UNIVERSITY OF
FLORIDA

Report of the IT Review Committee

Submitted to the Provost on March 8, 2001

University of Florida

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I   Executive Summary

The University of Florida's ability to carry out the academic mission of teaching, research, and service depends on the effective use of information technologies (IT). IT is essential to provide best possible support for students, faculty, staff and external constituents. Information technologies influence every aspect of the University, creating opportunities that lead to improved efficiency and performance of the enterprise. However, changes brought about by IT sometimes create new barriers that slow our progress. To date, UF has benefited from being an early adopter of IT, and in some respects it has set the pace for other institutions to follow. Nevertheless, many potential benefits from the application of IT are still to be realized. The recommendations in this report are intended to direct the University to achieve higher goals for IT in support of the academic mission.

This report of the Information Technology Review Committee is the result of: 1) an extensive internal review of the University's current IT environment, organization and resources, 2) a comparative analysis of other leading universities and 3) a collaborative vision and planning process. The committee identified eight major issues facing the University's IT environment and made recommendations to address each of them. The list of issues includes:

- Leadership and Organization

- Networking

- Research Computing

- Instructional Computing

- Institutional Data and Systems

- Planning

- IT Staff Hiring, Development and Retention

- Training

The IT Review Committee proposes solutions through a set of recommendations that will meet the University's short term needs while positioning it well for the long term. Whether addressing an instructional, administrative, research or personnel issue, each recommendation represents the committee's view of the best course of action for the University. A transition period from three to five years may be necessary to reach a satisfactory level of service and to implement some of the recommendations in this report. However, most of the recommended changes will make an immediate impact on the IT environment at UF, if for no other reason than to set the course for a reorganization and a long term plan.

The most important issue identified by the committee is that UF technology efforts in many areas are uncoordinated and inefficient because of the lack of clear leadership and authority to bring the University's 'bigger picture' into focus. The University can gain a tremendous organizational advantage by recruiting and empowering a leader who: 1) takes into account university culture, needs and barriers, 2) can help bring about

consensus regarding technology issues and 3) has the authority to make decisions regarding campus-wide technology concerns. The committee's recommendations include:

- Establish a Position and Appoint a Vice Provost for Information Technology (p. 29)

- Develop an Information Technology Planning Process (p. 30)

- Consolidate Network Infrastructure (p. 30)

- Develop Data Infrastructure (p. 33)

- Create a New IT Organization from Existing Academic Technology Service Providers (p. 34)

- Create an Information Technology Advisory Structure (p. 35)

- Create an Environment to Support IT Staff Hiring, Development and Retention (p. 38)

- Develop an Effective Budget and Funding Model for IT Services (p. 39)

Implementation of these recommendations will help position the University of Florida to capitalize on technology opportunities in this new century.

II   Purpose and Scope

The IT environment at the University of Florida, as at many other universities around the country, developed in ways unique to the institution's structure and culture. In some areas, UF has excelled and is justly recognized as a leader in creating and deploying IT solutions. In other areas, the University has struggled just to stay abreast of new technologies. Not surprisingly, the extent to which a unit now approaches the higher end of this range depends both on need and resources (human and financial).

The fact that UF has steadily moved up the ranks of America's best public institutions is no doubt partly attributable to successful incorporation of information technology in all areas of work. Credit for these successes goes to a very large number of people who have contributed individually and collectively for more than two decades. To this group, many of whom are still at UF, the University owes a substantial debt.

Individual staff in particular units creatively built the solutions they needed. Those solutions were sometimes built in isolation and for specific purposes and lacked coordination. While each of the three previous IT reviews produced discernable benefits, UF has not fully addressed the fundamental problem of campus-wide coordination and leadership. Although UF has progressed at an enviable rate to date, concern that it could not continue without a more unified approach to IT prompted Provost Colburn to impanel and charge the IT Review Committee on March 8, 2000.

Committee Charge

"Provide an analysis of the current information and technology environment at UF and recommendations on how IT services, support and budgets should be organized (consistent with the University's aspiration to join the country's top 10 public institutions in teaching, research and service)."

Committee Members

Committee members, singly and collectively reflect substantial expertise in a number of relevant areas and they constitute a broad cross section of the University's IT interests.

- Dr. Charles Frazier, Vice Provost for Academic Affairs (committee chair)
- Dr. Paul Avery, Professor of Physics
- Dr. Michael Conlon, Assistant Vice President for Health Affairs
- Donna Johnson, Director of IT, Warrington College of Business
- Dr. Eleanore Kantowski, Professor of Education & Graduate Coordinator
- Ed Poppell, Interim Vice President for Administrative Affairs
- Dr. Gerhard Ritter, Professor and Chair of Computer & Information Sciences

- Dr. John Sabin, Professor of Physics and Director of IT, College of Liberal Arts and Sciences
- Victor Yellen, Assistant Provost
- Fedro Zazueta, Director of IFAS Information Technology Office

Meeting Schedule and Review Methods

Beyond the representation reflected in the membership, the committee endeavored to learn about all segments of the University of Florida IT community. To that end, members first examined three major previous reviews done at UF between 1991 and the present. The committee considered, cross-referenced and evaluated the current status of each recommendation made in those reports. A summary spreadsheet of the analyses and the full text of the original reports may be found online at: http://www.aa.ufl.edu/itr, under the heading "Prior Information Technology Reports".

Second, the committee invited key UF IT leaders to present their programs and to share their views about UF IT with the committee. Each session was followed by an invitation for the presenter to write a summary report of their comments focusing on perceptions of strengths of and barriers to UF IT operations. A summary of those presentations and write-ups is presented in Section III. The committee also solicited information more broadly from the University of Florida community. College Deans and the heads of major academic support units were asked to present a review of their IT operations and to note any issues of concern. Those reports are also summarized in Section III and reported in full at: http://www.aa.ufl.edu/itr/pdf/UnitSummaries.pdf. Third, the committee reviewed data regarding IT expenditures, staff positions, salary and inventory. This included a review of previous IRM reports as well as focused analyses of relevant institutional data.

Fourth, the committee inquired about and considered the ways other major universities organize IT functions. The committee members reviewed web sites, talked to acquaintances, CIOs, Vice Presidents for Academic Affairs/Provosts, Vice Presidents for Administrative Affairs and other key figures at several major public institutions. A brief summary of universities examined, the persons contacted and the general conclusions drawn from those reviews is presented in Section IV of this report.   The web sites for many of the university IT operations reviewed are also listed (See p. 19 in Section IV).

Finally, committee members were themselves actively connected to many IT groups around campus and they sought input from all levels of the IT staff and user community. One such group, the Cooperative Computing Initiative (CCI), held a one-day retreat and submitted a very thoughtful outline of key issues and recommendations.   This CCI report can be found at: http://www.aa.ufl.edu/itr/cci.html. The last few months of the review have been dedicated to a thorough committee review of the IT environment at UF, to collecting and reanalyzing data, developing a list of major issues, and to reaching consensus on final recommendations. This report reflects that consensus.

III   Current State of Information Technology at UF

This section of the report is the result of the committee's effort to assess the current situation of hardware, software and human resources that are focused on IT at the University of Florida.   It represents a summary of input to the committee as well as a review of other reports and institutional data.

Instructional Computing

Instructional computing varies greatly among and within individual colleges and departments, depending on the internal needs and resources of different disciplines. For example, instructional computing in the Department of Computer and Information Science and Engineering requires a wide variety of operating systems (Solaris, Linux, Irix, Unix, NT, and AIX versions) and workstations for the many different subject areas being taught. On the other hand, the Warrington College of Business requires primarily PC based notebooks running Windows for its instructional needs.

Demands for instructional computing resources result from a variety of sources:

1. The current UF student computer policy requires that all students have access to a computer. The University expects students entering the University to acquire or have access to computer hardware and software appropriate to their degree programs. UF's goal is for every student to develop competency in the basic use of a computer.

2. The increasing number of courses requiring the use of computers and the increasing number of students that are required to take computer science service courses place a growing demand on computing resources.

3. There is a steady increase in the incorporation of IT into teaching in the form of web-based courses, email, listservs, and chat groups. More faculty members are adopting these technologies and some colleges are offering web-based courses and degrees.

4. Emerging new technologies (e.g. wireless networking) that have a direct impact on instructional environments are important and should be tracked and coordinated.

