The Future of Information Technology at West Virginia University

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The following remarks of the keynote address are unedited and written in conversational style; the reader will need to integrate the slides with the text.

Thank you Sid and good morning.

I am pleased to be here to share my thoughts with you.

To begin, I want to tell you what I am not going to discuss.

- I am not going to address the many administrative uses for technology.
- Nor am I going to talk about the specifics of hardware or software.

Rather, I am going to focus on **issues** related to the use of technology as it applies to academic mission of the institution. And even more pointedly, I want to focus **your thinking** on using technology as a part of the foundation for **learning**, as a tool that assists in the **learning process**.

Mission and Vision [slide 2]

Let me begin by reminding us of the mission and vision of West Virginia University.

These statements help define us as an institution.

WVU is a comprehensive, public, land-grant, research university with a complete suite of health science programs.

Note the shifting focus of the tripartite missions to more contemporary parlance, from teaching, research, and service to learning, discovery, and engagement. This change is a reflection of the efforts by the recent Kellogg Commission on the *Future of State and Land Grant Colleges and Universities.* One goal of the Commission was to remind these great public institutions, like WVU, of the critical importance of refocusing their academic activities to serve their students, their clients, and their citizens. These changes are more than "word-smithing"; they reflect the changing nature of our academic orientation.

Now consider our vision statement:

> *West Virginia University is a student-centered learning community meeting the changing needs of West Virginia and the nation through teaching, research, service, and technology.*

Note the addition of technology in statement. This statement is several years old and reflects our recognition of the importance of technology in all that we do.

Environmental Scan [slide 3]

I want to begin with an Environmental Scan to set a foundation for my later comments.

list of Recent IT Investments

First, I want to remind us very briefly of recent IT investments. This review is not meant to be exhaustive.

The point I want to make here is that **WVU has invested substantially in technology** to aid our administrative and academic functions. These investments have changed the way our administrators, faculty, staff, and students go about their work. These investments are changing the way we respond to our learning, discovery, and engagement activities.

Institutional Budget [slide 4]

For the general university, we are looking ahead to some significant **fiscal challenges**.

Our state appropriated base budget will be reduced by 13% next year.

We anticipate further reductions the following year.

These changes are a result of economic realities that are affecting the entire country.

It is clear that IT will **not be spared** in the reallocation process to balance the institution's budget as it was during the reallocations that occurred under Senate Bill 547.

Some Generational Characteristics [slide 5]

I want to spend a moment reviewing some of the research that Vice President Carolyn Curry has been pulling together for us as we look to understand our different audiences.

This is just a fragment of that work but I believe it will illustrate my point, namely that we are confronted with generational differences; these differences directly impact our academic perspectives.

We can categorize individuals by their dates of birth. Explain.

For each category, we can note specialized characteristics. Review.

The take home lessons include:

- **Our students are different than the faculty that teach them.**
- How do we bridge the gap between these generations?
- Can we, the faculty, respond to the learning behaviors of our students?

Learning Styles [slides 6 & 7]

I want to spend a few moments on learning styles as well. I firmly believe this is an often-overlooked component of curriculum design and a source of an ensuing sense of frustration both among faculty and students.

What a student learns is the product of how he/she learns and their preferred method of absorbing and using information. Each of us uses a preferred style for learning that defines ourselves. Yet, we tend to teach in certain ways, to only certain types of learners to the detriment of creativity, exploration, cooperation, and the pursuit of fascination.

The mismatch between faculty expectations in class assignments and the student's multiple learning behaviors and styles contributes to poor grades, student malaise, poor retention, and lack of success.

While there are many ways to classify learning styles, I find the 4-MAT approach easy to understand and use.

4-MAT is a registered trademark of Excel, Inc. and a learning style product developed by Bernice McCarthy.

Through an inventory, one can be categorized into four learning styles. Review.

Review characteristics of each type of learner.

Here my point is simply, **we are not all alike in how we learn. We each have a preferred style. Each is valid for the learner.**

If you superimpose learning styles over our earlier analysis of generational characteristics, you should notice a complex pattern beginning to develop.

Our millennial students are characterized as visual learners and are more technologically savvy.

