

Final Report
Of the
Blue Ribbon Information Technology Needs Committee

May 12, 2005

Submitted to:

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The Blue Ribbon Information Technology Needs Committee (BRITNC) was appointed in June 2004 following the reorganization of MTU's central information technology infrastructure. This report reviews the charge to the committee, the existing campus computing strategy documentation, a discussion of the current state of information technology (IT) at MTU, and concludes with several specific recommendations.

I. Charge to the Committee

The Blue Ribbon Information Technology Needs Committee was appointed with the following charge:

- A. To review and make recommendations to update the current University Computing Strategy. As part of the review, the committee will review and update the computing philosophy for the campus.
- B. To review and make recommendations regarding the role, the membership, and the purpose of the Computing Executive Committee (CEX) and the Computing Advisory Committee (CAC) [Recommendation from the Horizontal Budget Reduction Committee, Feb. 2, 2004].

The BRITNC is to review the relationship between the CEX and the CAC to the Senate Computing Committee and any other computing committees. The BRITNC is to make recommendations that will eliminate redundancy among the different committees and improve the efficiency in order to save faculty and staff time [Recommendation from the Horizontal Budget Reduction Committee, Feb. 2, 2004].

- C. To review and make recommendations regarding the role of central IT and its relationship to decentralized computing across campus. BRITNC is to make recommendations to the President's Executive Council on the role central IT is to play in supporting the University's strategic goal.

II. 1995 Computing Strategy Document

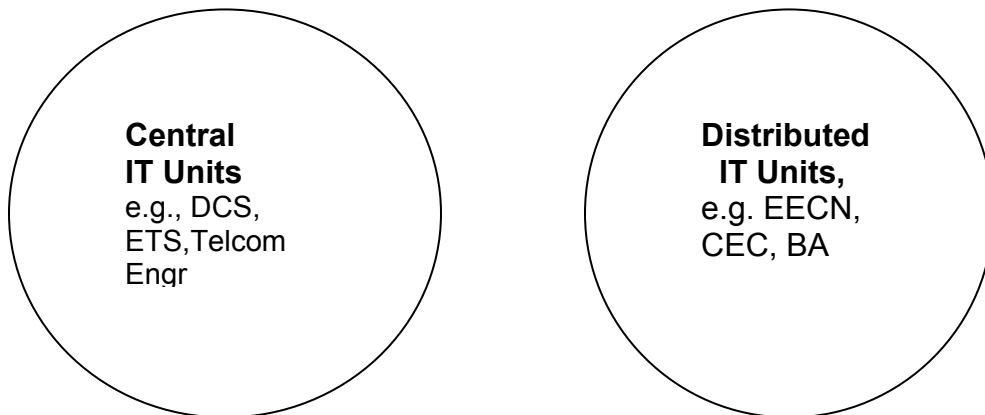
The current MTU campus computing strategy document dates from 1995. This document formalized our current system of distributed and central computing. It established policies for computer acquisitions and established the mechanisms and policies for our current student basic computing and course computing fees.

BRITNC reviewed this existing computing strategy document. The document mixes policy and strategy with tactics and implementation. Many sections of this document are currently being ignored, and have not been implemented for a number of years. Technology and its use on campus have changed tremendously since 1995. The committee structure described in the report has not functioned effectively. The acquisition procedures are burdensome with much lower expectation of any savings resulting from these burdensome procedures. Some implementation procedures have been superseded by changes in technology, some have been ignored due to impracticalities, and some have simply been forgotten. Thus, the 1995 strategy document needs updating in light of changing technology and organizational experience gained since its development.

III. The Current Situation

A. Current Organization

To best understand the current issues, it is essential to review the current campus IT organizations. In a simplified overview IT on campus can be divided into two distinct sets of entities – central IT units and distributed IT units.