Available Resources

Available instructional IT resources are centralized (OIR/CIRCA) or distributed (e.g. departmental computer laboratories). Distributed resources are heterogeneous. Academic units may provide hardware, software and support that range from minimal to well-funded student and teaching laboratories. Examples of well-organized laboratories include the IBM Creative Writing Laboratory, the Harris Corporation Communication and Networking Teaching Laboratories, and the Gartner Group Teaching Laboratories.

Many academic units rely considerably on the support services offered by OIR/CIRCA. CIRCA's role in supporting faculty and students plays a vital role in academic computing. OIR/CIRCA provides critical services that include:

1. Teaching laboratories (Windows, MacIntosh, and Unix computers).

2. Site and educational software license management (Soda Shoppe), including software licenses for use by students and faculty such as, office suites, web browsers, networking utilities, etc.

3. Support and facilities (computing, multimedia, WebCT) for course development by faculty.

4. Formal short courses in the use of a wide range of information technologies applied to teaching.

5. Multimedia and networking support in many classrooms.

As many activities (e.g. creation and maintenance of web pages) are highly labor intensive and require various degrees of computer literacy, many faculty feel overwhelmed and frustrated. Appropriate training in support is needed to assist such faculty. This notwithstanding, some groups of faculty have been successful in creating web-based courses and degrees and the trend of offering course content on the web is expected to continue.

Networking

User Base

Users of the UF network are diverse. They range from groups that maintain large databases with a need to access and manipulate data with speed and accuracy to those whose primary need for networking is access to the commodity Internet for web browsing and email. Available bandwidth ranges from 10Mb/sec to 1Gb/sec.

Usage patterns can also change dramatically and rapidly. Large bandwidth requirements are expected in the medical, administrative, and basic scientific areas that are used for real time connections between separated users. However, demands for bandwidth are now being made from sources such as the humanities and arts, for image manipulation and transmission. Also, new technologies used in on-campus distance education require large bandwidth capacity (e.g. Real Video Courses). In addition, demands steadily grow from the traditional users, as databases grow and numbers of users accessing those databases increase.

Infrastructure

The physical network on the UF campus is excellent. The infrastructure is in place and undergoes continual upgrading. The UF campus is presently connected to the Internet by two 45Mbps full duplex data circuits via Bellsouth.net (UUNet) and GRUCom (Sprint/Qwest). The Internet connection will be upgraded to 150Mbps no later than August. GRUCom (Sprint) and Qwest will provide the University diverse connectivity to the Internet at that time.

At the present time UF obtains Internet2 (Abilene) connectivity via a direct OC3 (155Mbps) full duplex data circuit from Gainesville to the North Florida aggregation point hosted at FSU. The University's Internet2 connection will move from Tallahassee to a renewed FloridaNet GigaPoP located at UF no later than August. The GigaPoP will connect to Internet2 (Abilene) via a direct OC12 (622 Mbps) link to new Qwest facilities being constructed in Gainesville.

The GigaPop will have sufficient bandwidth to Internet2 that will enable UF to offer additional institutions connectivity to the Internet2 network. As of this writing, UF has offered Internet2 connectivity to USF, FSU, FAMU, FIRN (K12/Community Colleges) and UCF.   There are plans to upgrade the Internet2 connection to OC48 when needed. The GigaPoP design provides for future connections to UNF and UWF when those institutions wish to join the Internet2 project.

Pending implementation of several NSF funded projects underway and the needs of those who join the FloridaNet GigaPoP, it is expected that an upgrade of the Internet2 connection to OC48 (2.4Gbps) will be required within eighteen months.

A campus core provides Gigabit Ethernet (GigE) service from points of presence (POPs) located throughout campus. Individual units are then connected by fast Ethernet links (100 Mb) to routers. Individual desktop machines are typically connected to the unit switches at 10 MB or 100Mb. At locations where need has been demonstrated (e.g. the Brain Institute, the Physics Department), GigE links are in place or imminent.

Several large units operate quasi-independent networks that are connected to the core routers, and in some cases units operate wide area networks (WAN).   The characteristics of these networks are determined by their individual administrations in conformity with University policy.

Projects for installing wireless networks with campus wide implications are underway, as well as some that are intended to address specific problems in specific units. Currently, there is no policy for their deployment.

Other networking issues that will impact the network include video distribution and telephony (voice over IP). The campus backbone network is capable of supporting both IP telephony and video. However, there are a few departmental networks that are now capable of delivering Internet2 grade services.

UF also provides remote access services and is involved in a partnership with Cox Communications to deliver broadband connectivity to locations throughout Gainesville. In addition, UF Network Services delivers dialup modem and ISDN ports to support Gatorlink and other dialup access.

Administration

There is no fully empowered central IT authority on campus. Various groups administer the network infrastructure, each with its own scope of responsibility and authority. These groups cooperate and communicate among themselves at an operational level. The participants resolve conflicts and disputes themselves, or if that is impossible, they appeal to the Provost's office.

The campus Internet POP, the Internet2 presence, and the campus core network are administered by Network Services (NS), which reports to the campus Director of Information Technology, who presently is also Director of the Northeast Regional Data Center (NERDC). The NERDC Director reports to the Provost. In addition, NS manages the subnet allocation for campus and monitors network security. For those units that operate their own networks, NS operates the network up to the building POP. Variations occur when the building in question contains either multiple units and/or registrar controlled classrooms. In the latter case CIRCA, which has responsibility for classroom networking, administers the classroom POP jointly with Network Services.

Smaller units that do not have network staff have the network administered to the desktop by Network Services. For units with network management capability, the network from the workstation to the building POP is managed and maintained by them.

Administrative Computing

Currently the administrative computing function is configured into a distributed model, with each unit reporting to and evaluated by the owner of the data. There are four organizations that have university-wide missions: Information Systems, Office of the University Registrar, Institutional Research and Student Financial Aid.

Information Systems (IS)

IS provides services to all the organizations reporting to the Vice President for Administrative Affairs. These include Finance and Accounting, Personnel Services, Purchasing, Physical Plant, Business Services, Environmental Health and Safety, University Police Department, Operations Analysis, the O'Connell Center, Small Business and Vendor Diversity and Facilities Planning. Primary functions interacting with the colleges and units are payroll, personnel, leave system, ACCESS, Managing Your Money and SAMAS Reporting. The systems are a mixture of legacy systems (green screen) and web based applications. As systems are enhanced, they are being migrated to web based technology.

Registrar Data Processing (RDP)

RDP provides services to the Office of the University Registrar (OUR - Admissions and Student Records). Primary functions include interacting with colleges to maintain student records, degree tracking and shopping, grade reporting, registration, drop/add etc. The system is a mixture of green screens and a web based product called ISIS. The ISIS system, which was developed at UF primarily as a service to students, is considered by many to be one of the most complete web based student information systems available.

Student Financial Aid (SFA)

SFA provides services to the financial aid office. Primary functions are the evaluation and packaging of financial aid funds to students. The systems are a mixture of green screens and some processes that have been integrated in the ISIS system.

Student Financial Aid, Registrar Data Processing and Information Systems all work together and with colleges and other administrative units that have individuals on staff

who interact with and use centralized administrative data files. Examples include Engineering, Business Administration, Health Affairs, Housing, Physical Plant, Bookstore, and Academic Affairs. Organization representatives meet individually or in small groups to solve specific problems. A desire has been expressed for a forum (such as the disbanded CITSADMIN) in which users and data owners could discuss needs and concerns.

In addition, most administrative groups have a LAN support group within the organization with functions similar to groups in colleges and departments.

CIO Office

The current CIO office provides application development support and EAGLE to a variety of administrative and academic offices. EAGLE allows host based programs to maintain a connection to the web interface, maintain a high transaction rate, and provide a security interface between the web application and the host security system. The office of the CIO is also engaged in several projects that are not part of the EAGLE system, and are in various stages of completion. They involve many different aspects of campus operations, including (but not limited to): Data Warehouse, International Student Center, Document Imaging, Card Swipe Technology, Fine Arts Pages, FACTS, Room Scheduling, Virtual Tour and Conversion to IO.

Research Computing

The use of computers in research has become ubiquitous in the past years. While numerical computation has been the primary use of computers since they became available, they are now used in almost all aspects of research including communication, data handling and storage, visualization and image manipulation, process control, and most other aspects of research.

UF fostered many successful computer based research efforts (e.g. heavy computational oriented efforts in Physics, the Quantum Theory Project, and Statistics). With the growing importance of visualization, the McKnight Brain Institute, Film Studies in the English Department, and the Astronomy Department telescope projects have all become major users of computational resources. Requirements for additional research facilities are now emerging in disciplines such as the Humanities and the Arts (e.g. the Digital Worlds Institute). While UF has so far successfully allocated resources to meet these needs, they have been met in a reactive manner. With the pace of new development in research computing and the certain need for high performance computing (HPC) from some units, UF must be better prepared in the future.