We might ask:

Where does IT fit into the curriculum they seek? Where are we in the design process to make IT a component of their learning process?

National Research Council Panel Report [slides 8 & 9]

Next, I want to share with you the six key insights from a Panel Report entitled…
Preparing For The Revolution:
Information Technology and the Future of the Research University

This is a most valuable report in that it outlines some of the challenges facing the research university.

I often use the following definition of a consultant – a person who is giving advice more than 50 miles from home. In this case, I will use the six summary statements as those of a consultant. They will challenge our future way of working and learning.

1. *The pace of IT will accelerate removing constraints of space and time.*
   We often hear this comment as we talk about online courses and degree programs; the anytime, anywhere model for instructional delivery; the University of Phoenix model. Will we be able to remove similar constraints on campus?
2. *The impact will be profound, rapid, discontinuous.*
   Change is occurring quickly, more like a revolution than an evolution. Are we prepared to meet the challenges in our course delivery?
3. *IT will change how university is organized, financed, and governed.*
   This is clearly not a student issue but a faculty issue. Will the interdisciplinary nature of information and the manner in which we solve problems and discover new knowledge cause new academic majors to arise and traditional departments to change? What resistance will be encountered?
4. *Procrastination and inaction are as dangerous as hasty responses to current trends*
   A wise statement that encourages finding the balance between being at the cutting edge and being totally behind the curve. Given our pending fiscal constraints, we will need to consider carefully how and where we invest in the future.
5. *IT will markedly change human behavior.*
   This point goes directly to my earlier remarks about learning styles and teaching styles. Our faculty will need to look carefully at their pedagogical techniques and how they assess learning outcomes. Our students will need to become responsible for their learning. Both changes are directed at the **concept of life-long learning as a paradigm for education.**
6. *There exists a need for in-house expertise to assess trends, courses of action, and opportunities.* We must continue the discourse. We must speed up the change process and one way is to continue to recognize the next generation of “early pioneers.”

Must Not Only Manage Transformation But Lead It

The generality of the six statements by the panel is intentional as the panel members agreed that they could not be specific but only identify broad general trends. To be honest to the report, the panel noted that the outward face of the research university would not change much in the next decade, in part because of point five – the slow nature for change in human behavior.

National Trends/Initiatives [slide 10]

Every week you and I receive some information that focuses on new IT initiatives, new products, new demands, a new analysis, and the like.

Last week alone, I received:

- A brochure from the University of Phoenix describes how to earn a business degree via the Internet. Note the University of Phoenix has been accredited for 20 years!
- The March/April 2003 *Educause Review* has three articles of interest:
    - Call for online teacher training
    - Sustainable models for funding IT
    - ERP systems
- The March 2003 *Chief Learning Officer* is a new journal that focuses attention on shift from teaching to learning.

Implications of IT for the Research University [slides 11-13]

If we are more or less willing to accept the Environmental Scan I have presented, then we need to address the implications for the research university.

There is no debate – we have experienced an explosion in knowledge. And the Internet has done what the book did a thousand years ago – opened up information to the masses. Except it has done so almost instantaneously and in a far-reaching manner. And while the capacity of our hardware continues to push new limits and new readily usable software is being developed, how has higher education responded?

In reality, the pace of transformation within higher education is modest. In the area of Service (engagement) little has been done. On the other hand, Research (discovery) has been transformed in dramatic ways by IT. We have also used IT to increase communications among scholars and between faculty and students, and we have made information more easily and readily available through our libraries and electronic databases. But Teaching (learning) remains classroom-centered, and seat-based. And when we use technology, it has often been as a substitute for a classical approach to learning.

This power point presentation, for example, is not much different than old 2-by-2 slides or an overhead. It may be more elegant and maybe easier to develop but not effectively different.

But what of the online university and the competition it provides for the campus-based institution? Is it a threat to our traditional universities?

In response, technology can create open learning environments in which the student is freed from the constraints of time and place.

We must change our approach to education and learning if we are to survive in the long term.

