College of Engineering

Vision Plan for Information Technology

2005-2006

(http://www.engr.utexas.edu/itg/vision/)

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Summary of College of Engineering ITAC funding requests for AY 2005/2006

Project Title	Brief Description	Requested Funding
▪ Classroom 2010 pilots and propagation	A Faculty Advisory Council is convening to envision the IT accoutrements that are needed in the classroom of the future. We will leverage the Technology Enhanced Learning (TEL) reports (2000 & 2004); determine pragmatic and potential uses and configurations of learning spaces. We aspire to engage the Provost's office to contribute to the emerging vision and will diligently work with other Colleges, especially Liberal Arts. We will also harvest industry best practice and systematically propagate innovations to the 55 classrooms within our buildings and hope to raise the bar on classroom capabilities across the campus. The aspirations of this campaign are more fully discussed in appendix 1: Unleashing Learning Spaces.	$500,000 (per year for 5 years)
Increasingly critical operational imperatives – recurring funding in nature		
▪ Network Funding	Adequate network funding remains the number one priority of IT funding, and will remain so until consistent funding is identified. (please reference appendix 2)	$450,000 per year
▪ Security hardening & scaling system management outreach	Emphasis is on extending securely delivered services and security updates to all college constituents through a set of proactive measures which will optimize resource use and management and protect the productivity of unrecoverable classroom time. A security conscious culture needs to be further developed and equipped with proactive diagnostic tools and properly trained response teams to address security breaches and protect the productivity of our learning activities.	$150,000 per year FTE and maturation and scaling of initiated pilots
	Total:	**$1,100,000 per year**

OVERVIEW OF CURRENT IT PROGRAMS AND INFRASTRUCTURE

Engineering continues on its diligent commitment to foster world-class learning through the innovative and appropriate integration of technology into the curriculum.

- Enhance the educational **experience** through student-centered learning
- Provide a supporting **environment** to nurture faculty, students and staff
- Foster a first-class learning **community** that reaches beyond the classroom

Engineering's heritage of Learning Resource Centers, Studio Classrooms, laptop mobility carts, Classroom Performance Systems, robust server infrastructure, Faculty Innovation Center and pervasive deployment of Multimedia Teaching Podiums (55 classrooms), wireless infrastructure (115 access points in 5 buildings) and Laptops for Learning Initiative (now entering its 9th year) depict the consistent efforts of the College to identify and address the pragmatic roles of Information Technology to improve pedagogy.

Engineering leverages the ITAC allocations for visionary IT projects at typically greater than a 100% matching level. We have yet to commit any Vision Plan funding toward recurring expenses and we aspire to continue this commitment.

Grants greatly assist the ability to pursue innovative projects, but successful pilots need to establish perpetual funding in order to be successful. Substantial IT grant opportunities have been languishing, yet price leveraging remains strong. Partnerships, such as those for Multimedia Teaching Podiums, engaging Liberal Arts, Natural Science, Engineering and others are essential to scaling and perpetuating successes.

The primary sources of funding available to the College of Engineering to support the IT infrastructure and activities are: 1) Instructional Resources fee, 2) Instructional Technology fee, 3) Information Technology fee, and 4) Graduate LRC fee. Each of these sources of funding is being incrementally consumed by increases to operational obligations and rate increases have not kept pace with needed funding amounts.

Software licensing partnerships with National Instruments LabVIEW (Natural Science, VP for Research and Engineering) and AutoDesk AutoCAD (Architecture and Engineering) extend the availability of resources and remove barriers from learning.

Recent best practices are able to substantially leverage **Virtual Server infrastructures** which offer unprecedented flexibility in prototyping, testing and deploying services. The cost savings and added value of the **Virtual Servers** has generally yet to be realized on campus, Communications is exploring Virtual Servers, leveraging Engineering's experience, and **Engineering is expanding its use of Virtual Servers to be the preferred server-infrastructure platform.**

Tablet PC pilots continue to expand the spectrum of tools and resources that can be employed in the classroom and continuing pilots will further our ability to utilize these new capabilities in rich new ways.

USE OF PREVIOUS ACADEMIC YEAR ALLOCATIONS

We were able to leverage an allocation of **$302,000** with **$419,633** from various sources for a total of **$721K** to implement a spectrum of IT projects as depicted below. As is typical, when we receive the ITAC funding we brainstorm on IT projects that are contemporarily appropriate and immediately fund these activities, thus ensuring a high correlation to funding and implementation. We also do some closing activities at the end of the fiscal year to ensure projects have been brought to a close or clearly understand delays, typically when physical plant scheduling has been involved.