Academic research today is increasingly collaborative and resources are increasingly distributed. Researchers are often linked by powerful networks that are capable of carrying vast amounts of information between institutions. Some units at UF have worked very hard to link to this type of HPC network (e.g. the physics GriPhyN network), but the University lacks the overall infrastructure to make this type of collaboration accessible for all types of research. UF must prepare for the inevitable HPC demands from almost every field of research. A strong HPC infrastructure will benefit the University in many ways. UF will show leadership at the state and national

levels by working with established players. The University will be able to provide technical support for faculty proposals, database support, WAN and network support and cutting-edge computing resources.

Research requirements for computing infrastructure can be loosely divided into three categories: machine support (processor speed, storage capacity, software support), interconnectivity (networking, bandwidth), and personnel support.

The availability of workstations and PCs on campus is generally good. There has been enough internal funding since the implementation of the Student Computer Requirement to put a machine on every faculty desk. In most colleges a replacement schedule has been implemented such that faculty can expect a new machine every several (3 - 5) years. Some colleges have shorter replacement schedules and also supply machines for work at home and/or laptops.

Larger (e.g. the Dec Alpha array, QTP's IBM/SP, and the UFBI's Origin) and more specialized (e.g. visualization, Imersadesk) machines have been bought with a combination of grant and UF matching funds. So far this has been adequate, but the system may be strained in the near future when more units begin to need facilities (e.g. mass storage for film studies, data intensive sciences) that fall between the funding level that UF provides and external funding sources.

There is a perceived lack of support for large scale computing. There is currently no organization at UF that provides this in addition to mass storage facilities, help and support with large systems, evaluation of new technologies and leveraging resources for grants.

Software contracts are generally handled by the Soda Shoppe, a division of OIR that also supports teaching and outreach. They negotiate licenses for many software packages used on campus, and provide licenses to units for a fee that covers their costs. There is no program for direct support for software purchases at the university level.

Interconnectivity and bandwidth have been addressed elsewhere in terms of on-campus facilities. Bandwidth seems for now acceptable for most research applications, but it is expected that pressure for ever-higher bandwidth will continue. For example, Project GriPhyn (http://www.gryphyn.org/) and programs associated with that research program will require high performance network connections world-wide that will enable the sharing of large data-spaces among diverse fields of research and collaborators. The Astronomy Department plans to establish a remote telescope observation and instrument support station in Gainesville for large optical telescope arrays in the Canary Islands, Hawaii, and Chile. This research requires low latency network connections and large bandwidth to transmit images in reasonable times from the telescopes to the facilities located on campus.

The support personnel for research computing are intimately tied to personnel supporting all kinds of computing activities on campus, as all activities use the same networks and machines, and these are typically supported by staff that are not segregated into teaching, research, and administrative functions. The staffing situation is adequate with the exception of problems with retention and the general lack of support for specialized staff.

Outreach/Extension

The University of Florida conducts numerous outreach and extension programs that provide services of different types to constituents across the State. This includes formal (distance) education programs by different colleges, clinical services and numerous extension education programs directed to rural and urban communities.

Distance Education and Satellite Campus Programs

Distance education relies heavily on IT. Courses are offered electronically using Internet communications, synchronous group discussion software, asynchronous class presentation software, video and audio streaming, interactive CD-ROM technology, interactive video conferencing, satellite downlink, and videotapes.

Formal degree and certificate programs are offered by different UF Colleges including: 1) Bachelor's Degrees in Electrical Engineering & Computer Science, and Fire and Emergency Services, 2) Master's Degrees in Agriculture, Business Administration, Engineering, Executive Master's in Health Administration, Nursing, and International Building Construction, 3) Doctorate Degrees in Audiology, 4) a working professional PharmD, 5) A Certificate Program in Forensic Toxicology.

Off campus facilities include satellite campuses. IFAS operates programs at sites in Apopka, Ft. Lauderdale, Ft. Pierce, Homestead, Immokalee, Lake Alfred and Milton. There are also 10 interactive video conferencing sites throughout the State and 23 one-way satellite downlink sites. The Health Science Center operates off-campus sites in Jacksonville, Tallahassee, Orlando, Apopka, Hialeah and St. Petersburg and in conjunction with the University of South Florida in Tampa and Bethune-Cookman College in Daytona Beach. The University of Florida urban campus in Jacksonville is home to over 300 faculty and staff from the colleges of Medicine, Nursing, Pharmacy and Dentistry.

Well-supported facilities exist for faculty use in the delivery of distance education programs. The Office of Instructional Resources (OIR) offers support to faculty for the development of courses that integrate the use of instructional technology. The Faculty Support Center offers training in the use of software and the Instructional Design Center provides technical assistance in course design. In addition, facilities for distance education have been developed and used by different colleges.

Patient Care Services

Shands HealthCare owns and operates nine hospitals in North Central Florida, including the teaching hospitals: Shands at UF (576 beds) and Shands at Jacksonville (760 beds). In addition, Shands HealthCare operates the outpatient clinics of the University of Florida College of Medicine under contract. The Colleges of Dentistry and Veterinary Medicine operate clinics for their disciplines. Each clinical setting has its own hospital information system (HIS) and Clinical Information System (CIS). These handle appointments, billing, episode tracking, and clinical records. Specialty systems are used to track laboratory, imaging and other data. IT support for clinical services is often integrated with academic IT services. A common data network (HealthNet) serves the clinical and academic health enterprises. The network extends via a series of WAN and MAN

connections to over 60 performance sites across the state, including presence in the Veterans Affairs Medical Center in Gainesville.

Florida Cooperative Extension

The University of Florida has a large presence in the State through the Florida Cooperative Extension Service. It includes a network of 72 county extension offices (CEOs) that provide educational services to a wide variety of audiences including programs in agriculture, natural resources, family, and youth and community development. Three hundred county faculty members are located at these CEOs and they require IT resources and support. These resources include systems such as: 1) administrative and accountability systems, 2) information delivery systems that include systems such as publications databases, real-time weather and climate data, communications services for plant and disease diagnostics, etc. and 3) core communication services such as email, listservs, device and file sharing, directory services, large capacity print, calendar and web hosting.

About 20% of these offices do not have a dedicated connection to the IFAS WAN and an additional 20% have an unacceptably low quality of service, with respect to bandwidth and reliability. Although the CEOs' situations have improved substantially in the last few years, IT developments are outpacing the ability of the system to resolve the IFAS WAN connectivity issues. Furthermore, a large percentage of PC stations are outdated and technical support staff numbers are inadequate.

Institutional Resources Allocated to IT

The University of Florida allocates substantial resources to the support of information technologies services including salaries, investments in infrastructure and equipment as well as operating expenses. In the period 1999-2000 a total of 4.25% of the University of Florida's budget was allocated to IT and communications.

IT Professionals and Salaries

During the decade of the 1990s, the University of Florida workforce, excluding electronic data processing (EDP) positions, grew 4.46% in terms of FTEs and 48.13% in terms of annual rate. During the same period, the EDP workforce experienced a dramatic increase: 52.02% in terms of FTE and 116.10% in terms of annual rate. As a percent of the University's total workforce, EDP FTEs grew from 2.88% in 1990 to 4.14% in 2000.

The largest 5-year growth rate occurred in the first half of the decade, 1990 to 1995, during which the annual rate devoted to EDP increased 71.84% while the FTE increased only 21.91%. During the second half of the decade, 1995 to 2000, the number of positions increased 24.70% but the annual rate increased only 25.76%. Unit administrators continued to hire more EDP personnel, but their budgets did not increase proportionally. The average salary for EDP positions increased 40.96% from 1990 to 1995, but increased only .85% from 1995 to 2000. The average salary of non-EDP personnel increased 15.15% from 1990 to 1995, and increased 23.12% from 1995-2000.

Over the entire decade, EDP average salaries increased 42.15% and the average salary of the rest of the University increased 41.80%. This appears fairly matched, but EDP

salaries experienced extraordinary growth during the first half of the decade, and have been relatively depressed since then. As a result, unit administrators have experienced extreme difficulty in attracting and retaining qualified EDP personnel during these last five years. IT professionals are either constantly moving from one unit to another to gain salary increases, or they are leaving the University for private industry, sometimes accepting offers 50-100% higher than the University will pay.

