

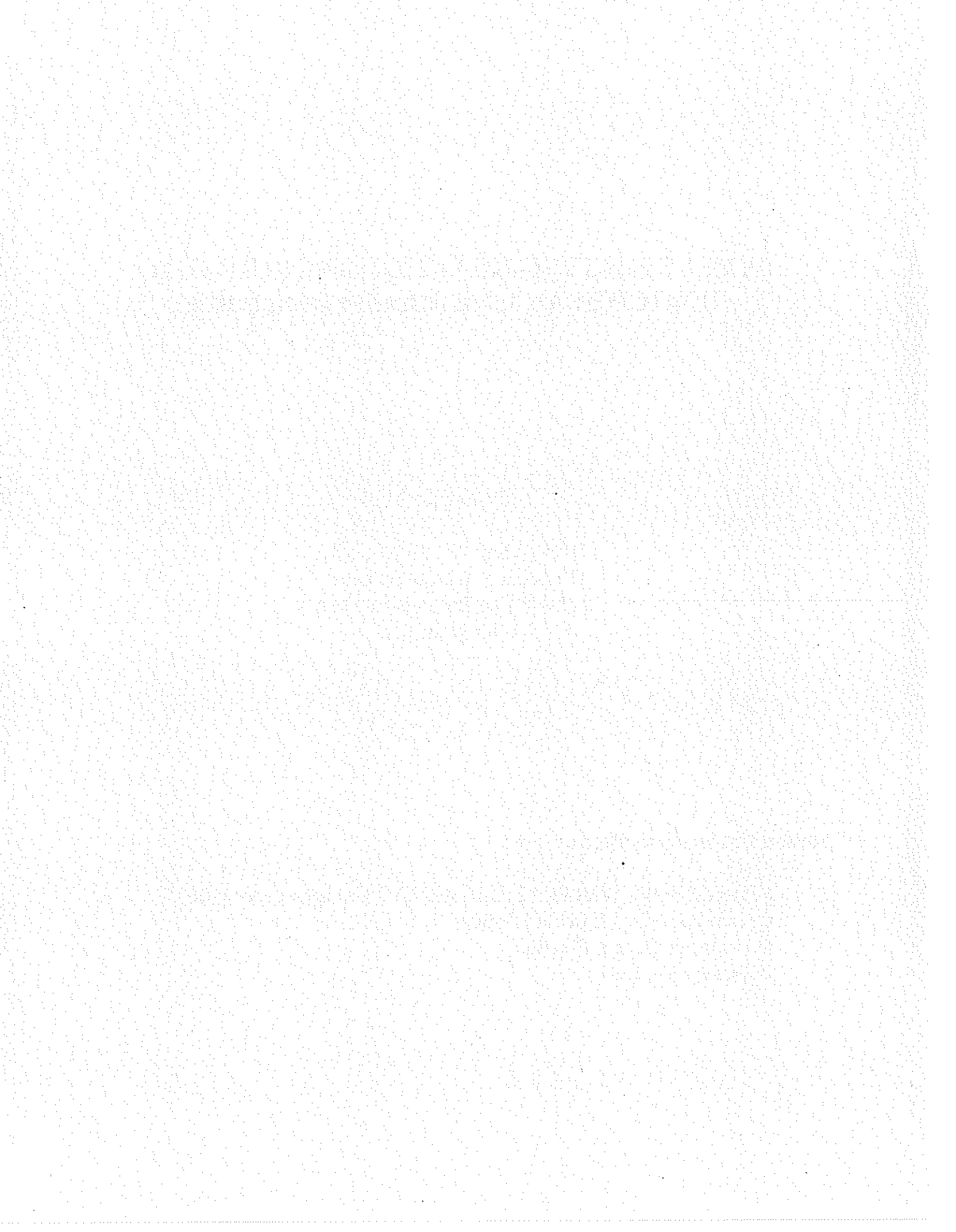
**DEVELOPING INFORMATION TECHNOLOGY  
POLICIES: An Administrative Perspective**

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The issues involved in developing, disseminating, and enforcing effective Information Technology policies on a college or university campus are many and complex. The purpose of this paper is to explore these issues from an administrative perspective. In discussing these issues it is useful to divide the discussion into three primary areas of focus. The three areas are: 1) Responsible Use; 2) System Security; and 3) Infrastructure Development.