Universities must become "learning organizations by systematically studying the learning process and reexamining their role in the digital age. . ."
In the short term, not much will change, but will we see the evolutionary changes that are occurring around us? Will we have the willingness to respond to the external factors that are influencing our universities?Will our students be able to assume responsibility for and control over their education? I would suggest this need for increased responsibility represents a key behavioral factor that pushes back against those external factors that push for change. And I say this in spite of my comments about our millennial students being more technologically savvy, because unfortunately, **student maturity cannot be readily inventoried.**

Thus, **while the rate of change in technology will be enormous over the next decade, change in individual behavior will be the limiting factor that will impede the rate of change in higher education.**

Impact of IT on learning is coming from the learners themselves
61% of US households access the Internet as do most schools and business. Worldwide, hundreds of millions of people use the Internet. The Internet is a democratizing force that will extend educational opportunities to those underserved by traditional institutions of higher education.

A digital future will challenge faculty to design technology based experiences based primarily on interactive, collaborative learning
According to one of the panel members – yes. His quote is: "If you doubt, check on the state of the family farm."

In reality, there will continue to be a need for all types of higher education institutions. However, universities will need to be more focused on those we serve. Our student-centered vision, intensified when David Hardesty became President, has moved us to the cutting edge as we focus on those we serve. But we must do more – we must become learner-centered. And we will need to do so in part because of the continuing economic constraints we will face in the future. **WE will not** be going back to the "good old days." The state resources are not there and will not be there. We have pushed tuition and fees to a point

where we cannot continue at the same rate of increase in the future. And we have other needs. We will need to reorganize the university.

Our students have a lot to say about their learning. If by no other means than deciding on which school to attend, students will help decide our future. **Because of the variation in learning styles, we will need to find ways to blend both e-learning and traditional learning.**

A digital future will challenge our faculty to design technology-based experiences, ones that are more than placing notes on Web pages. It was natural that the earliest experiments in the use of digital technology were enhancements of traditional courses. But in the future, our faculty will be expected to design courses that provide interactive experiences – courses that inspire and motivate an active learning process and reduce the reported high rates of student attrition in online courses.

We will need to rationalize ownership of courseware. I believe this will occur in the near future, as a national paradigm will emerge.

Finally, those virtual universities are not going to go away. The e-learning market will approach $14 billion by 2004! Despite the well-publicized failures, 2.2 million students are using online educational opportunities and the rate is growing by 33% annually.

Let me add here, that I believe that part of this impact is the result of lifelong learning concept that is embedded in our society.

As a footnote, at WVU we have 26,600 WebCT users this spring semester. We have developed five complete online degree programs as well as two web-based certificates. And we have 61 web-based courses on line this spring semester. We are more than novices in the e-learning market.

Research has been unbridled by IT.
In all disciplines, the computer has unleashed discovery. Computational power, data storage and manipulation, simulation modeling, deciphering code and text, analyzing data, and so forth have all been enhanced by the power of the computer. And the creation of new knowledge is shifting to multidisciplinary teams of scholars. The development of collaboratories (networks of researchers and organizations) could not exist without technology.

The Library is the facilitator of information retrieval and dissemination.
The library of the future may be less about a collection of materials and more a center for knowledge navigation and a facilitator of information retrieval and dissemination. But the cost of journals even electronic journals is dampening our access to information promised by technology.

Take our experiment in ETDs (Electronic Theses and Dissertations) as an example. We have had 3 million hits from 90 countries on our electronic theses and dissertations. Previously few if any read any of the information within our students' theses and dissertations. And I will tell you there was resistance to what I believe was a simple change – opening up our dissertations to multimedia and a new way to show the intellectual creativity of our students. That is behind us now but it is but one example of how difficult it is to change behavior.

Again to be fair, the legal and economic management of university intellectual property is becoming one of the more complex issues facing our institutions. We will need to untangle this issue quickly.

Higher education must define its relationship with emerging trends of the digital age in order to adapt, grow, and continue to excel.
In many ways this point summarizes the challenge to higher education institutions. Unburdened by the constraints of traditional academic institutions, virtual universities can experiment with new forms of delivery.

The focus on the learner is essential to preserving our market share. This is especially true in West Virginia and at West Virginia University as we face a decade of continuing decline in the number of high school graduates. This places us in an extremely competitive situation.