Trends in IT and Communications Expenditures

Figure 1 shows estimated actual dollars spent starting in fiscal year 1995-96. Values for 1999-00 are budgeted values. Note that there has been a steady increase in the allocation of resources (future values adjusted at 3.5%) from 1996-97 to 1998-99. The value shown for 1999-2000 is a budget value as an estimate of actual expenditures was not available at the time this report was written. Figure 2 shows a comparison of expenditures for different budget categories. Note that substantial increases occurred during this period for capital items (OCO) and data processing (EDP/DPS.)
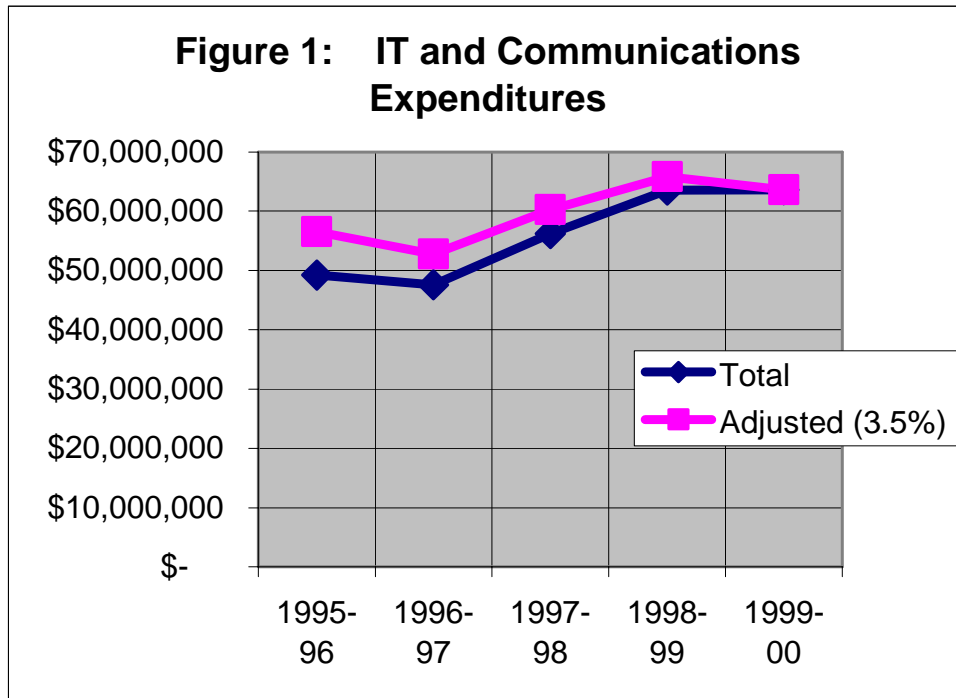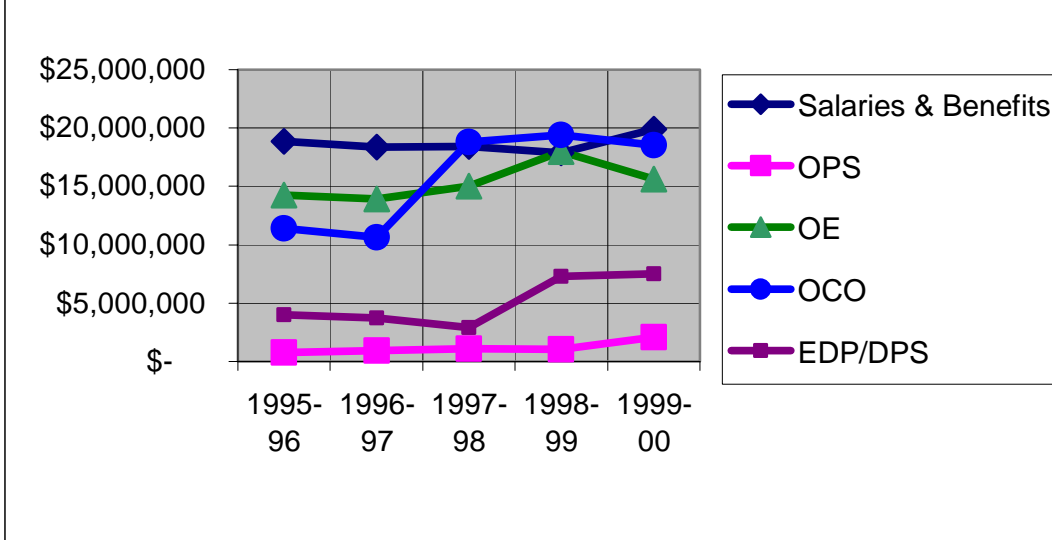

Figure 1:   IT and Communications Expenditures

Figure 2: IT and Communications Expenditures by Budget Category

Hardware Inventory

Table 1 summarizes the current computer hardware inventory. Much of the equipment in the inventory is clearly obsolete (e.g. workstations older than 5 years) and it is not clear what fraction of the equipment is still operating and functional. A large fraction of network electronics on inventory is new.

Table 1: Hardware Inventory Summary as of 6/30/99					
	Age in years				
Type of Hardware	> 5	3-5	1-3	< 1	Total
Network Electronics	659	187	357	890	2093
Workstations	15688	5365	6011	7755	34819
Minicomputers and Large Servers	1233	269	350	345	2197

Source:IRM annual Performance 1998-99 Report

Summary of Barriers Noted by Major UF Units.

The committee surveyed the deans and heads of major academic support units regarding perceived barriers that will obstruct the successful fulfillment of the unit's mission. Complete responses can be found at: http://www.aa.ufl.edu/itr/pdf/unitsummaries.pdf.

They are summarized below, and the number of times each barrier was mentioned is given in parentheses.

- Lack of a central IT authority, organization and leadership (individual or collective) that provides a unified direction, develops, articulates and executes a coherent plan that allows the efficient and effective use of resources available to satisfy critical needs (6). The current organization is one of independent and fragmented IT organizations among which coordination and communication need to be improved (3).

- The inability to recruit and retain competent IT professionals (13). This affects the institution's capacity to perform the necessary day-to-day activities that ensure adequate levels of service and support for users as well as the ability to stay abreast of IT developments that will support the realization of its mission. This is being fueled by current budgetary limitations, internal salary inequities and external economic pressure due to market demands.

- Lack of a budgetary strategy that recognizes the changing nature of IT and allows for growth, upgrades, maintenance of current systems and the deployment of new IT resources while addressing cost containment issues (8).

- Lack of training opportunities or mechanisms for IT staff (4) as well as inadequate training and support facilities for users (2).

- Lack of coordination of IT units with university level systems. Particularly, access to central information resources that are complete and comprehensive and permit cooperative applications (5).

IV   Other Universities

Background

Information technology continues to play a prominent role in modern society and leading universities recognize it as fundamental. This does not mean however, that there is a standard or model IT organizational structure. Universities differ considerably in the ways they structure IT operations. Some are organized as they were before IT became so integral to university life. Some have adapted existing structures to take on new tasks. Some have created new departments or divisions and others have completely reorganized, making IT a cabinet level operation. Recent trends in many universities show a shift toward development of a central, high-level administrative department that manages core aspects of information technology on campuses, including networking, data infrastructure, telecommunications, instructional resources, central server support, staff training and more. This type of organization tends to have one manager, known often as the Chief Information Officer (CIO) or Vice President or Vice Provost for Information Technology (VPIT), responsible for overseeing the function and integration of these departments.

Universities Researched

Indiana University	http://www.indiana.edu/~uits/
Ohio State University	http://www.cio.ohio-state.edu/
Pennsylvania State University	http://cac.psu.edu/infotech/index2.html
Purdue University	http://www.purdue.edu/PUCC/
University of California – Berkeley	http://ist.berkeley.edu:5555/index.html
University of California - Los Angeles	http://www.ais.ucla.edu/
University of Illinois	http://www.cio.uiuc.edu/
University of North Carolina - Chapel Hill	http://www.unc.edu/computing/
University of Maryland	http://www.oit.umd.edu/
University of Michigan	http://www.cio.umich.edu/
University of Minnesota	http://www1.umn.edu/oit/
University of Washington	http://www.washington.edu/computing/
Yale University	http://www.yale.edu/its/

Common Aspects of IT Departments

While the nomenclature differs from school to school, university CIOs or VPITs typically report to the President or Provost, especially when the Provost holds the title Executive Vice President. This places the IT department very near the highest level of administration on campus. Many of the universities researched also have an advisory committee that serves to assist the VPIT with strategic planning and policy making. Such advisory committees typically consist of representatives from each of the units served by IT, ensuring each unit will have input into the overall IT plan. Many universities also have or are working on a strategic plan to guide campus-wide IT development. These strategic plans indicate an acknowledgement that an organizational change will not happen instantaneously or with ease. Usually a developmental period of three to five years is anticipated to bring the reorganized IT department to full strength.