There are two tables following, the first relates the priority and themes selected for IT projects and the second depicts the breakout of funding as correlated to the themes. In certain cases, we require that an ad hoc working group be established in order to steer and learn from the funded activities.

Priority	Theme	Brief Description
1	Team Project Rooms	Each semester more faculty members are assigning projects to teams of students. This is beneficial because it is a better model of real-world engineering and it gives the students the experience in dealing with group dynamics. While our departments have learning resource centers for student use these are designed for individual, quiet work. The team rooms need to be designed for multi-student collaboration while providing resources conducive to team dynamics, not unlike real-world engineering workspaces.
2	Next Generation Classroom models	The existing classroom configurations and infrastructure need to be evaluated and prototypes developed to meet the needs of the contemporary and future classroom. The classroom must: • Be laptop, tablet, and PDA friendly • Allow for integration of real-world engineering • Be reconfigurable to support team activities and projects • Include digital whiteboards with capture and publishing features • The ability for faculty as well as individual students to share and display workspace with the entire class • Support high bandwidth wireless access • Provide access to live distributed learning
3	Real-world classroom	The emerging contemporary engineering classroom involves extensive digital data acquisition, distributed sensor networks, network-aware laboratory devices and analysis tools to permit students to see and interpret physical results in real time. These state-of-the-art tools allow students to immediately relate the theory they are learning in the classroom to real materials, devices, and systems. IT resources are critical to Real-World Classroom endeavors. Real-world problem solving involves a hand's-on approach to project-oriented instruction. Labs must transcend physical and geographical boundaries on a 24/7 basis. Entrepreneurship and global perspectives often require collaboration with group members located in different countries. In addition, the testing and visualization of models is often done using real-life models created by computer controlled equipment.
4	Secure Communications	A trusted communications channel between distributed sets of users is needed in order to increase productivity for those who must access official UT and Engineering resources from off-site. State of the art techniques and best practices will be used to create a managed environment to provide secure communications for the following: electronic documents, secure video conference, secure email, secure messaging, secure large file transfers, digital signatures, secure VOIP, authentication and identity management. All campus technologies will be duly leveraged, yet extensions and integration are needed to make these services wholly productive.
5	Proximate Data Access	Traditional, centralized data storage is inhibiting the productivity of our nomadic and distributed students and faculty. We need to examine and develop progressive storage mechanisms for high volume data that are accessible, replicable over various speed networks and affordable. A cascading mesh of high-speed, satellite, near-line and backup/recovery resources are envisioned to deliver the needed capabilities. Additionally there is a growing demand for archival mechanisms to enrich the learning experience and the practical boundaries of these desires need to be defined.
6	Ethernet over power-lines pilot	The potential cost-savings for implementing commodity Ethernet and voice over IP utilizing existing electrical wiring in our buildings is simply too significant to not investigate thoroughly. Image if you would that we effectively already have sufficient wiring infrastructure to ALL rooms on campus to deliver theses two key services if we simply rework our building telecom closets a bit. We would of course need physical plant and ITS cooperation in this endeavor to both pilot and explore the feasibility of deploying this technology broadly across campus, but the cost saving implications are so significant we are hopeful they would enthusiastically engage (seeds are already being planted).

Engineering IT Committee Vision Plan allocations for Spring 2004

Dept	Project Title	100% Tot%	100% Proj%	ITC Funding	Matching	Match%	Totals	Theme
ASE		5%						
	Deploy high speed wireless "g" pilot		5%	$ 15,000	$ 15,000	100%	$30,000	2
BME		14%						
	Computer-Assisted ELVIS Lab		14%	$ 43,778	$ 43,778	100%	$87,555	3
CHE		12%						
	Real World Classroom		7%	$ 20,000	$ 30,000	150%	$50,000	3
	Mobility		2%	$ 5,000	$ 7,000	140%	$12,000	2
	Collaborative Toolsets		2%	$ 7,000	$ 7,000	100%	$14,000	1
	Infrastructure		2%	$ 5,000	$ 17,000	340%	$22,000	6'
CE		10%						
	Universal File Storage		10%	$ 30,525	$ 30,525	100%	$61,050	new
ECE		27%						
	Team Focus Room		23%	$ 70,000	$ 90,000	129%	$160,000	1
	Upgrade Tablets		2%	$ 5,000	$ 5,000	100%	$10,000	2
	Increase Size of Mobile Classroom		2%	$ 6,000	$ 6,000	100%	$12,000	2
ME		6%						
	Thermal Measurements Laptops		6%	$ 19,000	$ 56,000	295%	$75,000	3
PGE		7%						
	Thirty three laptops w/cart		7%	$ 21,330	$ 21,330	100%	$42,660	2
FIC		11%						
	PRC Dist Learning		4%	$ 11,000	$ 11,000	100%	$22,000	3
	ETC Studio tech upgrades		8%	$ 23,368	$ 25,000	107%	$48,368	3
ITG		7%						
	Virtual Server Center		7%	$ 20,000	$ 55,000	275%	$75,000	new
			TotReq>	**$302,000**	**$419,633**	**<TotMatch**	**$721,633**	