Responsible Use refers to those policies that are intended to address the issues involved in regulating: 1) libel, 2) invasion of privacy, 3) obscenity and indecency, 4) harassment; 5) individual verses institutional liability, and 6) copyright in cyberspace.

System Security refers to those policies that are intended to address the issues involved in protecting a college's or university's hardware, software, and information assets from: 1) theft, 2) damage, and 3) unlawful use. System security policies should also address the working relationships amongst on campus groups and between on campus groups and the external agencies involved in handling problems connected with the theft, damage, or unlawful use of the institution's hardware, software, and information assets.

Infrastructure Development is a new area to which little attention has been paid by most administrators and attorneys. Unfortunately, inattention to this area often compromises an institution's ability to effectively use and control its information technology resources. The primary issues involved with infrastructure development are: 1) controlling the institution's infrastructure resources, 2) determining how an institution can remain at the correct level of technological currency/obsolescence without bankrupting itself, and 3) determining the appropriate way to migrate from leading edge to mature technologies.

## **RESPONSIBLE USE**

Colleges and universities have for centuries, maintained an environment for the freedom of speech and expression, for exploration and research, and for open access and the pursuit of knowledge. The protection of privacy and the preservation of rights and intellectual property are also very important characteristics of institutions for higher education. However, balancing the freedoms enjoyed within higher education and the protection of rights and property have become much more difficult to manage in the modern era of the information age. The discussion in this section sets forth the major



issues and concerns involved in an institution's Responsible Use of its information technology.

To establish an environment that promotes and encourages the Responsible Use of information technology, three elements must be present. The three elements are: 1) a Responsible Use policy which is a general statement of the institution's basic principles for the responsible use of information technology; 2) a set of usage guidelines designed to address the many specific issues connected with the use of information technology; and 3) the principles governing enforcement of the basic principles and usage guidelines.

The first element, a Responsible Use policy, which is a statement of the institution's basic principles for using information technology responsibly, should have the expressed approval and endorsement from the institution's Board of Trustees and/or its President. To be effective this statement should be general enough to remain relevant without significant changes for at least three or four years inspite of changes in federal, state, and local laws and inspite of changes in technology. It should also refer to the key issues needing regulation so that it provides an effective foundation upon which to build the specific use guidelines and procedures. As noted earlier, the issues that must be addressed in the Responsible Use of its information technology are: 1) libel, 2) invasion of privacy, 3) obscenity and indecency, 4) harassment, 5) individual verses institutional liability, and 6) copyright in cyberspace. It should also address the security issues connected with the wide range of uses and misuses of the institution's information technology resources to include the appropriate use of equipment, software, and networks at the institution. Finally it should address the role of faculty and system administrators in implementing and insuring the institution's compliance with the policy.

In covering the above issues, the policy should set forth the basic principles governing: 1) the rights of users of information resources, 2) the issues connected with the content of materials on individual machines on the network, 3) the rights of producers of information, 4) issues surrounding the creation of specific use guidelines, and 5) the question of enforceability.

## USER RIGHTS

First, the rights of users of information resources need to be understood and protected. Individuals using an institution's information resources have the right to free inquiry and expression. They should be able to keep certain data reasonably confidential and have the right to be informed of what limits of confidentiality are in effect within the information resources environment. Users also have the right to due process in cases of allegations of misuse and discipline resulting from policy violations.

Many institutions partially address the issue of user rights by applying FERPA regulations to the publishing of student and staff directories. Some are using encryption and authentication techniques to protect information about students and staff. However, new challenges to privacy rights surface constantly. For example, an independent



education services organization is requesting one institution to give them a list of faculty email addresses in order to directly send mass mailings of announcements and relevant advertisements. The services organization is stating that this public institution should provide the list since faculty email addresses are public information. In this case, the release of email address lists to non-university organizations raises concerns of both privacy and ethics.

