Culture, Change and Innovation: IT as a Transformative Agent

Marc Hoit
Vice Chancellor for Information Technology
Board of Trustees Meeting - April 16, 2010
Overview of Today’s Discussion

• **Global context:** Why knowledge generation and creativity is critical for the future of Higher Ed.

• **IT context:** What are the important trends in IT?

• **Higher Ed and IT:** Where are we currently?

• **Transformation of IT at NC State**
  – Distributed & central, partnerships, integration to “business”
"In God we trust," she said.
"All others, bring data."

~Margaret Spellings~
US Secretary of Education
Industrial Value Added (% GDP)

From World Bank Data
High Tech Exports (% Manufactured Exports)
From World Bank Data

- Ireland
- Brazil
- Germany
- Netherlands
- India
- France
- Japan
- Denmark
- China
- US

Legend:
- Green: 1988
- Red: 1997
- Blue: 2005
Growth of the Service Sector

![Graph showing employment in goods- versus services-producing sectors in the USA (1948–2007).](image)

Source: Martin Prosperity Institute and Institute for Competitiveness & Prosperity analysis based on data from Statistics Canada.

From Roger Martin, Dean, Rotman School of Management, University of Toronto, Institute for Emerging Issues, 2010
Changing Nature of Work in US

Routine-oriented and creativity-oriented jobs
USA (1901–2006)

- Routine-physical
- Routine-service
- Creativity-oriented
- Routine-resource

Source: Martin Prosperity Institute analysis

From Roger Martin, Dean, Rotman School of Management, University of Toronto, Institute for Emerging Issues, 2010
Skills’ Impact on Earning in NC

Average employment income (US$ 000), 2008

Analytical skills

Moving from 25th to 75th percentile increases earnings by $23,000

Social intelligence skills

Moving from 25th to 75th percentile increases earnings by $31,500

Physical skills

Moving from 25th to 75th percentile reduces earnings by $13,500

Note: Exhibit 6 simplifies the relationship between the skill requirements and average earnings for the 729 occupations analyzed – it shows the best-fit regression curve only.

IP Generation by Country

From Hamish McRae, Futurist, UK – various talks
Ease of Starting New Businesses

Barriers to entrepreneurship
Scale of indicators

- Italy
- France
- Japan
- Eurozone
- Germany
- Europe
- Sweden
- Spain
- Netherlands
- US
- Ireland
- Australia
- UK

From Hamish McRae, Futurist, UK – various talks

Source: OECD, 1999 study
Investment in knowledge (% GDP)
(Expenditure on R&D, Higher Ed, Software)

From Organization for Economic Co-Operation and Development (OECD)
Communication Costs Essentially Zero

The falling costs of transport and communications

Index (initial cost=100)

Sources: World Development Report / market estimates

From Hamish McRae, Futurist, UK – various talks
Work Where the Value Is

Stan Shih, Founder of Acer, Taiwan, 1992
Summary of Global Trends

• “World is Flat” – actually, “Spiky”
  – WWW/Internet, Mobile Devices, Crowd Sourcing, SOA, Off-shoring
• Communication cost are virtually zero
• Competition for technologically educated work force growing
  – Must be creative workforce to be leaders
• New economy
  – Creative thinking with technical skills
  – IP generation, business start-up & knowledge services
Global Trends in IT

• “IT Doesn’t Matter”
  – Much of information technology has become a commodity
  – Many companies outsource their IT (including payroll, HR, billing, networking, storage, .....
  – Access to inexpensive IT is not a strategic advantage

• Differentiator: Integration of IT and business model with focus on innovation & creativity
The Horizon Report 2008
The New Media Consortium and the EDUCAUSE Learning Initiative

• Grassroots Video
  – Virtually anyone can capture, edit, and share video clips.

• Collaboration Webs
  – Collaboration no longer calls for expensive equipment

• Mobile Broadband
  – Each year more than a billion new mobile devices are manufactured.

