

**GEORGIA STATE UNIVERSITY
INFORMATION TECHNOLOGY
STRATEGIC PLAN
2000-2005**

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**GEORGIA STATE UNIVERSITY
INFORMATION TECHNOLOGY
STRATEGIC PLAN
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1. INTRODUCTION

The Information Technology Strategic Plan 2000-2005 is a revised and renovated version of the first Information Technology Strategic Plan developed and approved in 1997. Many of the original goals are still appropriate, however, the development of 2000-2005 University Strategic Plan has offered an opportunity to align IT objectives with the larger University goals to *Enhance the Academic Mission* and to *Support the Academic Mission*.

2. INFORMATION TECHNOLOGY AT GEORGIA STATE UNIVERSITY

Information technology is a broad term used to describe a multitude of uses for computing and communications technology in support of an institution's mission and activities. This typically includes computers (mainframe, desktop and workstations), networking equipment, telephony, video distribution and transmission equipment, multimedia and similar computer-based audiovisual equipment, electronic or digital printing equipment, and other related hardware. Additionally, the term information technology may be used to include both software that operates on this equipment and data retained by these hardware and software mechanisms. When considering data, software, hardware and their associated instructional, research or business processes, the term *information systems* is generally used.

2.1 The CIO and Associate Provost for Information Systems & Technology Roles

The *Chief Information Officer* role performed by the Associate Provost for Information Systems and Technology is primarily to: provide an institution-wide perspective regarding information technology issues, assure that the University will implement technology effectively for strategic advantage, and assure that planning for information technology is incorporated into the institutional strategic planning process. Additionally, the CIO performs the "champion" role for promoting effective planning, adoption and support of information technology initiatives and recommending methodological improvements and standards from this institutional perspective which might not otherwise come from individual units within the University. Finally, the CIO serves as an information technology focal point for both internal and external constituencies. As Associate Provost for Information Systems & Technology, this individual also exercises line management responsibility for all institutional information technology support organizations at Georgia State University. This information technology dual role of CIO and line management is analogous to the dual administrative roles performed by the individual entitled Provost and Vice President for Academic Affairs.

2.2 The Information Systems & Technology Institutional-Level Organization

Information Systems and Technology, or *IS&T*, is *the institutional technology support unit*. In total, IS&T staff number approximately 160. As of July, 2000, the primary information technology support units contained within IS&T are:

- **University Computing and Communications Services (UCCS)**, that is responsible for all institutional computing infrastructure, digital communications services (including data networking, wireless and video distribution, radio frequency management and voice technology services), twenty-four-hours-per-day and seven-days-per-week operational support staff for these equipment items and operating systems support services.
- **University Information Services (UIS)**, that is responsible for institutional application systems development, purchase, maintenance and support, as well as institutional business process analysis and support, and
- **University Educational Technology Services (UETS)**, that is responsible for institutional instructional technology support, digital media services, classroom and open access computing lab support, technology training services and campus Web services.

In addition to these major units, IS&T provides strategic services via the several smaller units of Planning and Strategic Initiatives, Library Support and Technology Initiatives, and Advanced Campus Services. These units are investigating and implementing possible common solutions for addressing the next generation eUniversity environment.

As the supporting units for information technology at Georgia State University, the joint mission of these IS&T units is:

“To provide high quality, reliable, and responsive information and instructional technology support services to the Georgia State University community that are consistent with the strategic planning process of the University. This is accomplished through the delivery of efficient, enhanced, and collaborative support and services. Also, these IS&T units will foster the development of both innovative and proactive information technology expertise and assist the University in planning for effective use of both current and future technologies.”

2.3 Local Information Technology Support Staff in Colleges, Schools and Administrative Units

In addition to the institutional information technology staff, there are approximately sixty information technology support staff located in specific academic and administrative units. Their primary responsibilities are to provide local technology support within the units they support, as well as provide liaison back to the institutional support organizations as necessary. Specific responsibilities of local support staff vary widely. This is due to the specific idiosyncratic support requirements of the unit in which they are housed and the particular evolution of networking requirements at Georgia State. For several years, the Information Technology Support Subcommittee, which consists of the local information technology support staff from units having such staff and representatives from the institutional information technology support units have been meeting in joint planning and collaboration sessions. This group has been able to identify critical issues relative to information technology and make recommendations to the Senate Information Systems and Technology Committee. This effort should continue in the future. Additionally, an Information Technology Security Committee has been chartered to address the increasingly important aspects of protection of the critical information technology assets of the University.

2.4 Special Purpose Technology Support Organizations

In addition to the previously mentioned support organizations, there are several other areas that provide special purpose support within the institution. Within the office of the Assistant Vice President for Public Service, there is a need to support faculty engaged in what has been traditionally known as distance learning, and the unit known as Distributed and Distance Learning (DDL) provides this function. Within the College of Education, the Instructional Technology Center (ITC) exists to prepare teachers to use technology in their teaching activities. Most recently, a need has been identified for a faculty-directed center to provide focus for addressing technology uses in higher education instructional endeavors. The Teaching and Learning with Technology Center (TLTC) has been formed as a result of this need. The relative roles and responsibilities in this area should be defined in the coming year. As well, there is a need for a comprehensive review of services across all these support organizations, with corresponding consolidation or elimination of duplicated services.

2.5 The Evolving Information Technology Support Role

In today's technology support environment, it is becoming more apparent that the traditional totally centralized strategy for supporting individual faculty, staff and students does not always scale easily in today's more "fully-deployed" technology community. Because of this, Georgia State will continue to see an increased demand for local, or "distributed", information technology support staff. This increased demand will have to be accommodated for the institution to maintain its competitiveness in excellence and distinctiveness. As information technology evolves at Georgia State over the next several years, the IS&T unit should continue to enhance support of the local information technology support staff in other units within the institution. At the same time, IS&T should continue to provide basic "institutional baseline" services for the entire institution, serving as both a "safety net" for units not having local support staff and as a minimum standard of information technology services available to the institution as a whole. These baseline services will include essential network services, server services which support the provision of institutional services, instructional support, computer and network operating systems, campus-wide provision of baseline office suite workstation software, e-mail services, Web browser tools and similar related items.

The optimal technology support strategy for a specific unit will depend upon its needs (or expected benefits) and the associated costs of these benefits. Some units will need a high ratio of information technology support staff to technology customer and, therefore, may need to retain a larger number of local support staff. Other units may have significantly lower ratios and, hence, lower local expense levels. Some smaller colleges, schools or departmental units may wish to obtain local support by contracting for services from the institutional (IS&T) units, thereby taking advantage of economies of scale which may exist for them. A critical aspect of this evolving support paradigm is in its being "*layered*", that is, the individual support environment is based on the existence of a local departmental baseline of supported services that are, in turn, based on the existence of an institutional baseline of supported services. By following this strategy, flexibility and adaptability are maximized at the individual and local level, yet standardization and common benefits can be maximized at the institutional level. A study should be undertaken to better understand the support service requirements across the primary institutional constituency groups.

