and intellectual property disputes are currently challenging issues. In addition, Chuck Vest (MIT) provided a list of near-term tech issues that included broadband access to the desktop, middleware, and user-designed services in addition to security, lack of scale economies, and money.

The disruptive impact of IT raises the most fundamental questions: What is the university? What are its boundaries? How do we value the university? How do we link in our fundamental values?

The Role of the President/Chancellor

One important theme of the summit discussion was the proper role of presidents and chancellors in campus utilization of IT. Jared Cohon (CMU) remarked on the tendency of presidents and chancellors to let university CIOs deal with issues to the extent possible, although this is increasingly difficult as IT-related decisions are coming to drive the central direction of institutions.

Another reason why presidents and chancellors have been less involved in IT strategies is that the best ideas at research universities tend to come from the bottom up. Richard McCormick (Rutgers) likens the process to "letting a thousand flowers bloom." If people want to use it, they can get help, but there is no compulsion to do so. This allows ideas and initiative to flow freely, but may also result in uneven application of IT across disciplines and departments and no university-wide strategy for seizing the opportunities of the technology.

So how can presidents and chancellors positively influence change? Louis Gerstner's (IBM) keynote speech at the summit, particularly his recounting of how IBM turned around in the mid to late 1990s, was quite apt. When Gerstner arrived, IBM had great technology, but projects would escape, or not be launched at all. He cited a "success syndrome" in which the company was locked into rigid, suffocating ways of thinking due to its past success. This was coupled with "decentralization run amok." Changing the corporate culture and better integrating the enterprise were difficult but not impossible tasks. Corporate cultures are similar to national cultures in that most of the important rules are not written down. It was important to show that specific changes and closer collaboration across the organization were okay. CEOs cannot dictate changes in corporate culture, but can create a set of conditions to foster change.

University leaders have similar powers to facilitate change. For example, Shirley Jackson (RPI) suggested that institutions use the strategic planning process to identify and affirm the institution's fundamental values, and ask how IT can help support those values. Presidents and chancellors can also support and enable the drivers and innovators within the university. These projects serve as "stakes in the ground" and hopefully stimulate similar efforts.

These suggestions echoed Louis Gerstner's admonishment that IT should always be thought of as a tool rather than an end in itself. Before applying this powerful tool, an enterprise must set it's objectives and note the processes it wants to change.

One contemporary example of this process at work is the OpenCourseWare initiative at MIT. Anne Margulies (MIT) notes that is voluntary, yet a common framework and support are provided to ensure that OCW adds value to faculty efforts. Student demand can help push faculty toward greater use of IT.

Robert Berdahl (UC Berkeley) expresses concern that presidents have very little experience with providing strategic visions and leadership for uncertain futures driven by disruptive technologies.

Transforming the Research University *and* Society

A good deal of the discussion was devoted to long-term questions. Louis Gerstner raised two in his keynote talk: (1) Is it possible to manage universities as unified enterprises, or will they always function as decentralized entities? and (2) Will the university build its value proposition around the student (e.g. the University of Phoenix) or the professor?

Other questions emerged during the discussion, centered on the theme of how IT is changing the role of research universities in the larger society. How should scholarly communities be defined and organized? How will the emergence of virtual communities affect physical communities? Can and should the campus maintain boundaries in cyberspace?   How does the research university contribute to larger societal discussions about the challenges and opportunities of the digital age?

Nancy Cantor (Illinois, Urbana-Champaign) sees universities as moderating between "the monastery and the market." Scholarly exchange needs to be vibrant, but also moderated and civil. The internet has enabled easier and faster communication, but has not resolved such issues as how to create trust in cyberspace among people and groups, how to create environments where all participants have standing, how to encourage social responsibility, and how to provide IT on the campus as a service rather than a utility. A program at Illinois to "e-Mentor" novice teachers illustrates how the engagement mission of the university can be transformed.

James Moeser believes that research universities face a major challenge in fostering a community in place. A generation of faculty is retiring and is often being replaced with non-tenured lecturers and adjuncts. Will we replace longtime, resident faculty who sustain the campus-based scholarly community

with nomads in cyberspace? If so, how do we build virtual communities who identify with a particular institution, or even with the broader missions of higher education, for that matter?