According to the 1995 Computing Strategy document, central IT is responsible “for supporting the needs of the administrative, academic, and research units. They are responsible for maintaining centrally shared facilities (such as general

student labs, the campus network and its interface with regional and national networks, common software, etc.) They also act in an advisory capacity and as a clearing house for minimizing the cost of duplicate or redundant acquisitions. The IT organization is funded through a combination of central funding and charging for services.” With the dramatic change in computing technologies and computing uses on campus, the focus of central IT has shifted. Currently central IT is divided into three units: Distributed Computing Services, Telcom Customer Service, and Telecommunications Engineering. Distributed Computing Services is responsible for maintaining central IT resources and infrastructure in support of academics, research, and community service. These resources and services include operation of the campus datacenter, central storage servers, campus email system, campus administrative database servers, courseware systems, web servers, calendaring servers, directory servers, payment processing servers, etc. DCS is also responsible for campus computer and network security. Telecommunications Engineering is responsible for providing voice, data, and video services and infrastructure for all administrative and academic departments and residential housing areas. These services are purchased or leased and include data network connections, telephone services, audio conferencing, pagers, cellphones, voicemail, auto-attendant services, cable TV, and many others. Telcom Customer Service is the customer interface for the Services provided by Telcom. Until recently three other groups, SAS, ETS (Educational Technology Services), and Administrative Computing were also associated with central IT. A reorganization the summer of 2004 changed SAS to report to the VP for Research and ETS to report to the Dean of Distance Education and Administrative Computing to the VP for Administration. SAS provides system administration support for the administrative units on campus. ETS distributes instructional resources, manages the electronic display system, produces educational media, and provides satellite/video conferencing. Administrative Computing is responsible for administrating and supporting the university’s core data warehouses and associated reporting systems.

According to the 1995 document, “Other computing organizations may exist to serve the needs of particular groups.” Again with the dramatic changes in computing on campus, a wide range of these “other organizations” have evolved across campus. Today these distributed units serve the needs of specific groups of users, typically with relatively similar needs and expectations. In a distributed unit hardware, software and user support is provided based on the needs and resources of that unit. Examples of distributed units include the East Engineering Computing Network and the School of Forest Resources and Environmental Science Computing Network. Although initially many departments attempted to provide their own support infrastructure, the recent trend has been toward groupings of departments to achieve greater efficiency and strong support organizations. Most such groupings are primarily based on geographic proximity.

B. Current Issues

BRITNC interviewed a wide range of faculty and staff who have a vested interest in a well-organized and efficient campus information technology structure. The current issues concerning information technology on campus can be easily grouped by our current organizational structure, that is issues concerning central IT, issues related to distributed units and things that fall in between these two.

Concerns related to central IT -- There is a perception that central IT makes decisions in a vacuum. A recent example was the switchover to IP phones. There are concerns that central IT's budget is too large and that the fees charged are excessive. Campus units expect a much higher level of accountability from IT than other service units on campus almost certainly due to the fact that units pay network and phone charges on a recurring basis. There are concerns that there is insufficient communications between campus users and central IT. There is currently a high level of mistrust directed at IT. Visible indications of this mistrust include the reorganization of IT this past summer and the current scrutiny of all central IT purchases; and the significant amounts of IT resources that have been required to justify expenditures and decisions, often to numerous individuals and groups on campus. There is a perception that there is an imbalance between expenditures spent on central IT's infrastructure (e.g., the data center) versus the infrastructure in buildings across campus (e.g. replacing old network cabling and building switches).

Concerns related to the distributed units -- Users tend to be more aware of the activities of their local support personnel. Because of the nature of distributed things, concerns vary across campus. It has at times been difficult for smaller units to get their needs met. Groupings of units can improve efficiency and effectiveness, but can also lead to some units believing their needs are not being met or that they are not getting their "fair share" of the resources. The level of services provided to faculty and students across campus varies significantly. For example, some units provide backups of faculty and student files while other units do not. In addition, the inconsistent level of services, e.g. application of software patches, can have implications campus-wide. It can be difficult for chairs and other administrators to evaluate the effectiveness and appropriateness of their systems support operation.

Other concerns -- As information technology and its uses have evolved, difficulties with our current structure have emerged. Most obvious is the lack of a suitable mechanism for effectively deploying and centrally funding technologies in new applications and initiatives, e.g. campus-wide wireless and classroom technology. Departments on the other hand often have alternative sources of funding such as alumni donations or computer lab fees. Thus, in the absence of a central strategy local *ad hoc* piecemeal solutions get implemented. For instance, various departments have installed technology in classrooms that they predominately use. A wide range of products have been installed making it

difficult for faculty who teach in classrooms across campus and making it impossible to minimize maintenance and support costs.