2.6 A Vision for Information Technology Effectiveness

As part of the planning process, *Vision for Information Technology Effectiveness* at Georgia State University has evolved. The major goals and initiatives presented later in this plan reflect this vision. The vision is that:

- All faculty, staff and students will have unhindered information accessibility via a stable and robust networking and computing infrastructure as appropriate to each individual or local unit of the University;
- Each faculty member will be able to make full and effective use of technology in instruction and research through an individually appropriate use of training, desktop workstations, workstation support, and shared information technology resources;
- Courses and programs that are delivered electronically, or have technology-integrated components will be improved and expanded due to the availability of appropriate technology-equipped classroom facilities and instructional technologies and support to faculty and students. Web-based classroom management software is used to enhance traditional classroom-based courses;
- Support for all users of technology will be appropriate for their individual and local unit needs, yet systematically deployed by the University as a whole to maximize delivery to and minimize complexity and inconvenience for the user;
- Administrative support for the academic mission will be enhanced by appropriately employing information technology to enhance business process effectiveness and efficiency;
- Appropriateness for use of technology will be determined by systematic application of analyses of benefits and costs associated with this use.
- The University will utilize enhancements in technology to strengthen and develop the many relationships that sustain an institution – students, alumni, donors and partners.

3. SCOPE, VIABILITY AND MODIFICATION OF THIS PLAN

In this planning document, all information technology and information systems of Georgia State University are being discussed. This includes information technology planned, developed, operated and supported by the institutional information technology units (IS&T), schools, colleges and administrative units. The major goals and initiatives recommended by this plan are strategically significant to all units of the University. However, this document is intended to reflect major institutional directions initially, with subsequent addition and modification to include corresponding plans of respective units within the University.

This University strategic information technology plan is intended to be a “living” document, the primary purpose of which is to serve as a communication vehicle across the institution. For a planning document to remain viable, it must be modifiable. In addressing this specific dynamic area of information technology, plans must be rapidly adjustable and revisable on a short time cycle. Attempting to develop a strategic document for a time frame of five years is nearly impossible in this arena. Consequently, it is anticipated that this document will serve to initiate a steady modification cycle of planning for information technology within the University.

At its initial adoption, this plan will consist of the primary goals or initiatives recommended and adopted at the institutional level. In the upcoming year, two subsequent activities will occur. First, a more detailed action plan will be developed within the appropriate advisory groups and management levels for specifying how strategic institutional initiatives will be undertaken. Second, each major

organizational area, whether it be a college, school or vice-presidential functional area, will undertake the development of its own information technology strategic plan. These unit plans must be consistent with the institutional information technology strategic plan and take into account the adopted primary initiatives in this plan. Each unit will be required to submit to the CIO their respective unit plans for compilation and integration into the institutional plan. Even though preparation of these unit plans will be a challenge, as they are integrated with the institutional plan, a living document will evolve representing articulated institutional and unit plans. On an annual basis, specific action plans will be co-developed with the Information Technology advisory committees that will reflect these strategic initiatives and establish goals for the upcoming year.

4. RELATIONSHIP TO THE UNIVERSITY STRATEGIC PLAN

In any discussion of these initiatives, an important point is that effective use of information technology, having become integral to universities in the twentieth century, will be essential to the “eUniversity” in the twenty-first century. For example, “virtual universities”, or “universities without walls”, have already appeared in which information technology techniques are exclusively used to deliver instruction. Recent reports indicate that a majority of corporate-level education is now being delivered in this fashion, and these efforts will continue to spill over into the more traditional domain of university-based education. While to some, this may seem to be an overuse of information technology; it is nonetheless a clear illustration of information technology’s power to play a central role in twenty-first century universities. From this perspective, therefore, the University’s Strategic Plan clearly recognizes that success in achieving its goals requires that Georgia State University significantly enhance its capabilities in, and strongly promote the use of, information technology within its community.

As its major initiative in the area of *Enhance the Academic Mission*, the University Strategic Plan focuses on the infrastructure that supports teaching, learning, and scholarship. Within that initiative, the overall goal for information technology is that of “... an enabling technology ... allows for new dissemination mechanisms and new ways for students to engage in inquiry-based learning ...”.¹ Several important goals and priorities in this area were directly focused on enhancing specific functions and general objectives within the information technology area. In the area of *Support for the Academic Mission*, the major initiative is to “... become and remain current in the application of computing and information technologies.”² Students, faculty and administrators all require access to adequate network and infrastructure capacity, and a goal is to plan for these requirements in advance of when they are required.

5. UNIVERSITY STRATEGIC GOALS FOR INFORMATION TECHNOLOGY

Guided by the University’s Strategic Plan, this document elaborates on five *Strategic Goals* for successful use of information technology at Georgia State University that are necessary for meeting the University’s goals.

- ***Information accessibility;***
- ***Technology-enabled faculty, staff and students;***
- ***Technology-enhanced education;***

¹ The University Strategic Plan, Section II A b 5 – Information Technology

² The University Strategic Plan, Section II B f - Technology

- ***Business process effectiveness;***
- ***Technology-enhanced relationship management.***

The primary role of an academic institution is the collection, distillation, interpretation, and communication of information, and the development of skills necessary for doing so. With the advent of “digital convergence” in which hitherto analog forms of information (i.e., paper, picture, film, audio and video tapes) are becoming digitally based, information and the activities surrounding its use should become digital as well. Thus, accessibility requires a strong technology infrastructure to support and move the underlying digital content. Once, a distinguishing characteristic of major universities was the size of their library holdings. Increasingly now, the accessibility and availability of information bandwidth is a comparable characteristic. Evidence for this is the massive investments the leading universities have made, and continue to make, in their information infrastructures. Over the past four years, Georgia State has become increasingly involved with other universities in the region and nation to develop and improve the next generation educational and research network, known as Internet2.

Unused libraries and laboratories, no matter their size, impact nothing. Similarly, unused resources and capacity of an enhanced technology infrastructure impact nothing. Faculty should therefore be provided with the tools necessary to take advantage of the capabilities inherent in the evolving knowledge digital convergence, and they should be provided with the training necessary to adopt and deploy such tools. For some, the need is self-evident; for others, it is less so. A major strategic objective, then, should be not only to encourage the “champions”, but also to educate and facilitate faculty in their use of technology in research and education.

Commensurate with faculty involvement in technology is digitally enhanced education for students: in class, in labs, at home, and in other places of study and exploration. Students expect technology-enhanced learning now and the University’s ability to attract and retain high quality students will strongly depend on the speed and effectiveness with which the institution enhances and delivers learning outcomes to a society that is increasingly technology-literate, connected, media-aware, and time/place sensitive. The metaphor of the university as a knowledge oasis is rapidly being replaced by an image of the “eUniversity” with anytime/anyplace knowledge acquisition and learning, which is a key element in the University Strategic Plan.

While a university is fundamentally an institution for knowledge creation, enhancement, and dissemination, it is also a large and complex organization, with administrators and administrative processes, clients, vendors, and stakeholders. From a business perspective, Georgia State University needs to make much more effective use of information technology to significantly increase organizational efficiency, improve decision making, reduce cycle-times, and improve service to our clients. Successfully attending to these needs will result in more effective investments in payrolls, streamlined management hierarchies, improved response times, adequate, consistent and timely information, competitive administrative procedures, reduced reliance on paper forms, and a variety of other operational improvements. The cost of achieving these improvements is high; the cost of not doing so is even higher. Again, the University Strategic Plan recognizes the competitive advantages to be gained through these types of improvements.

