

The University of North Carolina Board of Governors



Long-Range Plan 2004 - 2009

Information Technology for Student Learning, Research, and Administrative Efficiency



THE UNIVERSITY
of NORTH CAROLINA
at CHAPEL HILL



NORTH CAROLINA
SCHOOL OF THE ARTS



THE UNIVERSITY OF NORTH CAROLINA
GREENSBORO

Appalachian
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IX. Information Technology for Student Learning, Research, and Administrative Efficiency

Information technology planning, both short-term and strategic, at UNC has been an ongoing process for the past several years. It is essentially a process of matching an institution's internal strengths and weaknesses to its external opportunities and constraints in the context of its mission, goals, values, beliefs, and traditions. The outcomes of the process are decisions about the institution's future. This view of planning emphasizes the trade-offs in which decision-makers are constantly engaged within the context of overall institutional planning. There is a growing synergy among UNC campuses, and among the many departments within each UNC institution, that deals with the creation, maintenance, and dissemination of information through digital technologies. This is occurring in such areas as administrative computing, academic computing, instructional media, library services, and telecommunications.

Increasingly, UNC campuses need the ability to facilitate access to information with little concern as to whether it is academic or administrative in nature. This is a broad view of the function of electronic resources on campus, encompassing the technology (or conduit), the information content, and the services that link both of these elements with users at all levels through help desks, applications development, training, and a host of other functions. From this perspective, information technology resources include everything from the growing global digital library of networked information, accessed by many faculty, staff, and students from their desktops, to administrative databases and the content of campus-wide information systems.

Two key underpinnings of the UNC IT Strategy are:

1. Information is a key strategic asset of the institution in a far broader sense than data processing, or academic/administrative computing, or administrative information systems, and must be planned for and managed accordingly, and
2. IT strategy and priorities must be well-aligned with the institutional strategy and priorities.

The UNC IT strategy spans the following five areas:

- ◆ Services for students (web-enabled services, integrated services)
- ◆ Teaching and learning with technology (campus activities, collaborative initiatives, leadership activities)
- ◆ Distance and Online Learning (eLearning)
- ◆ Administrative/decision-support systems
- ◆ Logistical needs (network maintenance, user support, and collaborative procurement)

Ubiquitous, pervasive, and embedded computing is increasing and will be the dominant paradigm in information technology. The challenge is to provide ready broadband access anytime and anywhere. The next generation Internet will be fast, ubiquitous, intelligent, reliable, trusted, scalable, easy, natural, always on, and seamlessly integrated to allow for collaboration. Technologies such as the *Evernet* (convergence of wireless, broadband, and Internet telephony that will result in the ability to be continuously connected to the Web anywhere using virtually any device) and voice over IP (VoIP), a set of facilities for managing the delivery of voice information, will strengthen delivery systems. The *Semantic Web* (the vision of having data on the web defined and linked in a way that can be meaningfully used by machines—not just for display purposes, but for using it in various applications) will soon unleash many new possibilities.

Learners today are much more “visual” and “experiential.” Therefore, to be successful, one must adapt and adopt newer techniques and technologies. New course designs, especially in the eLearning arena, must focus on providing individual learners with the tools, resources, and

tactics for achieving their specific learning outcomes. Although Peer-to-Peer (P2P) technologies are often talked about in the context of music downloads, they have opened an important door for peer-based content delivery for such uses as collaboration, training, and communications. The implications of wireless broadband (Wi-Fi) and personal digital assistants (PDAs) on pedagogy in higher education should be integrated into initiatives across many curriculum areas.

Information technology has a crucial role to play in assuring North Carolina's economic and educational competitiveness. To meet the demands of economic competition in the information economy, North Carolina requires a well-educated, well-trained workforce and a university system that has the resources to lead the state in the use of information and communication technologies.

Despite the collapse of the "internet technology bubble" in the recent past, employment in information technology industries is expected to grow over the next several years. Such industries will not locate in regions where the local workforce is inadequately prepared, in terms of either general educational level or specific technological skills. Not only is there regional disparity in North Carolina's participation in the information economy, but a "digital divide" also exists along racial, ethnic, and income lines. If all citizens of the state are to participate in and benefit from the knowledge economy, the University must be committed to helping to close this divide.

To address North Carolina's educational and economic needs, the University must offer campus-based and distance degree and certification programs that produce the teachers, business leaders, scientists, engineers, health care professionals, and others who are necessary to support economic development of a region. In addition to offering a variety of educational opportunities that address needs throughout the state, the University must partner with the North Carolina Community College System and the public schools in applying information technology to satisfactorily address the needs of the state.

Advances in information technology must be employed to enable the university to accomplish this goal effectively and efficiently. A first requirement for supporting North Carolina in this manner is to ensure that UNC institutions are providing their students and faculty with the appropriate information technology resources needed to prepare them for this leadership. Acquisition and deployment of these resources requires not only significant financial investment by the state but also careful attention to numerous organizational and administrative issues that arise. The parameters for competing in the educational sector are changing due to the impacts of various technologies. New and existing technologies have the power to transform learning from a *passive* process to one that is *interactive, participatory, and exploratory*.