Units reporting to IT

Reorganization at several universities has involved bringing key functional units together under a central IT department. These units include: networking, telecommunications, instructional resources, planning and facilities management, enterprise development, library computing, research & academic computing, and more. Each university is organized differently, however. Some have streamlined functions into three units under IT, while other universities have as many as eight units delivering and supporting core IT functions. By organizing these functions under the IT department, the VPIT is able to ensure that university data is in a standardized format which allows data from multiple units to be combined easily for in-depth analysis and institutional research, that basic connectivity is provided universally, and that appropriate standardization and purchasing economies are achieved. More importantly however, coordinating IT from a central office allows more coherent, strategic and responsive planning support and service.

Table 2 describes the organizational structures of IT units at several major US institutions. Table 3 lists contacts at major institutions made by committee members.

Table 2: IT Organizations at Selected US Institutions (Based on a review of each institution's website, November 2000)

University:	Top IT Title:	Reports to:	Units reporting to IT:	Committee Structure	Strategic Plan
Ohio State University	CIO	Exec. VP and Provost Academic Affairs	Communications & Marketing, Entrepreneurship & Alliances, Student Information System, Tech Visioning, Tech Enhanced Learning & Research, Network Integrated Telecommunications	4 advisory committees, all report to CIO: Business Partners, Instructional Technologies, Research Computing, Student Technologies	Yes, September 1996

Indiana University	Vice President for IT and CIO (of all 8 IU campuses)	President (of all 8 IU campuses)	Teaching & Learning, Telecommunications, University Information Systems, Research & Academic Computing	4 taskforces, all report to CIO: Research & Academic Computing, Teaching & Learning, Telecommunications, University Info Systems	Yes, May 1998
University of Illinois	CIO	Provost & Vice Chancellor of Academic Affairs	Communications Engineering, Communication Services, Instructional Computing	Campus Committee on Computing Technology, 12 members	None posted
Yale University	IT Services Director	Provost, also VP Finance & Administration	Academic Media, Admin Systems, Data Center & Services, Reprographic & Imaging, Telecommunications, Tech Planning	17 members, "sounding board for IT director"	None posted
University of Maryland	CIO	Vice President of Academic Affairs and Provost	Academic & Distributed Services, Enterprise Applications, Networking & Telecommunications	None posted	None posted
UC, Berkeley	Assoc. Vice Chancellor for IT & CIO	Chancellor (of Berkeley Campus)	Business Development, Central Computing Services, Communication & Network Services, Interactive University Project, Strategic Tech Planning	Campus Computing & Communications Policy Board- above CIO, chaired by Chancellor	Yes, October 1998
Penn State	Vice Provost for IT	Exec. VP and Provost	Academic Computing, Library Computing, Admin Systems, Telecommunications	None posted	None posted
University of Minnesota	Assoc Vice President and CIO	Exec. VP and Provost	Enterprise Applications, Tech Infrastructure, Tech Service	None posted	Yes, Fall 1997
UNC, Chapel Hill	Vice Chancellor for IT	Chancellor (of Chapel Hill Campus)	Academic Tech & Networking, Systems & Procedures, MetaLab, Admin Info Services	None posted	None posted
University of Michigan	CIO	Exec. VP and Provost for Academic Affairs	Ctr for IT Integration, Educational Services, Operations Management, Product Development	Federation of IT Providers- CIO + 3 groups: Strategic Directions, User Advisory, Executive Committee	Yes, January 1998

Purdue University	Computing Center Director	Exec. VP for Academic Affairs	Operational Services, Research & Supercomputing, Instructional Computing, Purdue Data Network, Computing Services	Administrative Computing Steering Committee	None posted
University of Washington	Vice President for Computing & Communi-cation	President	Communications, Info Systems, Planning & Facilities, Networking, Tech Outreach, Video & TV Tech	None posted	None posted

Table 3: Individuals Consulted at Selected Universities

University	Name	Title	Date
Penn State University	Gary Augustson	Vice Provost for IT	August 2000
UC, Berkeley	Jack McCredie	Associate Vice Chancellor for IT & CIO	August 2000
University of Maryland	Don Riley	CIO	June 2000
Yale University	Daniel Updegrove (now at UT Austin)	IT Services Director	
University of Michigan	Gary Gatlin	Assoc. Director IT	December 1999
University of Michigan	Jose-Marie Griffith	CIO	
University of Texas, Austin	Sheldon Eckland-Olson	Provost	November 1999
University of Illinois	Richard Herman	Provost	January 2000
UCLA	Al Solomon	Assoc. Vice Chancellor for Admin. Services	December 1999
North Carolina State University	Carl Malstrom	Director of IT	June 2000
University of Southern California	David Shawaker	CIO	June 2000
University of Virginia	Robert Reynolds	CIO	June 2000
Georgia Institute of Technology	Gordon Wishon	Assoc. VPIT	June 2000
University of Alabama, Birmingham	Clair Goldsmith	VPIT/CIO	June 2000
University of Houston	Randy Harris	VP Admin Affairs	June 2000

V   IT Review Committee Issues

The committee benefited greatly from work done by three previous review committees and the CIO strategic plan. We acknowledge here our debt and gratitude to their authors. Partly because of earlier careful work and partly to avoid duplication, this committee has developed its statement of issues in very general terms. Broad issues are identified and defined and later given corresponding recommendations. The careful reader will know, of course, that many details and specific sub-issues are subsumed under the general categories. To recognize many of these sub-issues, a series of numbers are listed below each issue. These numbers refer to more specific recommendations from one or more of the four previously published reports. Readers may examine those previous recommendations at: http://www.aa.ufl.edu/itr under the heading Prior Information Technology Reports.

In total, this report focuses on eight broad issues. Many are similar to issues identified by previous review groups. Issues are listed immediately below with brief descriptors. A more detailed discussion of each issue then follows.

No part of this identification of issues or the recommendations that follows is intended to criticize prior or current IT leaders on campus. To the contrary, this committee is convinced that UF has generally done quite well in meeting IT demands and providing quality service to end users. Much of this success is due to the exceptional dedication and talent of IT directors and staff across campus. This success notwithstanding, this review concludes that UF needs to be better positioned for some current IT issues. To prepare for and to be successful in that environment, UF must address:

- Leadership and Organization – UF currently lacks a structure for clarifying purpose, communicating direction and ensuring results.

- Networking – UF currently lacks an approach for ensuring access and capabilities throughout the University for voice, video and data networking.

- Research Computing – UF currently lacks a plan for improving its competitiveness and creating a greater capability for data and computing intensive work.

- Instructional Computing – UF needs to continue to improve the use of technology in instruction, including integrating student resources, institutional resources and Internet resources in courses and curricula.

- Institutional Data and Systems – Current interests and future needs require improving access and ability to use data and information easily in workplaces.

- Planning – UF needs to develop an institutional planning process that will identify needs, involve the community, consider alternatives and build a consensus.

- IT Staff Hiring, Development and Retention – The critical role that IT plays requires the University to work toward creating opportunities for IT staff and provide a structure for rewarding information technology careers at UF.

- Training – As in all professional areas, opportunities for advanced and continued training are an important way of maximizing the institution's benefit from IT expenditures and improving employees' working environments.

Leadership and Organization

Much effort is currently lost in working through boundary conditions on various issues. As an example, a recent effort to improve directory services uncovered fourteen distinct uncoordinated institutional level projects related to directory services. Local providers are often not staffed to meet the demands for 24 hours a day, 7 days a week service. Central providers are not always responsive in addressing unique needs of units that wish to deploy services above a yet to be defined baseline. Coordination and communication are lacking in present efforts.

UF needs shared vision and IT leadership. UF has prospered in many respects with local effort and initiative and these must not be harmed in the name of coordination and common purpose. However, shared vision creates purpose and motivates people and organizations to work together to produce results of value to the people and to the institution. Leadership translates intention into reality. UF also needs to increase its state and national presence on IT issues. Informed, persistent and persuasive representation is needed to ensure UF IT is appropriate for current needs and always well positioned to meet new and emerging needs. Providing a structure for leadership and IT coordination will allow territorial issues in the provision of services to be resolved.