The University exists through its relationships with its constituents – students, faculty, alumni, staff, donors and the immediate community at large. The focused use of technology can serve to strengthen these relationships, and provide added benefit to each constituent group, thereby leveraging the knowledge of these connections to support targeted, personalized interactions.

5.1 A University Goal: Information Accessibility

In today's university, information technology is a basic infrastructure requirement for achieving its academic mission. It is no longer practical for every computer user to "rediscover" fundamentals of technology through the stages of experimentation required of the previous pioneers. Today's technology users are more concerned with achieving their objectives over a stable and reliable network. To make effective use of the network, users should have available to them sufficient resources in the form of servers, productivity software, and appropriate support services. In other words, technology users in today's university take networking, technology use, and necessary support services for granted. In essence, they consider these services to be an *Information Utility*. Utility services are expected to be ubiquitous and to enhance the user's ability to accomplish work, and they are certainly expected to present no obstacles to accomplishment. Such services are expected to be reliable, transparent, and responsive. As well, they should be provided routinely to all users: faculty, staff, and students.

To produce a successful information utility, basic physical connectivity and data transport mechanisms should be standardized, and proper capacity, or bandwidth, should be available to meet the needs of the users. Resources like servers, office application software, and e-mail should be available to all users in a broad and consistent fashion. All of these services should meet generally accepted standards embraced by the extended higher education information technology community. Access to these services should be independent of location of the recipient: classroom, office, lab, or home. Similarly, it may be beneficial to the University to consider receiving services from remote locations, and the network should accommodate this. A broad complement of support services is necessary to ensure adequate user training, diagnosis and management of user-experienced problems, and, where possible, problem anticipation and avoidance.

5.1.1 Enhance and Extend the University Network Infrastructure³

It is self-evident that ready and reliable access to information resources and technology-facilitated communication requires that Georgia State University faculty, staff, and students be connected to a network with the capacity to handle the traffic. Therefore, a top priority is to complete development of the network, and to redevelop it where necessary, so that all members of the Georgia State University community have unhindered access to the information they need. Also important is modernization of the network physical infrastructure. Modern network components can be managed remotely, making it possible to detect network problems quickly, or even to anticipate them before they occur, thereby permitting correction before users are aware of a problem. The results of a network design study completed in 1997, with annual review, has led to the installation of, or redevelopment of, the network connectivity in 22 buildings on and off campus. Of the initial 22 buildings, 20 were programmed for upgrade, and 11 remain to be completed. The lifecycle of networking equipment is such that equipment installed early in the project is now requiring upgrades or replacement. Given the rapidly changing face of networking technology, and its strategic importance to the institution, it is advisable to investigate options that would permit the accelerated completion of the remaining buildings. Additionally, all new or renovated properties being added to the University plant are designed and equipped with these standard network infrastructures as part of the construction or remodeling costs.

³ "A goal is to complete the basic fiber optic backbone and the accompanying vertical risers and horizontal in-building connections for networking campus academic and administrative buildings." (Strategic Plan, II B f – Technology)

The university should continue to develop a network architecture and information security plan that will outline opportunities for use of new technology and protection capabilities in advance of actual need on the campus. This will ensure that appropriate attention is given to necessary capital improvements and their support of the University's mission.

5.1.2 Ensure Appropriate Off-Campus Network Access:

The need for high-quality digital communication capabilities is not confined to on-campus locations. For example, given the low proportion of students resident on campus, much of student access to online course materials including library facilities occur from off-campus. As faculty make more course materials available electronically and integrate technology-enabled collaboration in learning experiences, the demands for off-campus access will increase. Members of the university community should be able to access library materials, for example, from off-campus locations, and they should be able to effectively communicate worldwide in collaboration-related activities. A critical component, especially in today's increasingly interconnected and "always connected" environment, is the requirement for secure Internet communications, and protection from inappropriate Internet access. Efforts should continue to enhance the quality and reliability of service from the university's providers. Georgia State should continue to participate in nation-wide and regional networking collaborations such as the Internet2 Abilene network and SURAs Southern Crossroads high bandwidth aggregation point (currently co-sponsored by Georgia State University, Georgia Tech and the University of Georgia). Involvement in these organizations has provided a high-speed and reliable network for research uses, and has led to significantly increased bandwidth to the traditional Internet at no additional cost to the institution. It is probable that these increases will continue in the future.

Five years ago, the institution decided that it did not have sufficient resources to provide off-campus access to the Internet for students, and encouraged students to obtain access via a third party Internet service provider (ISP). At that time, Georgia State had ninety modems and the decision was made not to continue enhancing that service. Although the technology is approaching obsolescence, it is still used by faculty and staff. Given the wide range of options for ISP connections, the institution needs to continue its direction set in 1996 and disengage from continuing to act as an ISP for faculty and staff.

5.1.3 Ensure Effective Delivery of Information Technology Support:

The Associate Provost has re-organized the technology and systems support staff within and across the institutional information technology support organizations with the objective of ensuring high-quality service to the user community. The primary mission of these units is to support University-wide information technology activities and assist in determining various local support options for individual units. However, the institutional support units are not expected to be the sole providers of these services; instead, many academic departments, schools, colleges and administrative units have their own information technology support staff. This condition reflects the twin facts that some services are common to the University while others are unique to localized groups and may best be provided by persons who are locally available to provide support. To effectively develop and use this blend of centralized and decentralized support, clear delineation of responsibilities and coordination of activities are essential. As an example, network establishment, monitoring, management and support have now evolved into an institutional imperative. On the other hand, on-site support for

workstations and software issues for technology users might be better accommodated by local support staff. How local support is provided should be defined by the circumstances and needs of the local unit within the broad, general boundaries of institutionally acceptable practices.

In its role as provider of broad-based services to the University community, units of IS&T should continue to have as a primary focus the support of local information technology staff within departments, schools or colleges. To optimize delivery of service to all customers, efforts should continue to develop an effective group of university-wide information technology support professionals cooperating on decisions with university-wide impact. Fundamental to success in this overall effort is continued improvement in communications between the institutional support units and their customers, with the objective of establishing a climate of cooperation, mutual respect, and confidence. A subcommittee of the Senate Committee on Information Systems and Technology, the Information Technology Support Subcommittee (ITSS) has accepted this charge and acts as a focal point for IT support topics.

Another concept in technology support that deserves investigation is the use of knowledge-based solution sources, e.g., automated help center services, that are designed to provide self-service access into databases of known problems and solutions.

5.1.4 Continued Assessment of Information Technology Staff Positions:

Because qualified personnel are required to deliver effective service, an institution-wide IT Staffing study was completed in 1999, resulting in the establishment of industry-standard job titles and compensation levels for all technology support staff. Even though there has been significant acceptance of the new titles, there has been minimal support for addressing the study's assessment that the average technology support staff is under-compensated by 20% compared to regional pay levels. The University was able to fund adjustments to the minimum of the pay grade for those whose pay grade changed. In the coming years, attention should be placed on developing a strategy to narrow the gap between University compensation and local compensation levels, particularly for the most qualified and seasoned IT staff members.⁴ In cases where staff cannot be retained because of salary discrepancies, the institution should investigate the option of outsourcing the particular service.