IV. Analysis

BRITNC reviewed many of the current campus perceptions. Some of our findings follow:

Central IT's budget – We were not able to find any evidence that central IT's budget is out of line for a technological institution. Comparisons with benchmark institutions in terms of staffing indicated that Michigan Tech is on the low side in terms of IT staffing. See the Appendix.

Central IT expenditures – Central IT's major expenditures are in support of the campus community as a whole, e.g., the Data Center was updated to increase the reliability of the services provided to all campus users, e.g., email and network connectivity. BRITNC believes these expenditures were warranted and that users need to recognize that they do benefit from these resources. The problems caused by switch failures during this academic year indicate that Telcom's planned switch replacement was appropriate and should not have been delayed. Such network failures can cause serious problems for campus wide users and can impair our image as a technological university. A plan needs to be developed to deal with campus wide IT infrastructure issues, particularly aspects such as building wiring, for which there are currently no replacement plans. For instance, IT infrastructure should be considered when any building renovation is planned.

Telcom rates -- In comparisons with institutions that charge network fees, again we found that Telcom rates are quite similar to rates at other institutions. Detailed comparisons with other institutions are difficult because accounting practices for IT expenditures vary widely. BRITNC believes that core services provided by central IT should not be considered as auxiliary enterprises. Services provided to and funded by academic, administrative, and research units should not be taxed in an "auxiliaries" manner.

Funding model – Much of what is perceived as a rate issue is really a funding issue. There are pros and cons to the current funding model for both distributed and central IT. Alternative funding models would have different pros and cons. We believe the primary problem is that funding to departments for IT has not been at a satisfactory level. A computer, network connectivity and a phone are all essential for nearly all Michigan Tech employees to do their job. Thus each position should have associated with it sufficient funds to cover the cost of these necessities. Such funds could either be a part of department budgets or be given directly to central IT. An advantage of passing the money through departments is that it aligns more easily with charging other types of users and other types of accounts.

Communications – The mechanisms for communication about IT issues need to be improved. Certain aspects are working fairly well, e.g., the System Administrators Council is an effective mechanism for sharing technical issues of concern to the distributed units. It is also an effective mechanism for communicating certain technical needs to the central IT units. This organization is meant to be a technical support structure and hence this channel is not an effective mechanism for conveying concerns of a more strategic or policy based nature.

More formal and visible means of communication need to be established between the central IT units and the campus community, particularly for communicating about major technology changes and policy concerns and changes. Although at times central IT units have used faculty committees to establish needs and discuss policy issues, the campus community as a whole is generally unaware of these committees. A clear policy is needed for who establishes such a committee.

Central IT has responded to some of the concern for more information, e.g., Telcom's recently updated web pages contain quite a bit of information on their services and projects. This should be effective once the user base becomes aware of the wealth of information there. What is needed in addition is a mechanism to foster discussion about planning and strategic concerns between the user base and central IT.