Doug Van Houweling (Internet2) points out that it is important to consider the community that students live in, where much is taking place without the influence of university faculty or administrators. The conflict over access/capabilities in residence halls is one example of this. How can student energy be harnessed?

Bob Dynes (UC San Diego) observes that technology is moving so fast that there are vast differences between the seniors and the freshmen at his institution. The freshmen are completely wireless, and communicating in very unexpected ways. If we enable students, they will drive us. He also states that campus boundaries are less and less meaningful, which poses additional challenges. The fact that systems and applications are attacked almost as soon as they appear on line is one example.

Stuart Feldman (IBM) says that the breakdown of campus borders highlights the need to think strategically about IT and its influence on the institution. E-infrastructure can disintegrate, disaggregate, reintegrate and reaggregate functions and roles of a university. He questions whether the current package of activities that have emerged as the U.S. research university will survive intact. The real disruptive force is the marketplace, brought onto campuses by new technologies in a highly competitive and disruptive fashion.

Likewise, Bill Wulf (NAE) notes that past predictions of future social impacts from technological advance have been notably bad. They typically assume some version of the status quo, only faster, cheaper, bigger, etc. With today's technology, co-location is needed to help build and maintain trust. That may not always be the case, with enough bandwidth. The most profound impact is from unanticipated, disruptive technologies (e.g. web browser or PDA).

On the other hand, Chuck Vest notes that libraries are functioning with both traditional and digital means of service and will likely do so for a while. Perhaps the same can happen with residence halls.

However, even if the campus experience continues to be seen as valuable for students, Jared Cohon is more confident that the campus will last than the faculty guild. Today it is sustained primarily by the practice of tenure. But with an increasingly nomadic faculty, linked electronically rather than physically to campus, can the traditional faculty practices be sustained?

Alan Merten reminds us that traditional definitions of students and faculty are not as appropriate today, with the nation-wide 'traditional student' enrollment under 25% of the college-age population. In this context, what are the responsibilities of institutions?

Doug Van Houweling asserts that considering place-based vs. non-place-based visions of the university is useful, but it is difficult to translate these visions into clear guidance on today's strategic decisions. He suggests focusing on using the place-based aspects of institutions to meet student needs, enrich the campus-based experience, and create a global learning environment. It is important to think of strategies for the academic research enterprise as a whole. What should institutions do together, and what is best accomplished as separate institutions?

Riel Miller (OECD) suggests co-location could evolve, serving to support an experimentation function to test different contexts for using technology and/or forming social structures.

As noted above, the discussion of the NSF Cyberinfrastructure report suggests that the research mission is on the leading edge of institutional change. Peter Freeman (NSF) sees cyberinfrastructure as the

integration of several longstanding trends, rather than something completely new. Cyberinfrastructure will facilitate many shifts already in process, including a democratization of research, availability of a wide range of resources outside of academia, and a revolution in education.

Joseph Bordogna (NSF) asks whether the grassroots nature of IT-driven change will lead to a homogenization of higher education. How will institutions distinguish themselves?

Ideas for Follow Up and Additional Work

The current plan for the Forum on IT and Research Universities is to organize a discussion later in 2003 similar to the presidents-chancellors summit focused on funders of academic IT initiatives, including foundations and federal agencies. During 2004 and 2005, discussions will be organized with university constituents beyond the presidents: provosts, deans, CIOs, CFOs, VPs for Research, faculty, and students. In follow up discussions, it was suggested that the Forum might organize several meetings involving four or five universities each, with each institution sending leadership teams of five or so members. The Forum is also planning a series of campus-based dialogues and related activities, and will continue to meet itself about twice a year.

Although the Forum itself cannot author National Academies reports, it can develop study ideas and spin them off to other groups within and outside the Academies. The Forum can also commission independently authored work and organize meetings without some of the constraints that typically fall on Academies committees.