5.1.5 Evaluate Services and Customer Satisfaction:

Essential in determining the effectiveness of provided services and degree of customer satisfaction is the definition of "quality", and establishment of techniques for measuring the quality of service delivered. Assessment of the quality of information technology support cannot be done for either the institutional staff or the local staff independently. This evaluation of services requires examination of the interaction among individuals in these groups. The CIO should undertake a jointly developed information technology support evaluation mechanism that will allow end users of technology to assess and contribute information about the "total support system" made up of both local and institutional support activities and staff. As a result, the University will obtain measures whereby information technology support services can be holistically evaluated. Also, the staff providing these services should be partially evaluated based on the contributions these individuals make to a cooperative, well-articulated support environment. We must also continue relating services to customer satisfaction, and continue pursuing the consolidation of units that provide the same or overlapping services without clearly providing additional value.

⁴ "A goal is to continue to close the gap between average salaries and median market salaries..." (University Strategic Plan, Section II B c – Staff)

The University needs to make an assessment of the information technology costing strategy on campus. In some cases, expenses are budgeted as institutional infrastructure items and for others, partial cost recovery techniques are used. More focus needs to be placed on developing methodologies for determining when constrained resources have become “over-drawn”, and devising strategies for appropriate renewal of those resources.

5.1.6 Establish Campus-wide Standards:

An important aspect of successful interconnectivity of computing devices and services is development of institutional standards to promote effective use and support of information technology.

Standard environments can significantly enhance the ability of the University to effectively use and support the information technology environment. For example, well-defined and communicated standards could promote the following kinds of outcomes:

- An incoming student or faculty member arrives on campus with his or her notebook or desktop computer. The student or faculty member knows the hardware and software standards that have been adopted for plugging this computer into the campus network. Whether in offices, classrooms or libraries, a connection is easily accomplished.
- A local information technology support person leaves employment. The faculty and staff in that local unit know that standard procedures had been followed by that support person so that the effects of this turnover will be minimal and replacement of the staff person with another qualified technical support person is simplified. Because the same standard procedures are followed in the institutional information technology units in IS&T, temporary support can be provided to the local unit by IS&T.
- Even though faculty are often in unfamiliar classrooms, they know what hardware and software are available in the classroom, the resolution of displays and projection equipment and operating procedures for the equipment, regardless of what classroom is being used.
- Adoption of standards by groups of technology users results in a critical mass of knowledge that is more easily transferable within the group than if each individual uses different solutions and methods.
- A staff person who uses a standard-defined administrative workstation connected via a standard-defined network to a standard-defined server can immediately swap out the failed computer with a replacement computer that complies with the standards. This will be critically important in a client/server administrative system environment.
- As staff members and faculty move around the University and take on (or release) new roles and responsibilities, the necessary data, access permissions, software, and network devices are automatically added/removed from their use by employing a common global active directory or repository.

The adoption of standards does not necessarily imply authoritarianism. Standardization, where the service or product provided supplies a generalized solution, can serve to benefit the community. For instance, the recent purchase of Microsoft Office and operating system licenses for institutional and employees’ computers has simplified the installation and upgrade process for these basic computing

functions. WebCT has been accepted as the current course management system for both Georgia State and the University System. When it has been in the best interest of Georgia State, University System-provided administrative software, such as Banner and PeopleSoft, has been locally adopted. Georgia State should continue to recommend that the University System implement various standards as appropriate. The institutional support units within IS&T should promote, foster discussion, communicate and educate the community about the need for standards. Once those affected have had an opportunity to participate in the definition of the standard, e.g., members of the ITSS (Information Technology Support Subcommittee) and the TLTS (Teaching and Learning with Technology Subcommittee), these must be implemented for the campus.

5.1.7 Effectively Manage and Distribute Servers:

Currently, local units across campus maintain well in excess of 100 network file servers. These make use of various network operating systems, such as UNIX, Windows NT, and Novell. In addition, the servers meet no specific standards in terms of software, security configuration or hardware, and they may also serve as communications devices by acting as routers, bridges or gateways to other network segments. The communications function of local servers must be replaced by more modern, reliable, and manageable network devices (switches, routers, etc.) that are not server-dependent. In addition, discussions must continue within the community of a plan to systematically replace the many distributed servers with a much smaller number of more capable and reliable “super-servers”. The resultant decrease in complexity and increase in serviceability are significant.

Over the past several years, many units and departments have successfully migrated to institutionally provided servers. With the continued deployment of GSUNet2, and the resulting elimination of the requirement to place servers in close proximity to the users of the servers, this trend should continue. As servers age and need replacement, consideration should be given to utilizing these institutional servers, which are located in a 24x7 managed facility with power protection and services such as data backup and disk space monitoring. However, it must also be recognized that some academic units and their associated programs require software configurations not likely to be “standard” on institutional servers, and that these will need to be accommodated within the University’s policies.

A new emerging trend that bears examination is the provision of centralized account management for these servers that would provide automated account creation and deletion. The benefits include a common methodology for account creation that implies a more streamlined process for this tedious task.

5.1.8 Enhance Support of Library Initiatives:⁵

An easy extrapolation of current trends predicts that libraries of the twenty-first century will become major foci of information technology activity. Already established at Georgia State University, and within the University System of Georgia, the Galileo system provides a glimpse of the future. Georgia State University’s leadership role in Galileo, and in library technology within the University System of Georgia, provides the Georgia State University community with a significant resource for achieving its academic goals. Therefore, technology support within the library must be maintained at

⁵ “Georgia State University will continue to support the libraries’ technological advances.” (*Ibid.*, Section II B f - Technology)

a level ensuring adequate development. In particular, as more electronic, full-text and full-image files become available, the Galileo servers will need regular enhancement. Transmitting the files, especially those with images, to users across campus will create high traffic on the network further underscoring the need for a fully developed campus network infrastructure. Attention must also be paid to the potential of using handheld devices for viewing of Library provided documents along with associated connectivity and security requirements of these devices. Georgia State has contributed significantly to the development and implementation of the next generation library information system, known as GIL – GALILEO Interconnected Libraries. As a regional service provider for the GIL system, information for twenty libraries within the University System is stored and managed on servers located in the IS&T Operations Center. The University should continue committing resources appropriate to its desired level of involvement in these projects.

5.1.9 Enhance Internal and External Communications:

Current trends indicate a convergence of voice, video, and data technologies. Users should have simplified and consistent access to these services at their desktops. With such access, users will be able to work collaboratively from their desktops using technological capabilities such as: shared document revision; “whiteboard” interaction; desktop teleconferencing; and, integrated seamless voice, video, and e-mail communication. Ideally, an individual should have access to his or her “in-box”, electronic mail folders and other collaborative tools from any location, using a wide variety of generally-accepted Internet-based, open system e-mail clients or network-based devices. A single individual electronic identifier that is available throughout an individual’s involvement with the University would determine access to these various stores of information and tools. Enterprise directory services for these electronic identifiers would need to be retained in a consolidated location that is accessible by most generally accepted software programs as well as security software. Additional benefits derive with a standards-based e-mail directory, such as query capability for generating e-mail lists. An individual’s ability to use these services should not be affected by the non-availability of a specific server.