The e-learning Process [slide 14]

In this next slide, I have tried to diagrammatically portray the interrelationship of faculty and students in the e-learning process. This slide comes from the work of Adams and Sperling who are driving change in learning at Farleigh Dickinson University

Review slide.

The concept of assessment drives the refinement of the new pedagogical techniques. The importance of learning styles and student responsibility for learning are independently recognized. The goal is to accelerate the pace and deepen the strength of the learning process.

It is important to remember we need not use e-learning just to educate those at a distance. **We need to define the role of e-learning on a traditional campus like ours. This will challenge our traditional way of doing business.**

Choosing the Future [slide 15]

I have acknowledged that the research university may not change substantially over the next decade, in part because of the evolutionary manner in which higher education changes. But change is on the horizon; it is the rate that remains elusive. And so investments need to be made to prosper in the future.

Let's consider some of the challenges before us. Maintaining status quo in higher education is unacceptable as "disruptive" digital technology finds its way into every corner of our society. We must look for opportunities, be creative, and have a vision for the future.

We need to invest in our campus network. The core of a modern university IT infrastructure is its communications network. The network is critical for all that we do academically and administratively and its failure is unacceptable to faculty and students. The network has become analogous to a utility; we expect it to be there and readily useable. Unlike our other utilities in which the infrastructure will last 30 plus years, our current network is in need of an upgrade. The fiber is probably OK, but we need to upgrade the boxes at the ends of the fiber so we can increase bandwidth to accommodate voice, video and data. Such boxes come with three year warranties and in six years are outdated. How do we find the resources to pay for this expectation?

Will we go wireless? Wireless technology is already a reality on our campus. As we have seen, individual units have pushed ahead with this technology on an *ad hoc* basis. A stable, secure wireless environment is not in place. Central coordination is necessary to protect the security of our campus data systems. We have a report from a Wireless Task Force that will be posted for comment by the campus community. I will be asking Sid Morrison to develop a set of recommendations that will move us forward with ensuring the security of our network especially as we go more and more to a wireless environment.

Will we accept e-learning? The advent of e-learning brought hope that online learning would be efficient and economical. But as we have learned, if done with a high level of interaction, instructor-led online learning is as expensive as traditional classroom teaching. And student retention and course completion further provide added challenges.

Our goal must be to determine how we can use this medium to capture the wealth of available resources provided through the Internet in ways unimagined in the traditional classroom environment. Here, we will need to take risks and then evaluate our work. We must look for efficient and effective ways to use e-learning.

How will we integrate our campuses? This is an organizational question of importance if we are to function as an integrated set of campuses. The fiscal realities each campus faces will in turn drive the campuses to accepting an integrated model. This also will demand behavioral change.

How will we fund our aspirations? The first part of this answer is that we will need to constrain our aspirations. We do not have the resources to drive a "luxury car." We need to decide what we need, what we can afford, and then prioritize those needs in the context of all that we do and desire to do. IT will have to demonstrate its utility and importance in order to compete for our limiting resources.

So we will **need to align IT with institutional priorities, integrate IT into the culture and management of the institution, develop IT standards that promote efficiency, and demonstrate that IT is contributing to the learning process.**

Current Initiatives [slide 16]

In this next slide, I want to briefly focus on some initiatives that are underway or soon to be underway.

We are now reviewing a set of standards for the purchase of basic hardware and software. We recognize that there are many special needs, but the configuration of the basic PC is one area in which we should have some uniformity. We can increase our purchasing power by buying in volume, reduce our maintenance costs, and save special reconfigurations of more inexpensive machines to adjust them to our network.

I have authorized the posting of a new position in cyber security. Even in tight fiscal times, we must make strategic investments. This is one area – the integrity of our data – where we cannot compromise.

In conversation with Sid, we have spoken about the physical security of our data center and the need for constant back-up of our data. We must reduce our risk of system failure from an invasive event. We must be ever vigilant on this demand.

We need to find faculty who will be the next generation of pioneers who will truly analyze and experiment with online learning. We need to make the learning process user friendly to reduce dropout and academically challenging to compare with the rigor of a traditional classroom experience. Dr. Sue Day-Perroots has been supportive of past endeavors to improve our delivery of distance education. I will look to her to take this initiative to the next level.