• Data Mashups
  – Multiple sources of data merged together provide new insight

• Collective Intelligence
  – Hive, crowd sourcing, open source,…

• Social Operating Systems
  – Organize around people not content
Increased Information Access & Malleability

• All the time access to all your services
  – Mobile phone access is just the beginning
• Easy to use technology (no users manual)
• Analytics rule – predictive modeling
  – Amazon “people who have ... also considered...”
• Shared Data
  – Interlinked/connected – Web services, Mash-ups, cloud
• Identity Management
  – Know who you are, trust it is you and what you are allowed to access
• Outsourced components as appropriate
  – Industry leads, Higher Ed embracing now – (SaaS, Google apps, MS Live, Facebook for collaboration)
• Trusted and Verified Information Editing
"Our Age of Anxiety is, in great part, the result of trying to do today's jobs with yesterday's tools."

~Marshall McLuhan~
What does it mean for Higher Ed?

• Increased electronic platform delivery (growth, on-campus, flexibility)
• Shift to flexible advanced degrees – various providers
• Educate for the “Smile” (whole brain)
  – Creativity as fundamental education
  – Entrepreneurs – Need to foster cognitive diversity
  – Develop champions in science (biology, nano, physics)
  – Creation of new intellectual property (innovation)
• IT as an accelerator for research
  – Increase need for collaboration
  – High performance computing in all fields
• Increased expectations for service delivery
Bloom’s Digital Taxonomy – Premium on Higher Order Skills

Bloom’s Taxonomy

Knowledge
Comprehension
Application
Analysis
Synthesis
Evaluation

Higher Order Thinking Skills

Lower Order Thinking Skills

Bloom’s Digital Taxonomy

Remembering
Understanding
Applying
Analysing
Evaluating
Creating

Higher Order Thinking Skills

Lower Order Thinking Skills

From: Andrew Churches (http://edorigami.wikispaces.com/file/view/bloom%27s+Digital+taxonomy+v2.12.pdf)
What is the Campus IT Organization’s Role?

- Partner in the full university enterprise (not just provider of commodity infrastructure)
- Collaborate on strategies, services and solutions that allow people and teams to meet their strategic goals
- Be nimble, effective and efficient at providing services that meet campus needs
- Be a source of sought after knowledge on IT (from infrastructure to strategic)
- Be a national and state leader in IT as a representative of the University and its mission and goals

Some example Partnerships:
NCB-Prepared

• Connecting multiple databases through VCL using analytics for prediction and monitoring
Social Networking for Research

- GA grant $580K Phase I (UNC & NC State)
- NC State, Renci & Sandia submitted NSF grant – VO-Transform
Social Networking & Collaborative IT Efforts

• IT groups across campus working together
• Twitter, Mobile Web, Apple Developers
NC State IT Structure & Culture

• Central IT supports enterprise activities which by nature are less nimble
  – Larger scope, bigger stakeholder group, more complex requirements
  – Can reach scale and optimize costs university wide
• College IT support local needs
  – Generally more flexible and nimble
• Need a balance between decentralized and centralized
  – Research and innovation require nimble actions and support
  – Large, diverse organizations need efficiency and collaboration
  – Growth, change and innovation generally happen at decentralized location
  – Scale and sharing are more efficient
NC State IT Transformation Plan

• Create a Strategic Operations Plan (Dec 08)
  – Focus on service, quality, reliability and meeting customer needs
  – Implementation over the following 18 months
• Develop an IT Governance structure (in process)
  – Framework that defines the input and decision process for IT
  – Build on existing committees and structures
  – Complete by Fall 2010
• Develop a strategic IT plan for campus (future)
  – Integrate IT into the fabric of the university
  – Campus wide process and participation
OIT Vision Statement
Be the IT organization people seek out as a partner for providing visionary strategies, creative solutions, objective information, and effective and efficient services in order to help them achieve their mission and goals.