Highlights of these implementations include the movements toward virtual server infrastructures, as mentioned previously, distance learning capabilities established and in use at the PRC campus, precursor investments in our emerging Classroom 2010 campaign transforming learning spaces through the “Team Focus Center” project. We had a similar project the previous year as well. Our Classroom 2010 vision also includes labs and the theme 3 projects have introduced unprecedented flexibility, scalability and capabilities into academic classrooms and labs. And with an incredible coup by ITS Telecommunications and Networking the entire College of Engineering will soon be pervasive “g” wireless, upgraded from “b”, thank you ITS T&N! We have also been pursuing a distributed data center model, maturing in-house configurations and pursuing suitable PRC data center space with ITS.

NEEDS AND PROPOSED USE OF FUNDS

Although we would primarily like to emphasize our Classroom 2010 vision (ref appendix 1), several other increasingly critical needs must be articulated as well, especially since they could contribute or detract from the implementation of the Classroom 2010 vision.

- The centralized campus implementation of **courseware**, Blackboard, needs to be substantially more progressive and responsive to needs of the curriculum. Formalized mechanisms for input and improvement to continually address the evolving needs of this resource must be established.

- **A distributed and highly leveraged data center culture needs to be nurtured across campus.** It needs to be acknowledged that course critical content is already highly distributed and although linkages to content will likely emanate from the campus courseware solution, the content will be housed at increasingly dispersed locations. A wholly centralized solution is insufficient to address the inherently distributed nature of content creation and curation. Engineering and Business are certainly interested in helping to mature and deploy this much needed model across campus.

- Adequate and sustainable **networking infrastructure and security hardening** funding remains crucial and jeopardizes all other service offerings if not sufficiently addressed. Specific amounts are identified in summary table line items.

- The **Building Access Control System (BACS)** needs to be managed back on track with appropriate management and accountability. Original initiatives of the project were too short-sighted and poorly managed. A fresh and comprehensive strategy is needed that will address Classroom 2010 needs.

- **Campus-edge SPAM filtering** was found to be very beneficial, similar efforts are needed for **SPYware** and **Adware** once defense mechanism have sufficiently matured.

- **Cross-College collaborative software licensing efforts that should be acknowledged**

Description	Partners	Costs
AutoDesk AutoCAD	Engineering, School of Architecture (currently restricted to institutionally owned CPUs only, Architecture would really like to be able to distribute to student owned CPUs)	~$25-30K/year currently
Microsoft Premier Support	Engineering, Business, ITS, Facilities	~$97K/year
National Instruments LabVIEW	Engineering, Natural Science, VP of Research – unlimited license for academics and research	$24,995/year
Classroom Performance System	Pending partnerships, being led by Natural Sciences, to include Engineering, Liberal Arts, Business and hopefully others	~$50/year For first 3 years, then ~15% maintenance rate
CPU Client Management Culture	Communications is leading negotiations which Engineering, Business and others will participate in cost-lowering, enhanced capability supplanting lesser tools currently in use.	To be determined
Cisco Firewall Services Module	Engineering and Liberal Arts worked with ITS-T&N to bring this capability onto campus	~$7.5K Capital for campus infrastructure

  - Collaborative tool explorations and video streaming partnership pursuits are also underway

Appendices:

1 – Classroom 2010: Unleashing Learning Spaces

Leveraging experience, success, vision and opportunity to create the learning environments of tomorrow…

Building upon systemic transformational efforts to fundamentally evolve learning dynamics through project-centric learning experiences, Classroom 2010 plans to harvest pragmatic best practices and build prototype classrooms in each of the **classroom categories**:

- Lecture Audiences (large and medium)
- Distance/Distributed
- Seminar
- Project
- Computer
- Laboratory

And then **propagate the enhanced classroom models to all 55 classrooms** within the main campus Engineering buildings by 2010. Additionally, classroom models will be shared with the campus community and promoted, especially in learning spaces where Engineering faculty teach across campus.