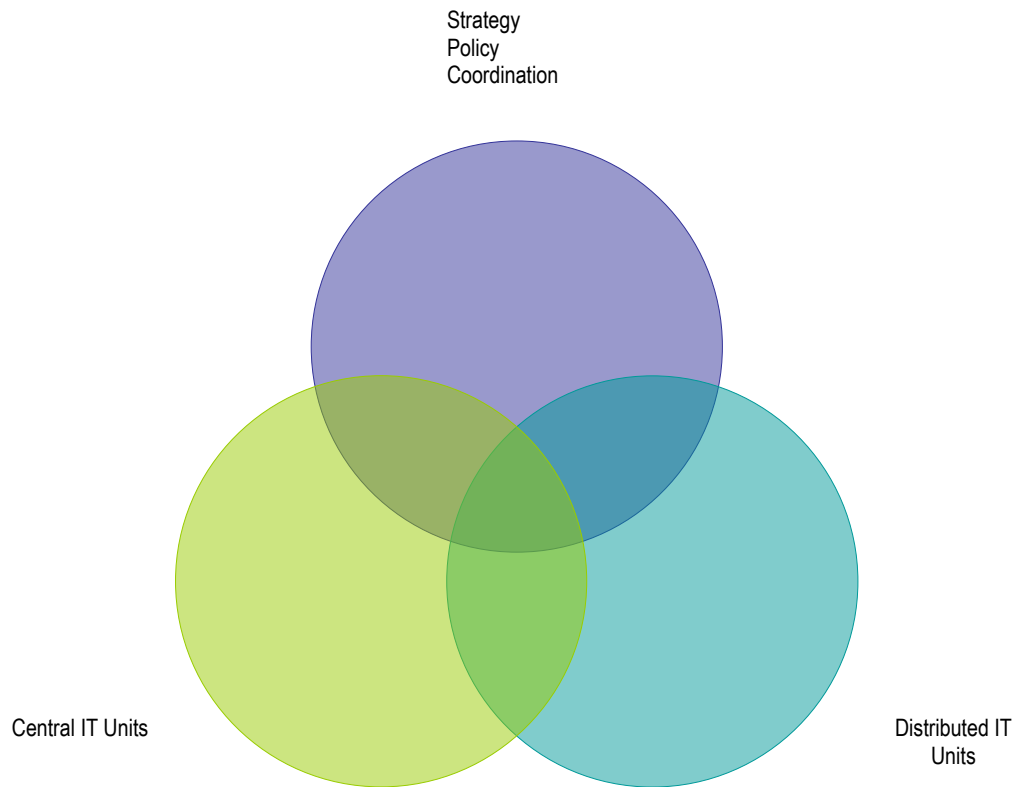
Communications between central IT and a given distributed unit also needs an identifiable communication channel. In particular, there is no formal channel for central IT to communicate concerns about activities, policies, etc., in a given distributed IT unit to the pertinent non-technical supervisors (e.g., deans and department chairs) .

New initiatives – A mechanism is needed to identify, prioritize, fund, and implement in a cost-effective fashion new IT initiatives as they become feasible and cost-effective. Our current piecemeal approach of solving technology needs such as classroom technology is not cost-effective when examined at the University level. Incompatible solutions are implemented; and unnecessary duplication of effort is expended across campus. These types of *ad hoc* solutions can also serve to aggravate relationships between distributed units and central IT. Often local solutions rely on relatively inexpensive hardware, but are not scalable. Since most campus constituents don't understand the complexities of scaling IT, it is difficult for them to understand the cost estimates from IT for campus-wide solutions.

IT Professionalism – An important issue regarding IT on campus is the fact that much of the expertise has developed from within and in an opportunistic fashion. Only recently, standards for rank and promotion have been developed. No standards for professional development exist and frequently our structure inhibits such development.

Administrative Organization – Our current information technology organizational structure pits the central computing units and the distributed units against each other. It lacks the critical piece that formally connects the distributed units and central units and has the overall view of information technology on campus and its relationship to the overall institution.

The administrative structure supporting information technology at Michigan Tech must recognize and serve to strengthen three interdependent components: distributed IT units, central IT units, and strategy/policy development and deployment (See figure below). Each of these areas is critical to the information technology infrastructure and its function; each is complex and makes a critical contribution to the overall form and function of information technology on campus. Each of these three areas must be somewhat autonomous, but there must be a high level of coordination and cooperation for information technology needs to be met for all users in a cost-effective manner.



Overall development and review of campus computing strategy and policy must take a global and institutional view; it must account for the strategic needs of the distributed units and the strategic needs of the institution as a whole. Priority setting for capital expenditures, institutional strategy, and campus computing policy should report to a high administrative level, if not the highest level. It seems clear, in order to achieve this balance, that information technology be given attention and consideration from the highest levels of the administration.

It is the unanimous opinion of BRITNC that the most significant computing-related problem at MTU is the lack of meaningful recognition at many levels of information technology as vital to the mission of the university. This has resulted in the absence of several key elements necessary for IT to be used most

strategically and cost-effectively by all campus groups and for all campus functions. These include:

1. The lack of a campus-wide strategic plan for information technology.
2. No person in the upper administration who is responsible for campus-wide information technology and information technology initiatives.
3. The lack of a known process for establishing policies on critical topics, such as security.