Related previous recommendations[1]
4, 8, 9, 33, 35, 36, 38, 39, 40, 41, 42, 43, 44, 45, 50, 51, 52, 53, 56, 57, 58, 64

Networking

The University needs to ensure appropriate network access on and off-campus for all students, staff and faculty. Ubiquitous network access is now necessary. UF must continue the good work that has been done to wire the campus, while ensuring that continuous upgrades of the physical network are planned, funded and implemented.

Wireless access will become commonplace and will fundamentally change the way information is used in teaching, scholarship and service. Coordinated deployment of wireless service will be required to avoid proliferation of incompatible systems. UF is also facing increasing problems with network security and disruption of service. While this is difficult to deal with in a university environment, it is nonetheless essential that UF

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[1] The numbers refer to item numbers in the "Review of Prior Information Technology Reports" compiled by Donna Johnson. See: http://www.aa.ufl.edu/itr/pdf/ReviewPriorReports.PDF. This review contains all the recommendations made by previous campus-wide IT review efforts, including the ITR Task Force, The McClure Report, Net 99, and the Strategic Plan of the Office of the CIO. The previous recommendations may contradict each other. Their presence under the headings above indicates only that the general issue has been identified and addressed as a recommendation in a previous report. It does not indicate that the current task force endorses the previous recommendation.

ensures security of protected information and provides dependable full IT service to all students, faculty, and staff.

High-speed access to the Internet and Internet2 are critical to the University's success. Participation in the development of advanced networking systems and applications is vitally important. To continue the climb among the nation's top universities, UF must be a leader in high-speed access to the world's networks.

UF needs to capitalize on the convergence of voice, video and data technologies to dramatically improve service. Internet Protocol (IP) telephone service and deployment of IP video will require planning and coordination to reap important benefits in access, features and flexibility. Video services are currently particularly decentralized and not interconnected (see the report of the Video Advisory Committee, 2000 at: http://www.aa.ufl.edu/itr/vac/contents.html). UF can increase the value of existing resources by addressing these interconnections.

UF needs to develop planning models, organizational models and funding models to ensure the ability to meet fundamental needs for access, to participate in advanced networking projects, and to capitalize on new technologies.

Related previous recommendations
26, 30, 49, 63, 77, 78, 87, 89, 95, 104

Research Computing

Research computing in the coming years will continue to have leading edge requirements for high-speed networking, high-speed computing and massive storage. In more and more academic disciplines, research requires greater computing power. In many cases, it will not be productive for individual projects to build computational facilities with the required capabilities. High performance computing will require pooling of resources and joint administration. UF will need to facilitate such resource sharing.

UF also needs to further pursue the shared research facilities between universities. Such collaborations are developing in physics, medicine and many other disciplines. Institutional ability to participate in such collaborations should be encouraged and improved.

Related previous recommendations
106, 107

Instructional Computing

The University has made substantial progress in improving its ability to use technology in instruction. Facilities, training and support have improved. However, much work remains. Indeed, the work of deploying instructional technology is continuous. All UF classrooms must accommodate appropriate instructor and student technology. UF needs operational support to ensure the best possible teaching experiences across the University. Faculty and students should be trained to use technology effectively in their

teaching and learning roles. Online Training courses for students, faculty and staff, a University training coordination committee and the university-wide laptop initiative are steps in the right direction.

Information resources are changing. The ability to access them and use them in instruction is changing. At a minimum, the University needs to integrate student, institution and Internet resources in our courses and curricula. All students are required to own or have access to computers. UF must further encourage and support students with new opportunities for using IT resources in support of their learning. The Internet affords incredible opportunity to bring information resources into the educational process. UF must continue work to ensure that faculty and students have the best IT resources and support.

The University has a great deal of work to do to open UF's instructional opportunities to students at a distance. A separate task force has reviewed these issues and has made recommendations that must be coordinated with those of this task force (see the report of the Distance, Continuing and Executive Education Review Committee, 2000: http://www.aa.ufl.edu/itr/distance_ed/contents.html).

Related previous recommendations
6, 12, 20, 21, 22, 23, 73, 102, 103

Institutional Data and Systems

The University operates under a large collection of different policies for access to data. These policies have been developed and implemented over many years without frequent review or coordination. This has resulted in a large collection of increasingly difficult operational requirements for gaining access permissions and subsequent training to reach needed data.

Opportunities and expectations regarding the ability to use information resources in every aspect of work are rapidly rising. The growth of e-business and the Internet fuel the imagination. UF can and must improve its efficiency and effectiveness with regard to the development and operations of enterprise systems.

UF needs to broaden the concept of institutional data to include electronic resources supporting all missions – library, finance, grant information, alumni, research expertise, registration, patient care, etc. These areas have traditionally operated independently. UF needs to consider how information access can be simplified to create opportunities for appropriate use of information in all aspects of work.

Developing and implementing policies for authentication and authorization processes are critical for achieving consistent policy-based access to data. Much confusion has resulted from discussions of making data available "on the web." All information must be made available as appropriate and often this requires policy-based access. Software, system and data architectures will need to be addressed to determine appropriate roles for proprietary software and appropriate methods of system integration.

Related previous recommendations

3, 13, 14, 15, 16, 17, 18, 37, 48, 71, 84, 85, 86, 90

Planning

IT funding in the past has been sporadic, leaving many units to rely on "end of year" funds to meet critical IT requirements. These funding uncertainties foil efforts to plan effectively. Space for IT related activities is often difficult to obtain. Resource allocation should follow from an open and participatory planning process.

The University needs to continue to improve its ability to apply technology in support of the University's missions. UF can capitalize on new opportunities by applying sound planning practices and principles. Knowing current resources, identifying needs, involving the community in the processes of generating recommended approaches, and making carefully informed decisions will all be required if UF is to continue to meet institutional needs and aspirations.

Planning creates opportunity to capitalize on opportunities presented by new technologies; examples include wireless networking and IP-based video conferencing. Planning enables the institution to respond to important shifts in technology and new needs growing out of rapidly changing and technology intensive disciplines.

UF will also need strategic responses to statewide initiatives in information technology.

A "sidebar" on central/decentral

Much of the rhetoric surrounding strategic planning and IT at UF has involved concepts of centralized vs. decentralized notions of service organization. The debate about central "versus" decentral is a symptom of the lack of clarity in the missions of the various provider organizations. There should be no debate on the core premise -- some services are best provided by decentralized units, while others are best provided centrally to achieve highly desired and agreed upon institutional goals. The agreement on which is which should be broad and deep. Arguing about the edges of the central/decentral debate distracts us from addressing the larger issues identified above. In particular, decentralized IT support customized to the discipline or local unit is often an effective and efficient means of delivering services to faculty, staff and students.

Related previous recommendations

1, 5, 10, 27, 46, 47, 54, 62, 66, 67, 68, 69, 70, 72

IT Staff Hiring, Development and Retention

University pay scales and position definitions for IT professionals are out of date. It is not uncommon for highly skilled current staff to be offered 50% to 100% salary increases to take jobs in industry. Such jobs often come with benefits and incentives that cannot be found at the University. UF needs to create an excellent working environment for IT professionals at the University.

As all aspects of the US economy and culture have embraced information technology, the demand for skilled IT workers has greatly increased. Until as recently as two years ago, UF was relatively isolated from this trend and complacent in its ability to attract, train and retain IT professionals. UF now faces a shortage of qualified IT professionals.

The University Personnel System is not designed to facilitate the hiring, development and retention of IT professionals. Classification systems do not recognize the nature of the work and do not offer the flexibility required to recruit staff and retain qualified people. Nor do the systems have an ability to respond to new technologies. For example, there are no positions in the USPS system appropriate for people managing web sites and web site content.

Related previous recommendations

None. This is an issue not raised before.

Training

UF faculty, staff and students can all make better use of the information resources and information technology that is currently available to them. The University has a collection of training programs, both on-line and face-to-face. These programs are now being coordinated through a committee of NAC.

It is important that UF explores multiple modes of training for faculty, staff, students and distance learners.

The goal of IT training and support should be to better enable individuals to use UF's information environment.

Related previous recommendations

31, 32, 65, 79, 80, 81, 88, 91, 101, 108, 109, 110, 111, 112, 113, 114, 115, 116

Other Issues and Previous Recommendations

Substantial Progress

Over the years, several previous task forces have studied UF's IT environment and the review groups made important recommendations. Many of these recommendations refer to issues that are still relevant today. In many cases, however, the University has made substantial progress toward accomplishing the goals outlined in previous recommendations and the review committees should be complimented for their careful and thoughtful work. There has been progress made on many previous recommendations, including the following:

11, 12, 19, 20, 24, 25, 28, 55, 60, 61, 74, 75, 76, 82, 83, 96, 99, 100, 105

Not recommended for further consideration

Several recommendations of previous task forces cannot be recommended for further consideration. They include: 34, 59, 97

VI   Recommendations

A)   Establish a Position and Appoint a Vice Provost for Information Technology

Goal

Provide central authority, coordination and leadership as the University implements a unified plan for efficient, effective use of mission critical IT resources.