Faculty will engage with undergraduate and graduate students to explore and articulate enhanced learning dynamics supported robustly by our **Faculty Innovation Center**, catering to the course content needs of faculty, and our **Information Technology Group**, ensuring IT infrastructures are robust and responsive to class needs.

Tablets PCs will be used as the computing conduit for this transformation to weave **courseware**, (Blackboard enhanced by Agilix GoBinder/Mobilizer and adaptive testing tools), **assessment** (Classroom Performance System-CPS) and **learning portfolios** (Polaris) in **morphable classrooms** that can adapt to student-centered project-bias learning needs. (Grants will be sought from Microsoft, HP and other industry partners in these pursuits.)

The focus will be on enhancing and unleashing learning opportunities throughout the College, leveraging existing resources in new ways and building future classrooms in ways that are conducive and available for unfettered learning.

- Next generation Multimedia Teaching Podiums are already under investigation
- Performance and Learning infrastructures will be actively pursued and enhanced
    - Classroom Performance System (CPS)
    - Courseware: adaptive testing and mobilizing
- Smartboards integrated in the classrooms to increase quality and reusability of learning
- Furniture, lighting and acoustical enhancements to address and transcend challenges

"The best way to predict the future is to invent it."
--Alan Kay

2 – Critical Network Infrastructure Lifecycle Funding needs

Adequate funding for the mission critical network infrastructure remains a crucial concern with the College of Engineering. Historically, we found allocating a portion of the ITAC Vision funds leveraged with College funds necessary to maintain essential networking capability. To transcend this undesirable situation, the College has proposed a Network Lifecycle Model, integrated into our fee structure, to provide for sustained maintenance and necessary expansion of the network. The following table shows the proposed schedule.

Network Infrastructure Lifecycle Funding
Budget Overview

Equipment (cost per year on 5 Year Lifecycle) **$250,000**

Year	Areas Covered (proposed cycle)
Year 1	WRW, CPE-East
Year 2	ECJ, ETC
Year 3	ENS
Year 4	BME, futures/new technology
Year 5	CPE-West, wireless, all building upgrades

All years contain an amount that is non-building specific to cover software, training, tools and additional areas.

Salary (3 Full Time Employees - proposed)

Position	Salary	Annual Salary with Fringe Benefit
Senior LAN Administrator	57,500	73,600
Network and Security Administrator	57,500	73,600
Tech staff	40,000	51,200
Total	**155,000**	**$198,400**

Total per year, nominally $450,000

Adequate network bandwidth, connectivity and redundancy remain chronic networking issues. While some buildings cannot currently add a single additional connection to their existing infrastructure and struggle to identify funding for expansion, other buildings have a growing concern for single points of failure that could be disastrous for mission critical network infrastructures. All of these concerns converge to the necessity of having a consistent source of network funding as proposed in our lifecycle funding model.

HEIRAlliance Survey Responses

1. Academic Program Support

1.1 Are software, hardware and network resources appropriate in quantity and quality to meet academic program needs?

- Although sufficient resources may exist, too much inadvertent sub-culture exists, even if the resources are available, faculty and students may not be aware that they exist &/or how to make use of them easily. Repeated problems with BlackBoard (course website management software) due to insufficient resources and poor configuration decisions. Inappropriate insistence on developing "home grown" resources (e.g., UT Direct) rather than using commercial vendors with "off the shelf" solutions.

1.2 Are such resources regularly updated to meet current and emerging academic program needs?

- Definitely not. The delay in upgrading BlackBoard, for example, was unconscionable. Attempts are being made to identify needs, but better communication channels are needed.

1.3 Are available scholarly resources provided in electronic form where appropriate, are they selected through an organized planning process, guided by written policies and procedures that include collaboration among users and library and computing personnel?

- Not really, to any significant degree.

1.4 Are support and training provided to help faculty and students learn to use and effectively apply such resources?

- When the faculty inquire with resources such as the Center for Instructional Technologies or the College of Engineering Faculty Innovation Center.

1.5 Are procedures and incentives in place to encourage faculty to make appropriate and innovative use of electronic information resources to improve the academic program, and to encourage student use?

- Resources are available, but incentives are not significantly in place. Each department and college may have its own approach. The Center for Instructional Technologies as well as the College of Engineering Faculty Innovation Center are outstanding. Academic Development Grants and FAST Tex program are excellent examples of the high level of institutional support.