Planning must occur related to desktop videoconferencing software and the impact this will have on network bandwidth. Significant standardization has occurred with desktop videoconferencing software, and the University should earnestly begin experimentation with H.323-based products. Basic videoconferencing requirements should be specified by the individual departments with specific standards-based recommendations coming from the University Computing and Communications Services unit within IS&T.

The concept of directory services (identifiers, authentication, and authorization) includes the idea of an enterprise-wide registry that serves as the source for establishing an individual’s “e-identity” at Georgia State University. A common starting point for all individuals will serve to simplify the complex processes currently in place to distribute person information to various University applications.

5.2 A University Goal: Technology-enabled Faculty, Staff and Students:^{6,7,8}

The importance of information technology as a tool in faculty activities, for both research and instruction, cannot be overstated. To perform as teacher-scholars at the level of accomplishment sought with the Strategic Plan, Georgia State University faculty need to have up-to-date desktop resources, high availability of network access, and knowledge about how to use the resources effectively. Similarly, many staff require effective information technology and related support to accomplish even their most fundamental responsibilities. Students exposed to a technology-enabled faculty member in only one course can quickly become dependent upon using technology significantly in their routine studies that follow. Many students arrive at Georgia State University already “wired” and ready to continue their pattern of using information technology to advance their studies. In fact, some students are diligent in seeking to understand the “wired” capacity of potential institutions. To our credit, Georgia State University obtained a ranking of 67th in the top-100 wired institutions in 1999, according to Yahoo’s Internet Life survey. To support the basic infrastructure, the institutional information technology units in IS&T must maintain high-quality staff resources. The institution is best served by sharing staff whose expertise is in short supply; all the expertise does not necessarily need to be in one unit, it can be drawn upon by all.

5.2.1 Ensure Faculty and Staff Development in Technology:

For research and other office-based work, information technology is important to faculty outside the classroom, and is critical to staff in carrying out duties expected of them. However, new installation of a major software capability without adequate training and support can leave users bewildered about the use of available functions, and may leave them as non-users. Therefore, an assessment should be made of the extent to which it is appropriate to provide, or offer, training to the broader University community. Many avenues are available for offering such training. It may be provided in electronically enhanced classrooms, led by trainers, or by means of multimedia courseware available over the campus network for use on an individually paced basis. The University Educational Technology Services (UETS) unit of IS&T has the primary responsibility for providing campus-wide training in general networking and product support. Other units do have expertise in specific areas and also offer faculty development programs. Development in the use of technology in instruction is coordinated through the Teaching and Learning with Technology Center (TLTC). UETS should continue to assess the mixture of different modalities of training delivery and select the most appropriate modality for the constituency and circumstances being addressed. Training material packets could also be developed by IS&T for delivery by local support staff within local departments.

5.2.2 Provide Appropriate Workstation Support for Faculty and Staff:

To achieve the goal of a technology-enabled faculty and staff, suitable resources must be provided to them in the form of desktop workstations, network connectivity, and staff support to ensure proper functioning of the workstations within the Information Utility. As discussed previously, staff support will be provided as an appropriate mix of IS&T and local personnel working together in a cooperative and collaborative manner. The specific support strategy must be determined at the local unit level,

⁶ “Faculty and staff will need the support of human resources, equipment and classroom facilities in the transfer and application of technology to new learning environments.” (*Strategic Plan, Section II B f - Technology*)

⁷ ”All students should have ready access to computing resources and an opportunity to develop information management skills for lifelong learning.” (*Ibid., Section II B f – Technology*)

⁸ “Administrators will need easy electronic access to data on which to base decisions for execution and continuous improvement of the University’s activities”. (*Ibid., Section II B f – Technology*)

within broad boundaries established at the institutional level, with particular attention to funding the support posture.

Significant improvements to workstation management will be achieved by combining the use of standard software, where feasible, with the use of tools that can automatically perform software installations and upgrades. The University needs to proceed with widespread deployment of these types of tools.

It is prudent for the institution to be aware of its current PC support staffing levels, and to consider benchmark ratios available from respected sources. Industry data for PC support staffing levels is reported as a ratio of 1 support person to the number of PCs supported. A Research Note from GartnerGroup indicates that a typical staffing ratio for “moderate technology adopters with medium technical requirements” varies from 1:90 to 1:130. Current data for Georgia State indicates that there is a wide variability in the number of PCs supported per support person. In general, it can be concluded that units with department-supplied support staff are better staffed than the averages indicated by GartnerGroup – they average 1:78. Units that are supported out of the IS&T Workstation Support pool (safety net support) fare poorly according to the GartnerGroup data – they average 1 support person per 358 workstations.

It is also reasonable to reflect on the direction stated by the 1997 IT Strategic Plan that concluded “on-site support for workstations and software issues for technology users might be better accommodated by local support staff”. It appears to be the case that the departments that have adopted this strategy are providing PC support ratios in the range of industry standards, and probably are receiving more responsive PC support than that available to the departments supported by the safety net staff.

5.2.3 Promote Effective Research Computing:

By historic definition, a university is distinguished from other educational institutions by its scholarship, i.e., the generation of new ideas and new entities. Georgia State University has achieved the goal of Carnegie Research II status, now called “Doctoral/Research University-Extensive”. Having met this objective, Georgia State University must continue to pay particular attention to meeting research computing needs. As new needs arise, and as computing hardware evolves, the University's objective will be to achieve the proper balance of general-access hardware (such as CHEETAH) and localized specifically-configured hardware to best serve the research and collaboration needs of the students and faculty. Associated with research computing are several needs such as appropriately configuring new systems (whether localized or general-access) for network operation, security, managing system-level operation, and managing the necessary application software. University Computing and Communications Services staff in IS&T will assist, as appropriate, in meeting these needs. In particular, they will serve as expert resource persons for any local information technology staff in the academic units. This is an extension of the general supporting role of institutional information technology support staff for all units of the University with particular attention to those activities that contribute directly to achieving the University's research goals including that of retaining our current Carnegie classification.

For the institution to continuing making strides in the area of research and provide the requisite technology infrastructure, an assessment needs to be done to determine how research overhead can be distributed to accommodate this.

5.2.4 Foster Technology Experimentation:

It is important for the University to remain abreast of changing technologies, both hardware and software, to support its research and instructional missions. For example, software that could enhance the abilities of teachers and scholars continues to arrive on the market, but individual departments now fund and support both acquisition and use of such software. Further, a mechanism is needed for University-wide dissemination and wider implementation. The Quality Improvement Fund (QIF) grants provide funding that supports these initiatives. However, the Teaching and Learning with Technology Center and the appropriate units within IS&T should review the proposals for consistency with this plan. While institutional underwriting to incubate creative uses of technology by faculty at the University is essential, at the same time, strong institutional instructional technology support from the University Educational Technology Services unit of IS&T, in conjunction with the TLTC, is necessary to ensure cultivation of these initiatives and the transfer of results to the broader community.