OIT Mission Statement
To provide nimble, effective, efficient and collaborative IT services, solutions and strategies in a timely and helpful manner that assists the university, state and nation in achieving their strategic goals.
Five Operational Goals

• Collaborative Engagement
  • Partner, Listen and support

• Proactive Customer Service & Solutions
  • Provide timely and helpful service

• Reliable Systems & Security
  • Dependable, secure systems people trust

• Innovation, Agility and Alignment
  • Forward leaning, flexible and meet customer needs

• Pervasive Transparency
  • Share, inform and communicate
OIT Operational Goals in Action

• Every “project” has a web site: meetings, documents, status
• OIT budget online
## Portfolio Management – 35 Major IT Projects

<table>
<thead>
<tr>
<th>Selection Criteria</th>
<th>Project Scope</th>
<th>Alignment with OIT’s Strategic Operating Goals &amp; Vision/Mission</th>
<th>Campus Impact</th>
<th>Return On Investment</th>
<th>Alignment with University Core Functions and Mission</th>
<th>Urgency</th>
<th>External Forces/Mandates</th>
<th>Leadership Value/Importance to Campus and Time Sensitivity</th>
<th>Total Score</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Student Email to Google Apps</strong></td>
<td>Transition students over to Google Apps, and bring up the Postini Service; includes portion of archiving project and development of support tools</td>
<td>8.0</td>
<td>9.0</td>
<td>6.5</td>
<td>8.0</td>
<td>8.0</td>
<td>8.9</td>
<td>10.0</td>
<td>198.5</td>
</tr>
<tr>
<td><strong>Email Archive Improvements</strong></td>
<td>Set up and functional a true Tier 3 level of service for legal compliance (includes migration, user testing, training and documentation)</td>
<td>7.0</td>
<td>7.0</td>
<td>6.5</td>
<td>7.5</td>
<td>8.5</td>
<td>8.9</td>
<td>10.0</td>
<td>191.5</td>
</tr>
<tr>
<td><strong>Storage Service Project</strong></td>
<td>Unified storage on new unified hardware with file system support</td>
<td>8.0</td>
<td>9.0</td>
<td>8.0</td>
<td>5.0</td>
<td>8.0</td>
<td>7.7</td>
<td>10.0</td>
<td>189.5</td>
</tr>
<tr>
<td><strong>WolfWise/GroupWise version 8.x Implementation</strong></td>
<td>Take the current customer base to GroupWise 8</td>
<td>7.5</td>
<td>7.0</td>
<td>6.5</td>
<td>6.0</td>
<td>8.0</td>
<td>8.5</td>
<td>10.0</td>
<td>185.5</td>
</tr>
<tr>
<td><strong>Audit Significant Progress Tasks</strong></td>
<td>Compliance with the state and internal audits findings. Includes ERP compliance plan.</td>
<td>6.0</td>
<td>4.5</td>
<td>7.0</td>
<td>7.5</td>
<td>8.5</td>
<td>8.4</td>
<td>10.0</td>
<td>180.5</td>
</tr>
<tr>
<td><strong>Advance to Web</strong></td>
<td>Move Advancement Services’ system from client-server to web environment; decommission client server hardware</td>
<td>6.0</td>
<td>7.5</td>
<td>7.0</td>
<td>8.0</td>
<td>6.0</td>
<td>8.3</td>
<td>10.0</td>
<td>180.0</td>
</tr>
<tr>
<td><strong>Sybase to Oracle Migration</strong></td>
<td>Migrate applications and data from Sybase servers to Oracle; shut down Sybase servers</td>
<td>8.0</td>
<td>8.0</td>
<td>7.0</td>
<td>5.5</td>
<td>9.0</td>
<td>5.4</td>
<td>10.0</td>
<td>178.0</td>
</tr>
<tr>
<td><strong>IAM Services</strong></td>
<td>Create IAM (Identity and Access Management) project roadmap. Investigate, recommend &amp; implement solutions for computing account management &amp; authentication (prov/deprov, affiliations, services, guest accounts, password strength/ resets/initial/multi-factor auth, SSO), federated identities, and enterprise directory services.</td>
<td>8.5</td>
<td>8.0</td>
<td>6.0</td>
<td>6.5</td>
<td>6.5</td>
<td>8.0</td>
<td>9.0</td>
<td>177.0</td>
</tr>
<tr>
<td><strong>Lab Seat Reduction/Student Owned Computing</strong></td>
<td>Increase support for student owned computing and move away from university-supported computer seats</td>
<td>6.5</td>
<td>8.0</td>
<td>6.5</td>
<td>8.0</td>
<td>6.5</td>
<td>7.7</td>
<td>9.0</td>
<td>175.5</td>
</tr>
</tbody>
</table>
University Data Mart

- Business Intelligence tools to provide decision-support information for NC State
- Integrate data across university systems to provide unified view
- Pilot project for spring – use Advancement data and Admissions data
UNC-CH & NC-State Partnership

- Combined development & operation of HR & Finance (PeopleSoft)
- Shared service structure reducing duplication
Combined PC Pricing for UNC System

- 7 standard configurations across UNC system
- Selected number of “preferred” vendors
- Required 80% of appropriated PC expenditures
- Exemption process for non-standard configurations
- Netbook, tablets and all-in-one will be added
Welcome to Google Apps @ NC State!