Principles

Central authority and coordination are necessary to ensure the University's research, teaching and service missions are accomplished without excessive and redundant costs, and with a continued emphasis on enhancing the tools and resources faculty, students and staff need to adapt to ever changing environments.

Recommendations

1. The University should create a new position, Vice Provost for Information Technology (VPIT), to coordinate IT functions university-wide.

2. The VPIT should report directly to the Provost.

3. The VPIT should have administrative and budget control of all central IT operations and personnel and coordinating authority for university-wide IT functions.

4. The VPIT should have a seat at the Council of Vice Presidents table and should meet with the Council of Deans at least semi-annually.

5. The VPIT should communicate regularly with IT managers from the broader UF technical community.

6. A national search for the VPIT should begin immediately upon acceptance of this report by the Provost and President.

Responsibilities

- IT Strategic Planning, see recommendation B

- Network Infrastructure, see recommendation C

- Administrative and Data Infrastructure, see recommendation D

- Academic Technology, see recommendation E

B)   Develop an Information Technology Planning Process

Goal

Develop an on-going, open, participatory planning process to identify and develop strategic initiatives and respond to opportunities.

Principles

1. Open and participatory planning develops consensus and improves internal communication and trust.

2. All interested members of the University community should have opportunities to participate in the planning process.

3. By establishing goals and objectives and evaluating performance, IT resources can best meet the needs of the University.

Recommendations

1. The VPIT should be responsible for the development of the University IT plan.

2. The development of the IT plan should involve a broad spectrum of the University community through the advisory structure, meetings with unit leaders and open forums.

3. The IT plan should include evaluation and assessment of the IT environment.

4. The VPIT should publish the plan on an annual basis.

C)   Consolidate Network Infrastructure

Goal

Provide a comprehensive, managed approach to network infrastructure for moving voice, video and data throughout the UF enterprise.

Network infrastructure

Network infrastructure is defined as the physical infrastructure required to carry network traffic for video, voice and data. Network infrastructure includes the fiber, wires, wireless transmitters, hubs, routers, switches and other active electronics, as well as the space, pathways, people and processes to deliver network transport. Network infrastructure includes security, Internet and Internet2 connectivity, wide area connectivity as well as administration of network protocols. Network infrastructure does not include services that ride on the network such as television programming, email, web, file and print or client/server applications, which will continue to be provided locally.

Principles

1. Network infrastructure exists to meet the needs of its customers, including education, research, service/extension, administration and patient care.

2. Cost efficiencies can be achieved by providing service across the enterprise.

3. The University will be able to offer new services and capitalize on new opportunities and technologies such as campus-wide wireless networking, IP phone services and digital video transport by providing a modern network infrastructure for teaching, research and service.

Recommendations

1. Create a new customer-driven, service-oriented central provider of network infrastructure reporting to the VPIT, responsible for network infrastructure throughout the campus and its remote locations.

2. Implement a stable, public funding model to increase accountability, increase responsiveness and ensure more timely technology upgrades.

3. Immediately convene a transition team to review current resources and recommend a phased transition plan with focus on preserving operational integrity during a carefully planned transition.

4. Create an oversight group for the organization as part of an overall IT advisory structure. (see recommendation F)

Customer Driven

- Customers will choose their levels of service.

- Services will be governed by written service level agreements developed with participation of the customers.

- Regular meetings will be held with advisory structure, technical community, and college representatives.

- Services must be effective, timely, courteous and responsive.

- Needs such as time sensitivity, special requirements, new building planning and construction, instructional requirements and research requirements will be addressed in designing and implementing services.

- Accountability with respect to governing documents will be achieved by using open processes to communicate details of operations.

- The customers and administration will receive an annual report regarding network infrastructure.

Organization

1. A new organization will be created from existing service provider organizations.

2. A consistent organizational, financial and operational approach is required.

3. The new organization will provide a single point of contact for the University's approach to network infrastructure, including information about network infrastructure.

4. All work will be consistent with institutional strategy and priorities.

Responsibilities

The new organization will provide reliable, ubiquitous, secure, multi-protocol, high-speed, modern network infrastructure to the faceplate in all UF locations including:

- Responsibility for University network infrastructure, including data transport, wireless infrastructure, telephone services, video transport, Internet and Internet2 connectivity, and wide area connections.

- 24 by 7 operations and support.

- Continuous improvement of the network design and deployment using open, participatory planning processes.

- Coordinated deployment with affiliates such as Shands HealthCare Network, local government, FIRN and others.

- Active participation in all new building design and renovation.

- Use of enterprise information management systems for documenting network infrastructure.

- Coordination with and participation in state, regional and national organizations.

Phased Transition

- The phased transition plan must address issues of Internet and Internet2 capacity planning, synergy of existing telecommunications operations with proposed combined operations of voice, video and data transport, existing investments, physical infrastructure (pathways, fiber plant) as well as "last mile" issues in providing comprehensive services to the faceplate at all UF locations.

- The transition plan must include organizational, operational, facilities and financial plans.

- The adoption of the comprehensive, managed approach will be an evolutionary process. Careful attention must be paid to operational integrity throughout.

- The University community should expect three to five years to fully implement the transition.

Expectations

- The new organization will implement a comprehensive, managed approach to improve and standardize service.

- As customers need higher levels of service and new capabilities, total costs will increase. New services and new service levels will justify the increased cost to the institution.

- The new organization will work with customers and advisory groups to identify satisfactory service levels and new services.

D)   Develop Data Infrastructure

Goal

Provide common data access and coordinate policy development across the University, improving the ability to appropriately access data and information.

Principles

1. The institution benefits by providing common data services useful to the business units and colleges.

2. The role of the central IT organization is to provide a foundation (data infrastructure) for the data of the enterprise (the terms data and information are used interchangeably below).

3. The business units own the business processes. The business units own the data.

4. An authoritative source is desirable for each enterprise data element.

5. Enterprise data can be complex. Interpretation of data often requires assistance from those experienced with it.

Data Infrastructure

Data infrastructure is the set of common methods, policies, tools and systems that business units need for their work and that the institution needs to ensure consistent data definition, data administration and data management, improve reuse, and foster responsive solutions to institutional requirements.

Elements of data infrastructure include:

- Enterprise data model – the enterprise definitions of data elements and their relationships.

- Enterprise data architecture – relationships of systems and their components as a unified whole.

- Enterprise data warehouse – the view of the enterprise data used for queries.

- Enterprise data administration – access control policies and procedures, enterprise data management processes for each data element.

- Enterprise middleware – workflow system, directory systems, authentication system, authorization system and data access tools.

- Enterprise data hosting – the hardware, software, people and processes used to store and protect the institution's enterprise data.

The enterprise data infrastructure serves as a foundation for the business and academic units and the processes of the enterprise. Business units acquire and operate transactional systems in support of their work. The enterprise data infrastructure enables the University to use and reuse its data and information across its units.

Recommendations

1. Create a new organization reporting to the VPIT, responsible for institutional data infrastructure.

2. Provide assistance and information to units in the use of the University's data infrastructure, including information about data infrastructure.

3. Create an oversight group for the new organization to assist with needs assessment and the creation of policy regarding enterprise data and its use. (see recommendation F)

Responsibilities

The new organization will provide fundamental services to the business and academic units of the University with respect to data:

- Responsibility for university data infrastructure, including the enterprise data model, data architecture, data warehouse, data administration, data management processes, enterprise middleware and enterprise data hosting.

- 24 by 7 operations and support of the data infrastructure.

- Continuous improvement of the data infrastructure using open, participatory planning processes.

- Operation across the business and academic units and in conjunction with the affiliates.

- Participation in state, regional and national processes.

Expectations

- The new organization will implement a comprehensive, managed approach to improving appropriate access to data and information throughout the University.

- By developing consistent approaches to the development of policies related to the access of data and information, UF will improve the ability to make data available to those who are entitled to have it and improve the ability to control access to data to prevent unauthorized use.

E)   Create a New IT Organization from Existing Academic Technology Service Providers

Goal

Make the best use of Information technology in support academic activity.