5.2.5 Provide Effective Information Technology Services for Students:

A contributing factor in Georgia State's richness as an institution is the diversity of its student body. This diversity, however, is also manifested in the information technology arena. The University must continue to recognize that a wide disparity may exist across the student population regarding their respective understanding of and accessibility to information technology resources. Georgia State was successful in influencing the Board of Regents to permit the establishment of student technology fees. With that funding available, the institution is now challenged to administer and execute the technology that is most effective and appropriate for our students. The implications for technology support of a non-traditional-age student who is working full-time in Atlanta are significantly different from those related to the traditional-age, residential student in University Village. Making sure that students are "technology-enabled" may be as challenging and complex an undertaking as doing the same for faculty and staff. The University should also encourage the creative use of information technology to enhance student life through provision of information about their possible careers, student handbooks, counseling services, health education and activities or events. E-mail services should be made available students at the appropriate time in the application process to provide enhanced communication with faculty, other students and administrative offices. Finally, Georgia State should ensure that information technology is intentionally planned to foster a sense of identity and community among the student body. The University should develop technology-supported programs for faculty-student interaction, student study group work, student leadership development, mentoring programs and similar relationship-building capabilities.

5.3 A University Goal: Technology-enhanced Education

Delivery of academic services can be enhanced by many new technological capabilities. Both instruction and learning can benefit from technology. The delivery of instructional materials is moving from paper to electronic media. In the main, students find their syllabi on-line or receive them by e-mail before class begins through a Web-based course management system, students can receive instruction, ask questions, and receive answers both from electronically-stored materials or from real-time interaction with an instructor. The interaction on the Internet can take place by web surfing, e-mail, voice conference, or videoconference. Georgia State has developed a virtual classroom in which class is conducted via simultaneous connection to the Internet. Students have ever-expanding, remote access to library materials, class materials, and instructors on their own campus, other

campuses in the state, the nation, and the world. At the same time that capabilities are expanding, the cost of implementing these capabilities is decreasing. It seems certain that there will be more and better use of technology in instruction and learning. It is crucial that support services for the increasing numbers of technology-enhanced courses be factored into the initial requirements.

As the use of technology grows, the University has the ability to remove barriers of time and place that prevent many individuals from enrolling and benefiting from Georgia State programs. For instance, participation in the GSAMS video teleconferencing network has enabled the University to offer several of its graduate professional programs on a statewide basis. The University System of Georgia has stated that the current GSAMS hardware is becoming obsolete and the participants need to be planning for a change in the system. Georgia State should take a leadership role in this effort, and an assessment of the needed responsibilities should be undertaken. Further, as more and more faculty are placing courses on the Internet, students are able to participate in these courses, at any time, from any place. Removal of these barriers is particularly important to serving a highly mobile, adult student body in an urban setting. For the University to gain maximum benefit from such programs, effective faculty development programs will be required, a necessity recognized in the University's strategic plan.^{9,10}

5.3.1 Establish Appropriate Levels of Technology in Classrooms:

If the University is to achieve the goal of technology-enhanced education, along with faculty training and development, it must equip its classrooms and laboratories appropriately. Within the Classroom South building, there are a number of technology-enhanced classrooms that enable faculty to be more productive in their teaching. Over the past four years, many classrooms have been enhanced with an instructor's workstation, laptop connectivity for the instructor and a built-in digital projector. However, the need to continually upgrade classrooms was recognized in the University Strategic Plan.¹¹ The Classroom Facilities Council has assessed the need for various forms of technology in classrooms. These activities should continue in conjunction with the Teaching and Learning with Technology Center (TLTC), resulting in a set of standards and the identification of which rooms fall into what categories. In conjunction with the Classroom Facilities Council, UETS should track the evolving needs for technology-equipped classrooms so that Georgia State can plan how to accommodate the growing need for technology classrooms and other technology facilities for supporting courses.

5.3.2 Ensure Availability of Information Technology Resources for Students:¹²

The recently initiated student technology fee significantly enhances Georgia State's capacity to provide technology resources for students. Included in the FY2001 technology fee expenditures is the replacement of 1/3 of the computers in the open access labs, in the libraries and in many department-

⁹ "... developing a "learning infrastructure" of learning tools and interactivity that can be fused with traditional on-campus learning". (Ibid., Section II A b 5 – Information Technology)"

¹⁰ "A goal is to explicate a strategy for development of a selection of hybrid courses." (Ibid., Section II A b 5 – Information Technology)

¹¹ "Training and access to improved facilities and technology support will be an important enabler for electronically mediated learning." (Ibid., Section II A b 5 – Information Technology)

¹² "All students should have ready access to computing resources..." (Ibid., Section II B f – Technology)

specific labs. Other expenses support an increase in the size of the main open access lab by 25% and provide for wireless network connectivity in the plaza and the open areas of Student Center. Additionally, a new comprehensive e-mail system for students will be deployed.

5.3.3 Engage the Academic Community in the Use of Technology: ¹³

In the year 2000, the Teaching and Learning with Technology Center (TLTC) was established with a director in order to encourage more effective use of technology in the academic environment. A charge for the TLTC is to coordinate, from a faculty perspective, all the appropriate support units involved in providing faculty support for technology. The primary institutional support unit for faculty is University Educational Technology Services (UETS); other support units on campus are the Division of Distance and Distributed Learning (DDL) and the Instructional Technology Center (ITC) in the College of Education. The goal is to simplify the process and articulate an institutional strategy for enhancing and extending the use of information technology in curricula and other academic activities. In doing so, the focus should be on both faculty and students, and on techniques for enhancing research, teaching, and learning. Basic technology support services for accomplishing these objectives should be identified and provided to the academic community as a baseline institutional support infrastructure. Examples of these services include instructional design services, assisting faculty in finding or preparing web-based course content such as animations and simulations and assessment services.

In 1997, Georgia State University chose WebCT as the primary web-based course management system. As of this writing, there are approximately 1200 institutional courses on the WebCT server; produced by 450 faculty designers, and every student can easily be given a WebCT userid. These statistics represent a significant engagement in using technology to enhance teaching and learning. As other infrastructure applications permit, WebCT should be more fully integrated into institutional processes such as enrollment, grade reporting and assessment.

5.4 A University Goal: Business Process Effectiveness

Georgia State University's business processes will be carefully scrutinized to streamline the institution's operation and to determine minimum service levels required to effectively perform these functions. More simplified business processes are needed for more timely service and this can be accomplished by a participative analysis of business processes. As a result of changes in business processes, the nature of administrative work will change from routine transaction creation and distribution to acting as a "knowledge worker" capable of analyzing and resolving business problems. This requires assistance in software and hardware support, professional development, and relevant training to work in a newer technological environment. The provision of more effective services to students, faculty, and staff should enhance Georgia State University's competitive edge and posture the University to take advantage of new products.

The time it takes to complete a task, respond to a request, or deliver a service is referred to as the "cycle time" of the underlying process. Reducing cycle-time has become a major focus of both public and private institutions as a client-focused measure of operational efficiency. Some examples of cycle-time relevant to universities include: the time to respond to a student's application; the time

¹³ "The purpose is coordination of the on-campus services for faculty that can provide training and support so that faculty may take advantage of the opportunities that information technology offers for improving student learning." (Ibid., Section II A b 5 – Information Technology)

required to order and receive supplies and equipment; the time it takes to be reimbursed for travel; the time required to obtain a needed journal article; the time needed to change a course description; the time to respond to a research grant proposal. The University's ability to adapt and successfully respond to needs is critically dependent upon the cycle times for these many processes. At present, many of these cycle times are far too long and increasingly non-competitive.