1.6 Does the institution, consistent with its size and mission, utilize the national and international information infrastructure to extend educational and academic opportunities to non-local and non-traditional students to make appropriate information available on the network as well as accessing it elsewhere?

- Increasingly, dialup and high speed internet access is readily available.

1.7 Are the campus-wide computing and telecommunications centers, library technological infrastructure, and computing laboratories appropriate for the academic programs and nature of the institution?

- Underleveraged, insufficient wireless coverage. Insufficient number of publicly available computing facilities that any member of the UT community can walk in and use. There is a lack of technology-equipped spaces suitable for collaborative work.

2. Administrative Support

2.1 Are administrative information resources provided electronically so as to increase the effectiveness and efficiency of the institution?

- Resources are not consistent or integrated. Some are quite mature, others almost non-existent, while duplications and deficiencies also exist.

2.2 Are access privileges to administrative information resources assigned to individuals commensurate with their scope of responsibility and need for such information to do their jobs effectively?

- Typically yes as far as existing tools can be extended to accomplish aspirations.

2.3 Are software, hardware, and network resources appropriate in quantity and quality to meet the needs of institutional management and operations?

- Existing resources are made to be adequate; innovation is however constrained and becomes an invisible, limiting factor.

2.4 Are such resources regularly updated to meet current and emerging administrative and operations needs?

- Faculty CPUs are not updated as frequently as needed to keep pace with IT innovations and progressively impact classroom learning. The classrooms themselves appear to have no viable stewardship. Network infrastructures also lag.

2.5 Are incentives and procedures in place to encourage administrators and staff to make appropriate and innovative uses of electronic information resources to improve the operation, management, and decision-making of the institution?

- No known incentives but they are encouraged to use the information.

2.6 Are support and training provided to help administrators and staff learn to use and effectively apply such resources?

- On some of the more complicated systems, as is appropriate. Classes are offered to staff and administrators.

3. Access

3.1 Is there ready electronic access to information resources such as bulletin boards, information repositories, and colleagues on campus and elsewhere, with sufficient capacity to supply high volume data where appropriate, and with local support for establishing such resources on campus for access by others?

- Central resources take a minimalist approach to address sufficiency for a broad-base of users; richer features are generally identified and delivered at College of Departmental levels.

3.2 Does on-campus access to information technologies and services include classrooms, offices, residence halls, kiosks, and other public facilities that are convenient and appropriate to faculty, staff, students, and visitors?

- Generally not adequate, access to resources for visitors can at times be difficult unless they are accommodated by a host.

3.3 Is there equitable access to electronic information resources for the institutional community, with access facilities provided for those who do not have their own equipment?

- Generally not adequate. Extensive Learning Resources Center facilities are available to all students.

3.4 Is there appropriate access to external electronic information resource for faculty, students, and staff?

- Yes, shortcomings have not been brought forth if they exist.

3.5 Have the needs of persons with disabilities been taken into account in providing access to internal and external electronic information resources?

- Nominally all web content has been adapted to these considerations and we are well aware of the requirements.

4. Extended Boundaries

4.1 Do students and faculty have adequate and convenient access to electronic information resources from off-campus locations?

- Yes, via electronic IDs, web and VPNs provided at campus and college level.

4.2 Where off-campus electronic information resources are used as part of the institution's programs, are students and faculty provided convenient and appropriate access to these resources?

- Yes, via electronic IDs, web and VPNs provided at campus and college level.

5. Institutionwide Planning.

5.1 Does the institution's mission and vision statement articulate the role and degree of importance information resources play in its academic and administrative programs?

- Not directly or significantly.

5.2 Is there a campuswide plan for information resources that not only addresses the communication paths such as voice, video, and data communications, but addresses as well the information content that travels over these paths?

- No

5.3 Is the planning for information resources incorporated into the institution wide strategic planning process?

- No

5.4 Does the planning process include participation of user communities, and are users or potential users of administrative applications meaningfully involved when such applications are developed or reengineered?

- N/A

5.5 Are administrators responsible for information resources management included in executive-level strategic planning and direction-setting for these resources?

- N/A

5.6 Does campus space/facilities planning incorporate the needs and standards for electronic information resources?

- N/A

5.7 Is there adequate and stable funding to support the institution's continuing commitments to electronic information resources, including capital replacement funding and annual budget allocations for upgrading and maintenance?

- Funding may not be the key issue; lack of planning may be core.