V. Recommendations

Before stating our recommendations, we offer a Philosophy Statement and Organizing Principles that are the foundation of our recommendations.

A. Philosophy

Quality information technology resources and infrastructure, and experienced, well-qualified personnel, are essential in a technological university.

Information technology is our prime communication device internally and externally, our most widely used research tool, an essential resource for our educational programs, an indispensable tool for administration, and a significant source of entertainment for our students. Our ability to accomplish our mission as a technological university and our ability to attract and retain the best students and faculty are increasingly dependent on our information technology assets. Thus, it is critical that we provide well-coordinated, high-quality, cost-effective information technology services to all users on campus.

B. Organizing Principles

Decisions regarding responsibilities, organizational structure, oversight, and funding mechanisms must be based on organizing principles that guide implementation of our computing philosophy. These are:

1. *Safety* – Safety and security must be assured for all users. Functions in one distributed unit that can negatively impact other users should be overseen centrally (e.g. security) or isolated within that unit.
2. *Responsiveness* – Functional requirements required by a local user base are best determined as near to the user as possible, usually within the distributed unit.
3. *Economy* – Where economies of scale are possible, they should be pursued. Functions needed by most campus users and where an economy is obtained by combining efforts with little or no diminishment of user functionality should be centralized. In many cases, economy may be realized by a reduction in time and effort; in others, financial savings may be realized by pooling efforts and insuring an appropriate distribution of expertise.
4. *Compliance* – The University must conform to legal requirements and be protected from unwarranted liabilities; issues with legal or liability consequences should be overseen centrally.

C. Recommendations

Recommendation 1. BRITNC recommends continuing the model of having central and distributed IT units. Consistent with the Organizing Principles, efficiency on the distributed side has been accomplished by creating some “right-sized” clusters and benefits may be achieved through additional clusters, where appropriate. Distributed computing units are most effective when they have sufficient autonomy to address the needs of the end users within the context of the campus IT infrastructure and campus IT strategic plan. The distributed computing units must be considered service organizations to their immediate unit as well as to the campus. The Organizing Principles also require a central IT unit whose efforts are consistent with the IT strategic plan of the University. The central IT unit is most effective when it addresses the IT needs of common interest to a range of users, is responsive to those needs, and cognizant of their role as a service organization.

Recommendation 2. BRITNC recommends that operating procedures applied to information technology be consistent with, and where possible identical to, operating procedures applied to the rest of campus. In the 1995 strategy document, there are several procedures identified for acquisition, student fee review and approval, and use fee determination. At the time of the development of that document, there were no formal campus procedures related to a number of these issues. BRITNC feels that, in a number of areas, there is no longer justification for having separate procedures related to information technology compared to other areas. In all cases, if a campus policy exists (e.g., purchasing), that policy should be applied to information technology as well as other campus activities.

Recommendation 2A. BRITNC recommends that a task force be developed to examine the funding mechanisms for central computing, the balance between general fund support and use fees, and the appropriate use of each to support central computing. The goal should be to have a report issued during FY06 for implementation in FY07. If it is determined that use fees should continue, they should be consistent with MTU Operating Procedures 2.2001, Special fees and use charges, and 2.2001.1, establishing a new user charge.

Recommendation 2B. BRITNC recommends that the existing student computing fee structure be retained. The committee that currently manages computing fees is the student computing fee subcommittee of the CAC. The committee’s composition should continue as it is but be viewed as a parallel committee to the non-computing fee committee. This committee will be formed by and report to the Provost. The criteria used to set the computing fees are reasonable.

Recommendation 2C. BRITNC recommends that the procedure for acquisition of computing equipment requires no special approvals.

BRITNC believes that the historical reasons for imposing additional approvals for computing acquisitions are no longer sufficient to justify their continuation. The purchase requisition forms should be modified to make the process for acquiring a computing-related purchase the same as any other purchase.