Information technology is now widely used to significantly reduce cycle times, by supporting re-engineered processes wherein electronic documents are moved through a shortened set of (non-sequential) steps, and the intermediate decision-makers have, at their desk, the information needed to complete their task and move the process to the next step. The basic technologies include: workflow system software; electronic imaging hardware and software; combined with electronic document management systems; and ready access to data needed to process or authorize a procedural step. It can also include other forms of collaborative software such as group authoring systems, audio/video conferencing with "whiteboard" facilities (the ability to reference and manipulate a working document electronically while conducting an audio or video conference) and remote access to systems for inquiry and update tasks.

Not covered by current, computer-based administrative systems, or their probable replacements, are a variety of mundane, time-consuming, business processes which are, at present, paper-based (*e.g.* student appeal procedures, key control and authorizations, personal reimbursements). Newer technologies, including document management, workflow systems, and "intranets", make it possible to develop simple, cost-effective replacements for these labor-intensive manual processes while at the same time reducing both the cycle-time to completion, and the quality of the results. The development of such administrative support systems requires an examination of the current processes, revisions based on improved use of information technology, and implementation using the newer technologies.

5.4.1 Improve Efficiency of Operations:

The technologies of document management, workflow systems, and intranets, should be applied incrementally to a prioritized list of basic business processes where existing cycle-times endanger the proper functioning of the University and/or affect the perceived quality of service offered to current and prospective stakeholders (students, faculty, staff, research bodies, government agencies, alumni and other supporters, etc.).

One business process that is becoming more and more critical is the ability to quickly integrate an individual into the University's electronic systems. As the number of applications requiring userids proliferate, it is a very time-consuming process to define userids, reset passwords and provide the appropriate access to the appropriate systems. Of concern from an audit and security standpoint is the ability to quickly eliminate or modify access when appropriate. Many of these systems permit users to manage all their passwords from a single interface, and permit the distribution of access and authorization to different areas. After the establishment of the University directory infrastructure, automated userid management systems need to be assessed and at a minimum, a trial deployment should be undertaken.

5.4.2 Institutionalize the Data Warehouse System:

A data warehouse system that has been derived from existing data and subsequently extended has been deployed. This system has been very successful in presenting student information to deans and other academic administrators in ways that have improved the decision making process for current

topics such as unmet demand and student retention. Effort must now be undertaken to institutionalize this environment using standards-based commercial, off the shelf products. This will ensure the sustainability of the existing system and facilitate further expansion into other areas of use, particularly in the financial and research arenas. An emerging Decision Support System has recently been formed as a collaboration between Institutional Research, IS&T and various user groups. This effort should continue as an institutional initiative.

The University collects, at considerable expense, an extraordinary amount of data about all aspects of its operations and its members. This aggregation of data is potentially useful to anyone having to make decisions about the University's governance and direction. However, these data repositories are contained in a variety of places and formats, making it nearly impossible to use the collected data for such purposes. By copying data into a central institutional data store that is designed for decision-making, rather than transaction processing purposes, it is possible to have data as a true information resource. That, in brief, is the concept underlying a data warehouse - a database designed for query by decision-makers, whose data is obtained as a by-product of existing processing systems.

A data warehouse, while a usable store for such data, is a means and not an end. To make use of this data, the warehouse should be coupled with improved data-aware, analytical tools. These are called "On-Line Analytic Processing" (OLAP) tools. OLAP tools enable a user to identify and analyze trends, perform visual pattern recognition (e.g. by superimposing map information on demographic data), identify problems and exceptions, and respond to "what-if" questions and a variety of other decision needs without having to learn about the underlying technologies, analytic techniques, or data organization. Much of this analysis is currently labor intensive, if it is done at all, and is based on separately collected data or the manual transfer of data from reports intended for other purposes. More often such decisions are *ad hoc*, or are naïve projections from the past (e.g., course schedules). In the present, rapidly changing, environment, such approaches to analysis are costly. Moreover, since everyone is forced to work from privately collected/extracted data, conflicts invariably arise with no rational means of resolution.

OLAP functionality should be acquired and disseminated throughout the University community.^{14,15} By making these web-based tools available, department heads, deans, directors and other administrators will be able to retrieve to their desktops usable information from standards-defined repositories. In turn, this should result in greater consistency in reporting information and reduced replication of work efforts in the respective units.

5.4.3 Replace University Business-Process Software Systems:¹⁶

Business software systems in use at Georgia State University for managing human resource and student data were developed in-house over an approximate 20-year period. As a result, they are rapidly becoming obsolete, are labor-intensive (expensive) to maintain, and require expert

¹⁴ "A data warehouse project has been initiated to provide on-line the minimal set of data useful for administrative decision making and reporting." (*Ibid*, Section II B d - Administrative Services)

¹⁵ "Administrators will need easy access to data on which to base decisions for continuous improvement of the University's activities." (*Ibid*, Section II B f - Technology)

¹⁶ "Further systems enhancements are needed in the near future, including a faculty information system, PeopleSoft's asset management module of the financial system, the Banner system for student accounts, and the PeopleSoft human resources information system." (*Ibid*, Section II B d - Administrative Services)

intervention to perform a non-standard query. The financial systems were replaced in July 1999 with three modules of the PeopleSoft financial application – Accounts Payable, Disbursements and Purchasing. Further steps must be taken to modernize the remaining “mission-critical” systems with new software capable of interfacing with standards-defined systems in use elsewhere in the University and the University System.

A project is currently underway to replace the legacy student information system with SCT’s Banner Student application. The Banner Implementation Project team has a goal of making this the "Best Banner Implementation Ever" by learning from and following the advice of the 1100 other universities that are using the software. Implementation will take place through a simple initial implementation Fall 2002 that will bring on line 15-20% of the capabilities of the software. Full implementation to take advantage of more advanced features (e.g., prerequisite checking and registration restrictions) will be gradually phased in over two to four years following Fall 2002. Implementation will be accomplished through the following guidelines: 1) protect credit hour generation for the university; 2) don't harm the system during the first registration cycles; 3) continue to build the capabilities of Banner during the post-implementation phase in order to meet all needs of the university community.

Additional systems to be modernized include a faculty information system, PeopleSoft’s asset management module and PeopleSoft’s human resources information system. An inquiry needs to be initiated into commercially available software for sponsored program management, to include both pre- and post-award operational systems. As the current mainframe hardware platforms are also rapidly becoming obsolete, installation of new software requires concurrent installation of new hardware platforms employing the “client-server” concept.¹⁷ In addition, the client-server approach, because of the distributed nature of the information and processing, places greater demand on the network in that traffic can be high; this in turn further supports the need for network enhancements. In the next releases of most of the business systems, more emphasis will be placed on supplying “thin clients” in the form of web forms accessible through a standard web browser. These changes will shift the network traffic patterns and may require adjustments to the network.