In Jared Cohon's summary remarks, the subsequent discussion, and follow up communications, several issues emerged that would benefit from additional attention from the Forum and others. In addition, a few specific action items were mentioned that could be pursued by the Forum and/or other groups. In the coming months, the Forum will consider which priority items it is uniquely positioned to move forward, and which items might be better tackled by other groups.

(1) The Evolving Role of the President/Chancellor and the "Executive Core"

How can academic leaders help facilitate positive change on campus and help chart the institution's IT-mediated role in society in areas such as privacy and security, vibrancy and civility, and trust? How will this role change as campus boundaries become less well defined? Brian Hawkins (EDUCAUSE) pointed out in communication following the summit that with the exception of the cyberinfrastructure discussion the issues raised in this group were identical to those raised in meetings he has organized with presidents involved with the Mellon-funded National Institute for Learning & Liberal Education. Would a broader consideration of presidential leadership in this area, perhaps under the auspices of ACE and EDUCAUSE, be helpful? The Forum itself might also undertake to provide presidents with occasional updates to keep the dialogue going. Stuart Feldman suggested in post-summit discussions that it would be useful to move beyond the presidential focus to examine the role of the university's "executive core" of senior administrators.

(2) "Paying for the Revolution"

Shirley Jackson suggested that an analysis be undertaken of how the costs IT are developing on campuses, what the future prospects are, and how would they be paid for. This is an area where the Forum and other groups like AAU, EDUCAUSE, and NACUBO might explore a joint project or encourage a consulting company to do a pro bono survey.

(3) Assessing Educational Impacts

The need for more research into the impacts of IT, technology-enabled learning, was highlighted by a number of participants. This is an issue that affects education in general, not just research universities. NSF is launching a new Science of Learning Centers program, but what more should the Forum and other groups do?

(4) What Do Students Need to Know?

Can research universities and other components of higher education develop consensus on what students need to know in the digital age? What constitutes true IT literacy? This would include values, such as social responsibility in cyberspace, and take into account the socioeconomic and cultural differences among students. It might also cover what Chuck Vest calls "Linux learning": how do huge groups learn, design, discover, and build on the Web?

(5) What Do Faculty Need to Succeed?

What do faculty members need in terms of training, encouragement, and support, to thrive in the digital age?   The National Academies report of a few years ago *Issues for Science and Engineering in the Digital Age,* was partly devoted to identify these faculty needs.

(6) Identifying Effective Practices

In communications after the summit, Nils Hasselmo suggested that the Forum consider doing some case studies that use the participant-observer methodology common in anthropology in order to "discover" the factors that influence change positively and negatively in response to IT developments, and what new paradigms of interaction are emerging. He participated in a similar effort organized by the Council of Graduate Schools a few years ago that successfully studied changes in master's degree programs.

(7) What Should Institutions Explore Doing Together?

It was noted several times during the discussion that successful collaboration in academia generally is conceived at the faculty level and then blessed by the administration. Internet2 is an example of institutions coming together for a common purpose. Are there other areas where collaboration should be explored? Chuck Vest mentioned two possible areas: (1) Archiving the scholarly output of the 21st century, and (2) Sharing expensive learning materials among institutions and learners.

(8) Beyond Cyberinfrastructure

While the NSF Cyberinfrastructure did take social and other factors into account, the report is clearly focused on natural sciences and engineering. Alan Merten asks whether a similar study should be aimed at the needs of the humanities? Such a "cyberhumanities report" might be worth exploring with groups like ACLS.

(9) Global Education

Although the international dimensions of IT transformation of research universities were not extensively discussed, clearly IT holds the promise for academia to educate, perform research, and undertake outreach globally in ways that have not been possible up to now. Anne Margulies observed that when the first courses went "live" on the OpenCourseWare prototype site, reactions had already come in from Asia when the east coast business day began. Also, the OECD examination of the future of universities

illustrates that higher education, and IT as a transformative capability, are topics of great interest outside beyond North America.

(10) Conduct Surveys

A systematic survey of presidents and other key players (provosts, deans, CIOs, CFOs, faculty, students) might reveal interesting differences of perspective on these issues.