5.8 Where information is valuable to the institution over time, are there procedures and planning for backup, migration and refreshing technology upgrades, and long-term information integrity and archiving?

- Some central strategies exist, but boundaries for these needs have not been generally established. Where needed, this is done in more of an ad hoc fashion.

5.9 Is there institutionwide coordination of the process of evaluating and acquiring emerging technologies?

- No. Some informal and ad hoc efforts exist.

5.10 Are mission-critical information systems regularly evaluated to ensure that they continue to meet the changing needs of the institution, in light of opportunities presented by emerging technologies?

- Centrally, “flat-line” services are generally perpetuated inordinately and little communication currently exists to elicit needs from the customers.

5.11 Are the acquisitions and gifts of software, hardware, and other electronic information resources consistent with articulated academic and administrative program directions and needs?

- Although gifts have lessoned, due to economic challenges of the past few years, gifts are generally highly leveraged and consistent with program needs.

5.12 If the institution relies on the computing resources of other institutions or organizations, does it have a well-conceptualized rationale specifying the roles of both on- and off-campus computing resources?

- Our reliance upon single providers for internet and phone connectivity have become increasing concerns.

6. Advisory and Policy Structure

6.1 Do written policies and procedures exist regarding appropriate and authorized use of computing resources and network access, such as a rights and responsibilities statement?

- Yes. For example, http://www.utexas.edu/its/policies/rights.html or in the Handbook of Operating Procedures (HOP).

6.2 Do policies and procedures exist to ensure the integrity and security of information used by faculty, staff, and students?

- To a large extent yes, shadowbases are of some concern and are addressed as discovered.

6.3 Do the institution's access and delivery systems have appropriate measures in place to assure data integrity, security, and access control, including the fulfillment of legal requirements (including copyright), regulations, and commercial agreements?

- Known vulnerabilities have been addressed or have active resolutions being pursued.

6.4 Do policies and procedures exist that encourage the legal and ethical uses of electronic information resources by all members of the institutional community, and, where sanctions are applied, are principles of due process followed?

- Yes as far as we know.

6.5 Do rules and procedures regarding access and use of data strike an appropriate balance among an individual's right to privacy, the institution's imperative to operate efficiently, and, in the case of public institutions, the rights of citizens to information about their government?

- Yes

6.6 Are the written policies and procedures for the acquisition of hardware, software, and other electronic information resources kept current and are they widely circulated among academic and administrative departments?

- Although procurement processes are known, enterprise-aligned purchases are still under promoted or pursued.

6.7 Are procedures for gaining or granting access to information clearly stated and consistently and equitably applied?

- Although the desired access can be achieved without too much a hassle, the abundance and complexity of systems provides challenges to identifying a streamlined process.

6.8 Are information technology standards in place and are members of the campus community aware of these so that they can make an informed choice when making technology purchase

- Efforts exist, yet may not be fully leveraged or sufficient to meet faculty needs. More diligent efforts are needed by all parties.

7. Staffing

7.1 Are sufficient resources (staff, equipment, and facilities) available for network planning, operation, and ongoing support?

- Network funding has been a chronic area of deficiency. Adequate lifecycle funding has yet to be identified leaving networking infrastructures languishing and susceptible to compromise. Unresponsiveness during hours outside of 9-5 M-F, and inability to respond to systems that are overloaded.

7.2 Are there sufficient staff and funding for the identification of scholarly information resources, for their being made available, and for the assistance of students and faculty in locating and using them?

- Our Faculty Innovation Center (FIC) has been able to nurture a critical mass of interest, yet as we enter the next generation of content development the expectations of faculty are dramatically increasing to desire rapid turn-around of context development and current resources will be outstripped.

7.3 Do students, faculty, and staff have adequate support services (training, consultation, documentation, development, maintenance, help systems, and so forth) to meet their academic and administrative program needs?

- Current resources appear adequate for contemporary faculty demand, but interest is gauged to be increasing significantly and current capacity could easily be outstripped. The level of support varies dramatically between different components within the university.

7.4 Is there an ongoing, comprehensive training program in the use of electronic information resources for faculty, staff, and students, including those in continuing education and off-campus programs?

- Many training opportunities exist, though I think there are still difficulties in making members of the community aware of those resources. Staff training in IT is minimal. Although efforts are consistent with new faculty, efforts are spottier with established faculty and need to be formalized further.

7.5. Do training programs address differing skill levels of users, and are there strategies for providing online help and support services?

- Current training is inordinately biased toward novice users. Intermediate and advance needs are generally addressed through consultations.