Due to the impact of technology and globalization, education in the 21st century will change significantly in terms of delivery systems, teaching and learning methodologies, and the nature and number of educational providers. Examples include change from a faculty-centered to a learner-centered environment, greater reliance on interactive and collaborative learning, and greater focus on learning outcomes and competencies, and delivery of education "anytime, anywhere." Furthermore, higher education, especially public higher education, will be subject to changing and heightened expectations both from the state (e.g., economic development, solution of societal and environmental problems) and from the public (e.g., a more "service, client-centered" orientation coupled with broad access to quality, affordable, and convenient education).

Information literacy gained through the ability to use various technologies will be an underlying principle of quality education for the future. UNC must make computing and telecommunications services ubiquitous, transparent, and accessible for everyone in the community. The University must use modern information and communication technologies

effectively as well as provide valued information technology products and services efficiently. During periods of constrained resources, the University of North Carolina must evaluate, engineer/re-engineer, and optimize various processes to achieve the needed efficiency gains and free up and redirect resources for new key initiatives. This planning effort must share the unique competencies of faculty and other resources with collaborating community colleges, universities, and industry that will result in the development of innovative programs that are beyond the capacity of any one institution.

Advanced and emerging technologies will change the way classroom instruction and library services are delivered and will have a major impact on research. These will require expanding development programs for faculty, staff, and students that, in turn, will increase the demand for resources. Services for our students, faculty, and staff need to become “outward-facing” with “self-service” capabilities. This is in contrast to the current “inward-facing” services where considerable human intervention is required to complete routine and mundane tasks. Not meeting these service needs of the constituents effectively is not a viable option in the world where there are many choices and options available.

University activities in eLearning will dramatically increase and could substantially affect on-campus enrollments and lead to cooperative programs with schools (K-12). The effective use of various technologies promises to transform teaching & learning. This promise is in various stages of realization on UNC campuses.

Technologies such as streaming audio and video, virtual learning environments and tele-operated experiments (digital video courses and labs) are entering the web-based learning arena. Along with new learning management systems (LMS) and online course infrastructures, it will be necessary to reinvent educational pedagogy to take advantage of the opportunities these new methods provide. The ubiquitous availability, scalability, and inter-operability of technologies make eLearning a viable alternative for all campuses.

Knowledge management focuses on the accessibility and reusability of an organization’s intellectual assets and its core competencies. Organizations need to provide personalized solutions for the knowledge needs of individuals without requiring everyone in the organization to master the same body of information. Just in time and just enough delivery of knowledge resources reduces the required inventory that an individual must hold in store. Universal access to content—whether represented as objects, links or frames—literally destroys context. Therefore, the use of trusted intermediaries is needed. Precision distribution provides individuals with content objects and context for interpretation (SCORM, AICC, IMS, and W3C standards).

Learning architecture and learning object standards are being developed to ensure the interoperability of learning management systems and settings. Learning objects offer access to content at a granular level that typically maps to a single learning objective. Learning objects (also known as content objects, knowledge objects, reusable information objects, and reusable learning objects) are stand-alone pieces of information that can be reused in different contexts, depending on the needs of the individual user.

Based on an EDUCAUSE survey, researchers found that, in spite of the fact that only two UNC institutions *require* all students to have personal computers, most UNC institutions have a large percentage of students who use their own computers for academic work. Another key finding shows that, while two UNC institutions offer 24 x 7 public help desk operations, several institutions continue to provide less than 57 hours per week help desk availability. This is directly correlated with the lack of availability of adequate funding. The survey also showed that while most UNC institutions had some percentage of classrooms with wireless access, UNC as a whole is trailing behind the members of the comparison group. However, UNC institutions continue to make consistent progress in this area. Finally, in the area of enterprise resource planning (ERP) systems, UNC institutions were at some stage of

implementation. Of the sixteen, fourteen are currently at some stage of implementing the SCT Banner suite of application, one has fully implemented PeopleSoft, and one has taken a “best-of-breed” approach, purchasing and customizing software or writing software “in-house.”

In order to remain the nation’s premiere public research institution, UNC must continue and enhance its research capabilities. After Internet2, in which UNC is playing a key leadership role, Grid Computing has the potential to become the next wave in high-performance computing. Internet2 is a consortium being led by 205 universities working in partnership with industry and government to develop and deploy advanced network applications and technologies, accelerating the creation of tomorrow’s Internet. Internet2 is recreating the partnership among academia, industry and government that fostered today’s Internet in its infancy. The primary goals of Internet2 are to

1. Create a leading edge network capability for the national research community,
2. Enable revolutionary Internet applications, and
3. Ensure the rapid transfer of new network services and applications to the broader Internet community.

A Grid is a network of computational research centers whose supercomputer clusters, databases, and specialized programs form a pool of resources that is more powerful and more versatile than that of any single research center, or node, on the network. It may very well change the way scientists and, eventually, all of us interact with computers. By establishing the statewide North Carolina BioGrid in 2001 as a test bed for Grid technology in the biotechnology industries, North Carolina has become the first state to build its own terascale computing grid for life-science research. North Carolina’s MCNC offers a variety of technology services, including computing resources, data storage and networking infrastructure. Beyond the benefits to the university system, Grid computing will provide services to the private sector and become a catalyst for statewide economic development. Supporting this Grid initiative is the North Carolina Research and Education Network (NCREN), which is one of the country’s most advanced communications networks providing statewide research and education services. High-speed interconnections provide services to more than 180 North Carolina universities and public institutions, including all of the UNC system campuses, Duke, and Wake Forest. These services include access to national research networks, advanced video and distance learning services, and Internet access.