Recommendation 3. BRITNC recommends that the administrative structure related to information technology be revised, with an emphasis on communication among the three major information technology components, and between each component and the user community. Failures in communication, and a lack of checks and balances among the various information technology components, have characterized recent information technology development and administration on campus. It is important to institutionalize communication channels between the technical specialists and the user community that recognizes the knowledge base and technical expertise of technical specialists and incorporates input and feedback from the user community in any administrative structure to be implemented.

Recommendation 3A. BRITNC recommends that a position of Chief Information Officer be created responsible for IT strategy consistent with the MTU mission, policy, and prioritization of all campus IT resources. This position must be part of the executive team. The person in this position is responsible for the effective functioning and welfare of all of IT including the distributed units. The CIO must have the authority to establish a campus-wide strategic plan for IT and oversee its implementation in *both* the distributed and central IT units. Although the distributed units will not report to the CIO, it is necessary that the distributed units be responsive to initiatives generated by the CIO. The CIO must have the authority to see that central IT acts as a service organization responsive to prioritized campus-wide IT needs. The CIO will be responsible for creating a professionalism in IT across campus and setting standards of expertise in both the distributed and central units. The CIO should not be immersed in the day-to-day implementation issues, yet be technically competent enough to intervene, if necessary, on either the distributed or central side. The CIO must have the vision of campus IT issues, its integration with the University strategic plan, the ability to collect ideas and needs from the users, and the authority to see policies developed, implemented, and changed. The CIO should be well-connected with campus units and viewed as a resource to chairs, deans, and directors.

Recommendation 4. BRITNC recommends that the current advisory committee structure be revised.

Recommendation 4A. BRITNC recommends that the CIO appoint *ad hoc* advisory committees. Committees composed of individuals with knowledge and interests relevant to specific tasks will be more effective than over-arching, large, standing committees. The rapidly-changing nature of IT often requires

high-quality decisions regarding priorities, policies, strategy, etc., to be made in a timely manner; *ad hoc* committees offer this necessary agility.

Recommendation 4B. BRITNC recommends that University Computing Forums be held by the CIO once per semester. Each forum would meet with a specific group, such as academic department chairs, students, or staff. These forums would be similar to the current Academic Forum. The CIO would meet with the appropriate forum to get feedback on campus-wide IT initiatives and plans and to hear concerns, plans and priorities from the respective units.

Recommendation 4C. BRITNC recommends that the Systems Administrators Council be retained and report to the CIO. The role of this Council is to share technical information across campus. Responsibilities include: discuss and propose campus-wide technical standards, communication and coordination of technical standards and issues across campus, assist units with analysis of IT support needs and hiring of IT personnel upon request, and education among the members of the Council. This council will annually provide the CIO with a prioritized list of technical issues which require central support and/or co-ordination.

Recommendation 4D. BRITNC recommends that the CEX be disbanded immediately. The CEX has apparently not met for an extended period and appears to have little utility with respect to computing strategy or priorities on campus.

Recommendation 4E. BRITNC recommends that the CAC be disbanded. *Ad hoc* committees should be appointed by the CIO as described in Recommendation **4A** and university computing forums held as described in **4B**.

VI. Conclusion

The current campus relationship with information technology is best described as dysfunctional. Much of that dysfunction can be attributed to the clashing that results when two separate groups are required to work together and yet there is insufficient coordination and communication between the groups, particularly in an environment in which resources are scarce. The above recommendations are aimed at increasing the functional effectiveness of information technology across campus, both centrally and in the distributed units. Fundamental to our recommendations is the hiring of a Chief Information Officer who is responsible for ensuring the effectiveness of **all** of information technology on campus. We believe that it is imperative that such a Chief Information Officer be a part of the Executive Team in order that information technology on campus be strategically aligned with the overall University strategic plan and to facilitate discussions on the strategic use of information technology.

Appendix

Included here are data collected from the Educause Core Data Survey report, for 4 universities in addition to MTU. Owing to the conditions of use of the Educause data, the universities can only be identified upon request of the BRITNC committee. University "1" in all graphs is MTU. The universities were chosen from the pool of benchmark peer institutions identified by MTU.