I probably need not say more here but just note we must develop rigorous standards to protect our data.

Finally, as noted by the National Research Council, we need a committee that continually assesses IT trends that relate to academic directions for the future of e-learning. I have decided that WVU should establish such a committee and I have asked Dr. Sue-Day Perroots to be the first chair of this new committee.

The report of the National Research Council outlines questions for a campus-based dialogue. **[slides 17-19]**

Our committee will have interested faculty who see themselves as the next generation of early pioneers, and critical IT personnel, and others. I will look for this committee to offer advice on how to help our university change to meet the challenging times ahead.

My Vision [slide 20]

I have one last slide that I would like to use to sum up what I believe is the essential foundations of my vision. There are three points to this vision.

1. IT becomes embodied in infrastructure of institution
We need to be sure that **IT is viewed as part of the core element of this university, essential and critical to the learning, discovery and engagement missions of WVU.** Herein, we need to decide how to maintain an affordable yet safe, secure, and reliable network.

2. The PC (or its successor) becomes one of many learning tools
Yes, we need to articulate and then implement the **PC or its successor as a learning tool for our students.**

3. e-learning becomes embedded in the curriculum, providing our students with a value-added education and a commitment to life-long learning
As an academic thrust, we need **to prepare students for lifelong learning and online learning is one part of that challenge.** In time, I anticipate we will require all students to have at least one online course to graduate. This will shift the paradigm of the traditional university.

Thank you for your patience and attention.

The Future of Information Technology at West Virginia University

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for
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April 1, 2003

Mission of West Virginia University

- Teaching
- Learning
- Research
- Discovery
- Service
- Engagement

Vision Statement

West Virginia University is a student-centered learning community meeting the changing needs of West Virginia and the nation through teaching, research, service, and technology.

Environmental Scan

Overview of Some Recent IT Investments

- SB 547 – IT was protected and enhanced
- Y2K – Investment in Oracle
- MIX
- Internet2
- ITRC
- S2C
- Data Center
- State of Art Library Facilities
- WebCT

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Institutional Budget

- 2002-03 3.4% one-time reduction (~$5M)
- 2003-04 13% base reduction ($18M)
- 2004-05 further reduction anticipated

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Some Generational Characteristics

Boomers (1945-1965)	X'ers (1965-1985)	Millennials (1985-Present)
Stellar Career	Portable Career	Change Career(s)
Live to Work	Work to Live	Work is Meaningful
Goal Oriented	Balance Now	Flexibility
Look for Meaning	Freedom; Variety	Skills; Experiences
		Visual Learners
		Technology Important
		Overprotected

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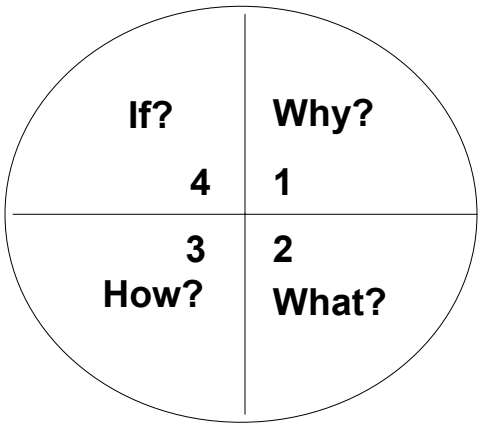
slides 6 and 7 on next page

4-MAT® Learning Styles



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1. Imaginative Learners: listen, share ideas, work to bring harmony, nurturing spirit
2. Analytic Learners: critique information, value details, integrate concepts, create models
3. Common Sense Learners: integrate theory and application, pragmatic, value experience, skills oriented
4. Dynamic Learners: learn by trial and error, relish change, take risks, bring action to ideas

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A Panel Report

Preparing For The Revolution

Information Technology and the Future of the Research University

National Research Council
of the National Academies
2002

1. The pace of IT will accelerate removing constraints of space and time.
2. The impact will be profound, rapid, discontinuous.

3. IT will change how university is organized, financed, and governed.
4. Procrastination and inaction are as dangerous as hasty responses to current trends.
5. IT will markedly change human behavior.
6. There exists a need for in-house expertise to assess trends, courses of action, and opportunities.