Principles

1. Information technology provides unprecedented opportunities for application to academic effort in instruction and research.

2. Improving the ability of UF students and faculty to capitalize on opportunities afforded by information technology will strengthen the University.

3. Incorporating technology into education better prepares students for the modern workforce.

Recommendations

1. Create a new organization from existing service provider organizations responsible for academic activity using information technology.

2. The organization will report to the VPIT and be responsible for academic technology support.

3. A high-level advisory group (ITAC) will be formed to assist with planning and policy making. (see recommendation F)

Responsibilities

The new organization will provide fundamental services to the faculty and students in support of instruction and research:

- Support for faculty and student use of technology in instruction.

- Development, maintenance and support of classroom technology.

- Pre-award technical support for development of grant proposals involving information technology.

- Development of faculty and student knowledge and skills regarding technology applicable to instruction and research.

- Act as a clearinghouse for information regarding the application of information technology to academic activity.

- Establishment of a single point of contact for the enterprise's approach to academic technology support and development.

F)   Create an Information Technology Advisory Structure

Managing the diverse information technology needs of the University necessitates the implementation of a committee structure designed to serve as an advisory voice to the Vice Provost for Information Technology on matters relating to technology.   It is essential that the University of Florida community is knowledgeable about information technology issues and proposed technology initiatives. In addition, there must be a well-defined communication conduit to ensure the concerns and suggestions of faculty, staff, and students are included in the University's IT planning activities.

Goal

Institute a clearly defined and responsive organizational structure and process for information technology planning, coordination, budgeting and use.

Principles

1. A well-rounded and integrated view of campus technology needs is critical in order to have effective resource planning and allocation.

2. All facets of the user community must know and understand the IT committee structure and be able to utilize it to provide input to the IT planning processes. It must be open and participatory.

3. Bi-directional communication is essential to the successful functioning of the advisory committee structure. The ITAC must be routinely apprised of the current needs and future plans of the academic technology, data infrastructure and administrative computing and network infrastructure committees. The committees must be responsible for broadly soliciting input from the various academic and administrative units relevant to their respective areas of responsibility. The University community must be kept informed of the recommendations and implementation status of the input from various IT committees. The VPIT should provide regular and timely communication regarding IT policy decisions.

4. The office of the Vice Provost for Information Technology facilitates activities and prepares agendas for the various councils and subcommittees of the advisory committee structure.

IT Advisory Structure

The Information Technology Advisory Council (ITAC) structure is the conduit between the Vice Provost for Information Technology and the University user community. Three ITAC subcommittees address the specific concerns of academic technology, data infrastructure and administrative computing, and network infrastructure. The ITAC solicits input through its subcommittees in order to help set strategic direction and priorities for technology. The ITAC subcommittees report to ITAC and ITAC advises the Vice Provost for Information Technology.

ITAC evaluates recommendations from its subcommittees and integrates those recommendations into appropriate proposals for presentation to and action by the Vice Provost for Information Technology.

Recommendations

1. Develop an Information Technology Advisory Council (ITAC) advising the Vice Provost for Information Technology.

   - The ITAC is appointed by the Provost. Terms are fixed with staggered three-year terms. Appointments are not limited to one term.

   - The Provost seeks membership input from the VPIT, the Faculty Senate and the Council of Deans to develop a council membership consisting of individuals selected for their specific understanding of current and emerging technologies, strategic planning for IT, and the broad spectrum of needs and interests within the university community which must be served. The VPIT and the Chairs of the three ITAC subcommittees are ex-officio members of the ITAC.

- The council will make appointment recommendations to the Provost for membership of the subcommittees for academic technology, data infrastructure and administrative computing, and network infrastructure.

- The council will participate in development and annual review of the campus information technology strategic plan.

- The council serves an advisory function to the VPIT for university level policies, priorities and strategies to be followed to best meet the IT needs of the university community.

- The council studies issues, evaluates alternatives, and makes recommendations for both the short and long range IT needs of the University.

- The council solicits input through its subcommittees and makes broad budgetary and resource allocation recommendations to the Vice Provost for IT.

- The council plans and hosts at least one public forum annually for communicating with and soliciting input from the general IT user community.

2. Develop specialized ITAC subcommittees for academic technology, (ITAC-AT); data infrastructure and administrative computing (ITAC-DI&ADM); and network infrastructure (ITAC-NI) reporting to ITAC.

- The subcommittees are appointed by the Provost from recommendations made by ITAC. Terms are fixed with staggered three-year terms. Appointments are not limited to one term.

- The Vice Provost for Information Technology is an ex-officio member of all ITAC subcommittees.

- The membership of ITAC-AT consists of a faculty representative from each college, the graduate school, and the libraries. Additional member recommendations may be made by the ITAC.

- The membership of ITAC-DI&ADM consists of the University data administrator and appointed representatives from the major administrative entities on campus, including: Faculty, Libraries, Graduate School, Registrar, Housing, Career Resource Center, Student Financial Affairs, Physical Plant, Personnel, Information Systems, Student Services, etc.

- The membership of ITAC-NI consists of a designated representative from the Network Services unit, each college, and major administrative unit (e.g. Academic Affairs, Administrative Affairs, Student Affairs). Additional member recommendations may be made by the ITAC.

- College deans and administrators will be strongly encouraged to institute similar committees within the individual departments and/or units who will then provide input to the appropriate university level subcommittee.

G) Create an Environment to Support IT Staff Hiring, Development and Retention

Information Technology (IT) services require that a competent and stable staff be available on a continuous basis to ensure a reliable environment for users.

Goal

Recruit, develop and retain qualified IT personnel.

Principles

1. The working environment for IT personnel must be attractive.

2. The University must have appropriate classification and compensation strategies to recruit and retain top quality IT personnel.

3. Professional development is an essential component of employee satisfaction and thus retention.

4. Increased knowledge and outstanding performance should result in increased compensation and promotion.

IT Staffing

The demand for skilled IT workers has greatly increased. UF, like most employers, now faces a serious shortage of qualified IT personnel. Consequently UF must be aggressive in its ability to attract, train and retain IT staff.

Current job classifications must recognize the changing nature of the work and offer the flexibility necessary to hire and retain qualified people. The personnel system must have the ability to respond to new technologies and changing work practices with regular reviews for appropriate position classifications. It should also be recognized that the traditional 8-5 structure is not always viable in an environment often requiring 24/7 response.

University pay scales for information technology personnel are not competitive in the marketplace. It has not been uncommon for staff to be offered 50% to 100% salary increases to take jobs in industry. Such jobs often come with benefits, stock options and other incentives that cannot be found at the University. This emphasizes the importance of the working environment, including the benefit structure, to attracting and retaining top notch IT personnel.

Recommendations

1. Pay competitive salaries for IT personnel.

2. Create an environment competitive with industry that is attractive to external IT personnel and encourages retention of UF IT employees, including:

    *   continued access to University courses and degree programs

    *   participation in state of the art IT related projects

- adequate funding for both internal and external professional training programs and conferences

- a discernable career ladder for IT professionals to pursue

3. Develop policies and procedures that encourage UF IT employees to remain within their units. For example allow matching offers based on intra-university offers as well as extra-university offers.

4. Regularly review and revise the job classification system to ensure there are appropriate classifications and compensation strategies for the changing IT environment.

5. Provide flexibility in UF policies and procedures in order to attract and hire the most qualified personnel. For example, the best-qualified people for A&P IT positions often may not hold baccalaureate degrees.

H) Develop an Effective Budget and Funding Model for IT Services

Goal

Fund VPIT operations in a stable and sufficient manner avoiding excessive and redundant costs.

Principles

1. The goal is that the IT organization will function as another service provided to the University by an auxiliary organization.

2. The IT budget should be developed as an open process in concert with the advisory structure and the IT strategic plan.

3. The cost of service should be on a per port basis to recover the costs of the equipment and service, based on a 3-year useful life of equipment, plus overhead.

Recommendations

1. Establish a headcount technology fee assessed per student per semester (regardless of course load or fee status) for the use of technology enhancements to student labs and classrooms.

2. Impose an appropriate headcount fee based on actual IT costs on all full time employees, using a census on September 1 of each year. The current costs of centrally supported IT units will be included in reaching this assessment.

3. Use the funds raised from these fees to enhance the IT infrastructure and to provide the availability of leading edge technology to all units.

4. The administrative units will continue to purchase cycles from the regional data center under its current cost recovery structure. The regional data center may also evolve into a fee-based location for the mass storage of data that the units believe either for security reasons and/or economic reasons to be impractical to provide from the unit's own resources.