The Office of Information Technology (OIT) is happy to announce that Google Apps @ NC State for students will soon be in beta! More information about this beta offering can be found in the FAQs. The transition to Gmail will not change student e-mail addresses. It will continue to be UnityID@ncsu.edu, which will also continue to be the e-mail address used by the university for official e-mail communication with students.

Students, Request an invitation to begin beta testing this exciting service when it becomes available later in the spring semester. Want to wait for the real thing? Your account will be created this summer!

The detailed announcement is in the press release. More information about Google Apps @ NC State in general is available on our At-a-Glance! Google Apps @ NC State page.

**Gmail**

Gmail is a free, search-based webmail service that combines the best features of traditional email with Google’s search technology. Besides offering an entirely new way of reading and tracking messages, Gmail includes over 7 GB of storage space. Learn more...

**Google Calendar**

Google Calendar is a scheduler that lets your family and friends see your calendar, and view schedules that others have shared with you. With reminders, invitations, RSVP's, and mobile access, you have access to your schedule on the go. There’s even an offline access option. Learn more...

**Google Docs**

Google Docs is a word processor, spreadsheet and presentation editor that enables you to create, store and share instantly and securely, and collaborate online in real time. All your work is stored safely online and can be accessed from any computer. Learn more...

**Google Talk**

Google Talk, also called Google Chat, is an instant messenger built into Gmail, so you can easily switch between emailing and instant messaging with your contacts. Video chat, voice chat, invisible mode, and group chat enhance your instant messaging experience. Learn more...

**Google Sites**

Google Sites is a website developer that makes creating a website as easy as editing a document. You can quickly gather a variety of information in one place—including videos, calendars, presentations, attachments, and text—and easily share it for viewing or editing with a small group, an entire organization, or the world. Learn more...
Identity and Access Management

• Secure and validated identity
• Access based on policy
• Across systems, universities and countries (In-common)
Major Foundational Projects (cont)

– Centralized Storage Project
  • Expand & enhance the centralized data storage & backup services OIT offers NCSU

– Imaging & Reduced Printing
  • Expand use of scanning, workflow and print less (50% reduction)

– NextGen Email system
  • Gmail (1st choice) and Exchange (if Gmail not sufficient) – either can be retained (eDiscovery)

– Remove ½ computer lab seats campus wide – modify to “collaborative space”
  • Expect student to use Laptops – improve service for student owned computing, use VCL & Google apps (cloud)

– Web hosting
  • Offer hosting services competitive to industry - move to content management

– Desktop management and virtualization
  • Support services about to announce a new support structure: fee for computer & support, executive support, etc
Next Steps: IT Governance

- Weill & Ross Model (MIT Sloan School)
- Clear input and decision structure
- Different solutions for different domains

<table>
<thead>
<tr>
<th>Proposed “Straw Poll” Governance Structure</th>
</tr>
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<tbody>
<tr>
<td>IT Principles</td>
</tr>
<tr>
<td>Input</td>
</tr>
<tr>
<td>-------</td>
</tr>
<tr>
<td>Business Monarchy</td>
</tr>
<tr>
<td>IT Monarchy</td>
</tr>
<tr>
<td>Feudal</td>
</tr>
<tr>
<td>Federal</td>
</tr>
<tr>
<td>Duopoly</td>
</tr>
<tr>
<td>Anarchy</td>
</tr>
</tbody>
</table>
Final Thoughts

• Creative thinking balanced with technical savvy is the high value future.

• Partnerships, partnerships, partnerships

• Higher Ed must adapt to the new global competition.

• Leading the integration of technology into education, research, service is fundamental for the future.
“Imagination is more important than knowledge.”

~Albert Einstein~