MUST NOT ONLY MANAGE TRANSFORMATION BUT LEAD IT

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National Trends/Initiatives

- Earn a degree via the Internet
- March/April 2003 *Educause Review*
  - Call for online teacher training
  - Sustainable models for funding IT
  - ERP systems
- March 2003 *Chief Learning Officer*

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Implications of IT for the Research University

IT is changing the relationship between people and knowledge.

- Pace of transformation in higher education is modest, especially in teaching/learning
- Yet IT should free us from physical boundaries of classroom
- Behavioral changes are the important foundation for success

We have developed an Internet-driven means of communication.

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"Can an institution such as the university, which has existed for a millennium and become an icon of our social fabric, disappear in a few decades because of technology?"

- Universities must become "learning organizations by systematically studying the learning process and reexamining their role in the digital age. . ."
- Impact of IT on learning is coming from the learners themselves
- A digital future will challenge faculty to design technology based experiences based primarily on interactive, collaborative learning
- Who owns "courseware?"
- What is the role of the "virtual university?"

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Research has been unbridled by IT.

The Library is the facilitator of information retrieval and dissemination.

Higher education must define its relationship with emerging trends of the digital age in order to adapt, grow, and continue to excel.

- Universities must become more focused on those they serve; they must transform themselves to learner centered entities
- In an age of knowledge, lifelong learning is expected

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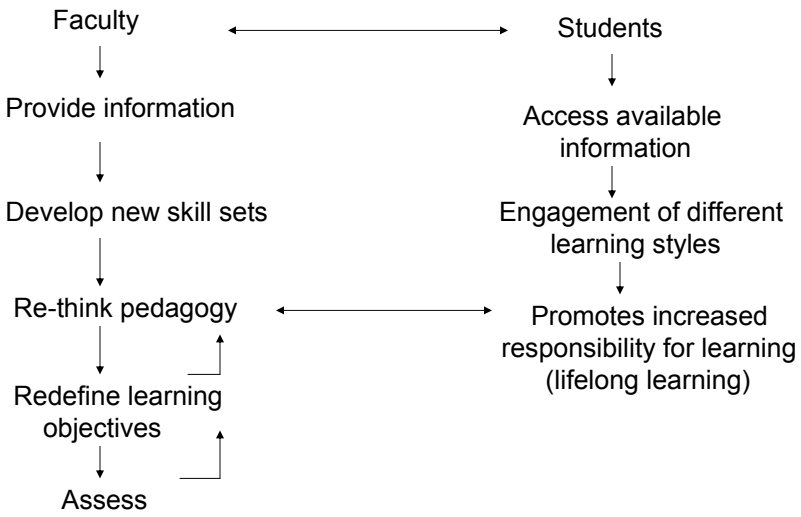
Potential Impact of e-learning



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Choosing the Future

Challenges

- Rebuilding the network
- Going wireless?
- Acceptance of e-learning
  - Enabling faculty to utilize IT
  - Movement to competency based grading
  - Expect active student learning
- Integrating IT among the 4-campuses
- Funding our aspirations

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Initiatives

- Establish basic hardware/software standards
- Post a new cyber security position
- Review hardware/data security
- Experiment with providing learning experiences
- Develop wireless standards
- Establish Committee for IT Dialogue

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Questions for campus-based dialogue

1. How will e-learning environments affect the need for traditional teacher-centered instruction?
2. How will the residential campus experience be affected?
3. What are the implications for graduate-student assistants who carry a large share of the teaching load?

4. How will information-technology advances affect the ways in which universities tackle major research problems?
5. How can the research university become more effective in the planning and management of IT infrastructure?
6. What operational and management changes are needed?

7. How can the needs of diverse campus constituencies be better anticipated and addressed?
8. What new policies—for example, on intellectual property, copyright, instructional-content ownership, and faculty contracts—does the research university need to reconsider in light of evolving IT?

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My Vision

- IT becomes embodied in infrastructure of institution
- The PC (or its successor) becomes one of many learning tools
- e-learning becomes embedded in the curriculum, providing our students with a value-added education and a commitment to life-long learning

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