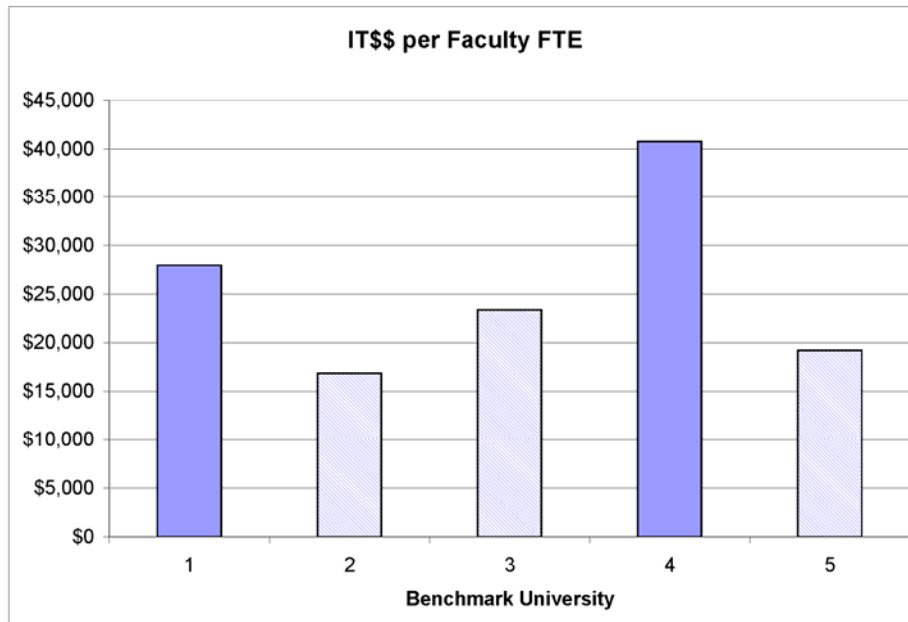


Figure 1 IT dollars per full-time equivalent faculty. Note that universities 2, 3, and 5 did NOT report dollars in their distributed units, only central IT units. We know that at least two of these universities have significant distributed expenditures.

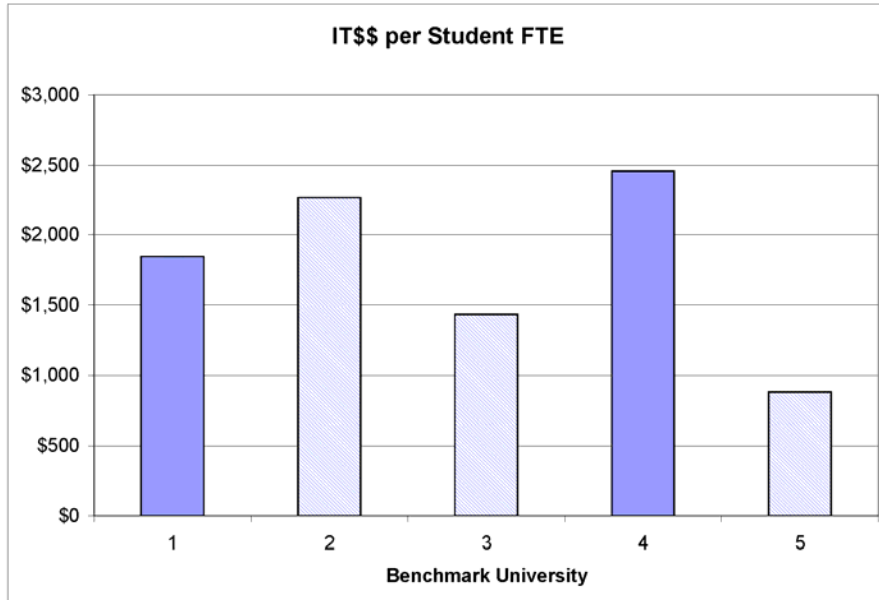


Figure 2 IT dollars per full-time equivalent student. Note that universities 2, 3, and 5 did NOT report dollars in their distributed units, only central IT units. We know that at least two of these universities have significant distributed expenditures.