The primary challenge in replacing the business-process software systems is the expense associated with purchasing, and adapting to Georgia State University use, such major software packages, concurrent with the purchase of the new hardware that is also required. Moreover, the complexity and extent of the software requires that the “old” systems be maintained as the new systems are installed and tested, requiring, in turn, additional personnel during this period. As a result, careful study should continue to identify approaches to meeting this need within the financial means of the University. In particular, as the Chancellor’s Office is interested in installation of modern administrative software systems, every effort should be made to find ways to fund the transition from System-level sources.

¹⁷ Systems employing the “client-server” concept make use of several lower-capacity (and lower-cost) computers as the “servers” among which the information is distributed. Users, or “clients”, gain access to the data from workstations on which “client” software runs, thereby providing each user with ready access to the data and with individual computing power for processing the queries that meet their needs. In this concept, no single hardware unit has the power, or expense, of a mainframe computer; however the client workstations need significant computing power. This is in contrast to the mainframe concept where the user workstations function simply as terminals, and thereby require minimal computing capability.

5.4.4 Develop Operational Data Stores for Reporting:

Reporting availability for administrative systems, such as financials, student, HR and grant management, can be greatly simplified via the use of “operational data stores”. This data is typically an extract of the information from the transaction systems that is re-organized and re-formatted to be easier to understand. Use of third-party query tools that are web-based and easy to use make the information available very simply.

5.4.5 Investigate the use of Workflow Systems to supplement in-place Operational Systems

An increasing number of Universities using systems such as Spectrum have found that, while the system provides basic transaction accounting, it does not easily replicate or track the multi-level approval processes found in most Universities. Thus, some Universities are adopting workflow system packages that tie into the “backbone” accounting systems. This allows the use of pre-existing (and more familiar and detailed) forms, the prescribed electronic movement of these documents through the necessary approval process, and then interfacing directly with the underlying financial (and other) systems at the transaction level. And, as a by-product, more detailed transactional information can be captured at the local level that is not constrained in its organization by the overall “chart of accounts” that the backbone system operates with. Such systems then provide an electronic extension (and system of control) that is currently lacking in such systems as Spectrum, returns some degree of flexibility to the units in how information is captured, tracked and presented, while providing a direct interface to the backbone system without the need for data re-entry.

5.5 A University Goal: Technology-enhanced relationship management^{18 19}

Customer Relationship Management (CRM) is descriptive of software systems originally developed in the late 1980s and early 1990s that were focused on automating and standardizing the internal processes associated with capturing, servicing and retaining customers. According to a Gartner Group publication, “there is an enormous opportunity to leverage similar kinds of functionalities to deepen and intensify higher educational institutions’ critical relationships”.²⁰ It could be possible to utilize existing technology to generate automated financial aid notifications, automated tracking and targeted pro-active counseling of students in academic difficulties, targeted career advisory notifications, targeted course advertising and so on. Significant benefits can accrue from soliciting and maintaining information from a student from the first visit to Georgia State’s web pages, to the application process, and on to acceptance and enrollment. Naturally, all this information could be of value as the student progresses into alumni status. E-mails or customized web information about guest lectures in the student’s area of study or other applicable courses could maintain the bond to Georgia State even after graduation, and increase the possibility of donations.

¹⁸ “Supportive staff and administrative services with reliable physical and technological infrastructures help retain students and faculty. Strong external communications inform alumni, potential students, and other constituents of our accomplishments.” (Ibid., Section II A – Enhance the Academic Mission)

¹⁹ “Information technology allows for new dissemination mechanisms...” (Ibid., Section II A b 5 - Information Technology)

²⁰ “Trends in the U.S. Higher Education Market”, Gartner Group, Inc., September 18, 2000

5.5.1 Investigate Portal Technologies:

Portals act as a single point of entry for applications and data (structured and unstructured) throughout an organization, offering personalization for an individual user. Portals are web-based and can offer a single point of entry into the web and other institutional applications. Portals can provide context-sensitive information to an individual based on current status, expressed interests or any other differentiator. As well, the individual can customize the portal environment to streamline the interactions. An assessment needs to be done to determine institutional needs in this area, followed by analysis of products available.

5.5.2 Investigate Supply Chain Management:

Supply Chain Management (SCM) involves the flows of material, information, and finances in a network consisting of customers, suppliers, manufacturers, and distributors. The University should investigate use of these techniques in acquiring the materials and services (MRO) required for day-to-day operation. For instance, use of processes for pre-cleared purchases can simplify the manner in which standard materials are acquired. As well, the ability to apply on-line tracking methodologies for purchases could be very helpful. Improvements in efficiency and effectiveness relative to costs and time to deliver can be achieved by utilizing the power of the Internet to maximize the institution's interactions with suppliers and manufacturers.

6. SUMMARY AND CONCLUSION

This strategic plan provides a set of strategic initiatives to establish information technology at Georgia State University in the major supporting role it must play for the institution to effectively accomplish its mission. Common to the five strategic initiatives are the concepts of information access, application, and creation. Success in implementing these initiatives will require significant investment in resources that necessarily requires weighing their costs against other University priorities. For example, requests to create new technology-enhanced classrooms and/or laboratories should be justified carefully in a campus-wide context, weighed against the University's goals, and weighed against other needs within the institution. It is also necessary to remember that some important information technology support functions, in the form of staff and/or hardware, will continue to reside outside the institutional information technology support organization (IS&T). In addition, it is necessary that an appropriate balance of investment be maintained between faculty, staff, and student needs from a goals-based perspective. For this reason, a broadly based and effective information technology advisory structure has been established that reviews proposals for significant new expenditures against the University's mission and goals. Since information technology use is growing at such a high rate, it has been important to establish an advisory environment capable of dynamic response to rapidly changing priorities and opportunities. This has permitted both management of information technology issues and exercising responsible stewardship through control of University resources. Georgia State has an exemplary information technology advisory structure that is broad-based in nature to solicit input from all stakeholder groups.

Following adoption of this plan, an action plan must be developed which identifies the priorities and provides an estimate of costs to implement the initiatives and achieve the goals outlined in this plan. Among the specific steps discussed are ones requiring investment of funds, and others requiring investment of organizational energy. As the unit with primary responsibility for institutional information technology development and support, IS&T should take the leadership in the organizational items, including those that require establishing methods of appropriate cooperation with information technology support staff across the University. In addition, these IS&T units should provide the technical analyses and operational justifications in as clear and understandable a manner as possible for those strategic items requiring significant investment of funds. Such information is important to making effective decisions in the face of budgetary limitations. In allocation of resources, care must be taken to analyze return on investment of a specific technology initiative. In allocating resources, the University's overall priorities must be considered to ensure that technology initiatives are aligned with and contribute to the aims of the institution.

As mentioned previously, each unit within the University should also begin development of its strategic information technology plan for submission and review by the advisory structure and the CIO. Subsequently, these unit plans should be integrated into the University's information technology strategic plan. On an annual basis, the University's plan should be reviewed and modified as necessary to reflect the unit-plan recommendations and changes in the information technology environment.

From a combination of the University's Strategic Plan and this University Information Technology Strategic Plan, implementation of the information technology strategic initiatives will proceed within the overall context of University development over the next three to five years. Specifically, projects requiring significant new university-level funding will be reviewed by the University Senate Committee for Information Systems and Technology, as well as other University governance structures, for consistency with the University Information Technology Strategic Plan and University

goals.