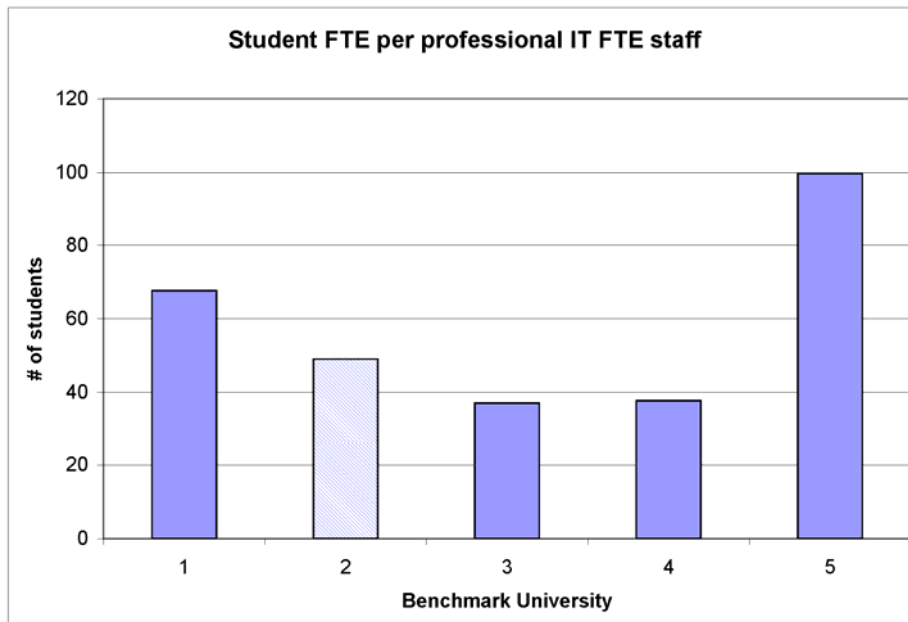


Figure 3 Number of full-time equivalent students per professional IT full-time staff. Note that university 2 did NOT provide data on staff in distributed IT units, only central IT units.

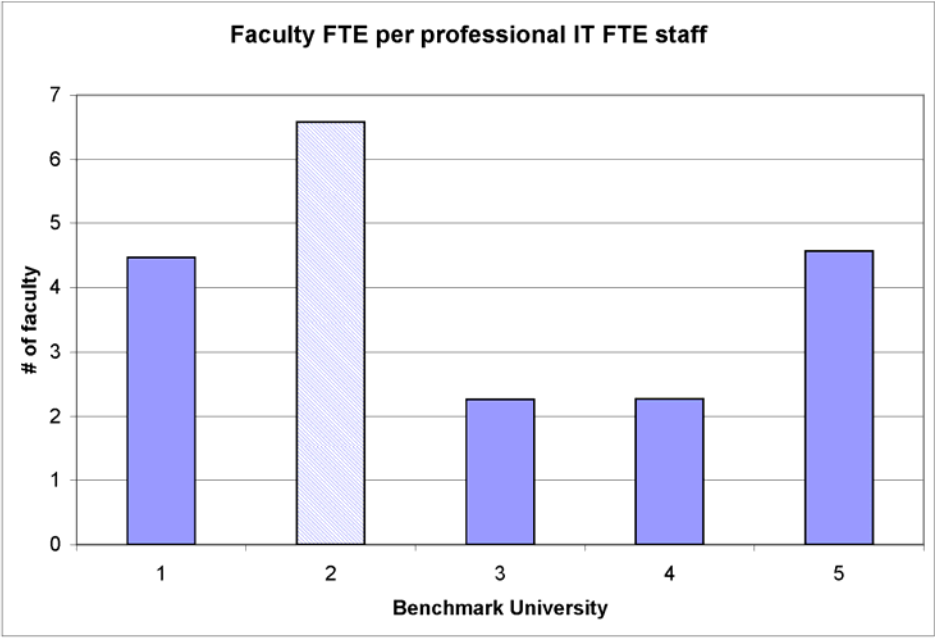


Figure 4 Number of full-time equivalent faculty per professional IT full-time staff. Note that university 2 did NOT provide data on staff in distributed IT units, only central IT units.