## CONTENT ISSUES

Other ethical issues have become common in today's digital networked information resources environment. Higher education institutions are home to creators and providers of networked content that may be deemed inappropriate, indecent and perhaps illegal. In the recently passed Telecommunications Act of 1996, Title V of the new law, a.k.a. the Communications Decency Act (CDA), poses serious concerns. According to the CDA it is a federal crime to "knowingly" use a telecommunications device to make "indecent" material available to minors. Hence, in developing a Responsible Use policy statement, institutions need to develop policies that explicitly state the role local, state and federal law plays in the administration and publishing of content using institutional information resources. One of the challenges in this area, however, is the catch twenty-two that most college and university administrators find themselves in when it comes to the issues surrounding content. The catch twenty-two arises over the fact that just because the content of a given web page or document is gross or disgusting does not make it pornographic or illegal.

For example, it is possible for a university to be challenged in court over the on-line display of Renaissance paintings as part of a distance education class on art history. As part of a student's assignment he/she may be asked to create a virtual notebook consisting of links to web pages which contain arguably obscene and pornographic material in fulfillment of their class assignment. Similarly a student taking a psychology or criminal justice class may have an assignment that causes them to create a virtual notebook with links to web pages containing hate speech and harassing content. Unfortunately, for your average administrator confronted with the issue of what is and is not permissible content, the very same web pages that might be used in the art class, psychology class, or criminal justice class could also be contained as links to a web page by a faculty member or student with less honorable motives.

While institutions need to be aware and prepared for these types of challenges in the information age, they also need to refrain from overreacting. As one director of public relations at a major university once stated, more administrations have received bad press in the form of charges of censorship and abridging freedom of speech for shutting down faculty and student HomePages than have received bad press about letting questionable HomePages exist.





## PRODUCER RIGHTS

The rights of the producers of information is also a major issue. How copyright law is interpreted in the networked information environment challenges the fair use provisions of the law. At minimum, institutions need to enforce intellectual property rights, and in particular, software copyright laws and contractual obligations as part of the administration of their information resources. This issue highlights the concern for adequate security to address problems with unauthorized access and the interception of data communications. In short institutions need policies and procedures that protect both their own intellectual property and the intellectual property of others.

Protection of this material is complicated by the need, within the academic community, to use and share protected material as a part of instruction and research activities. Consideration of this requirement needs to be incorporated into the procedures students and faculty use to access and manipulate digitized material. Adherence to licensing agreements, duplication restrictions and other contractual agreements must be addressed in responsible use policies.

Given the continually changing landscape of the information resources environment, institutions need to concern themselves with policy and process development relative to the dynamic information age. Users and producers in the environment need to act responsibly and understand the consequences of irresponsible activity. By developing a responsible use policy and associated guidelines for the use of resources such as electronic mail, home pages, and copyrighted material, the institution is showing reasonable effort to balance the often conflicting rights of freedom and protection.

## SPECIFIC USE GUIDELINES

While the creation of a general policy for the responsible use of information technology is absolutely essential for governing the use and misuse of information technology on a college or university campus, the general policy is of little use if a body of specific guidelines does not exist that is adopted and supported by both campus-wide and local system administrators where the guidelines govern the use of their systems.

Having system administrators responsible for the creation, implementation, and enforcement of the specific guidelines applicable to their systems is the easiest way to ensure that the guidelines are taken seriously and enforced. However, because it is important that the specific guidelines be consistent with the Responsible Use Policy of the institution, it is necessary that the institution have some form of advisory body that is responsible for reviewing the guidelines that are created to ensure that they are consistent with both the overall institutional policy and with the specific guidelines created by other system administrators.

In addition, because there are some items, like the handling of the thorny issues surrounding the regulation of system content that are institution wide in their impact, it is



important that the same advisory group be charged with the development of certain specific guidelines with an institution-wide impact. In the case of developing guidelines governing system content, it is generally best if this advisory group concentrates on creating guidelines that address: 1) the process for allowing web pages to exist; and 2) how to develop barriers to persons, like juveniles, who might be able to gain remote access to questionable sites via the college's or university's web page.

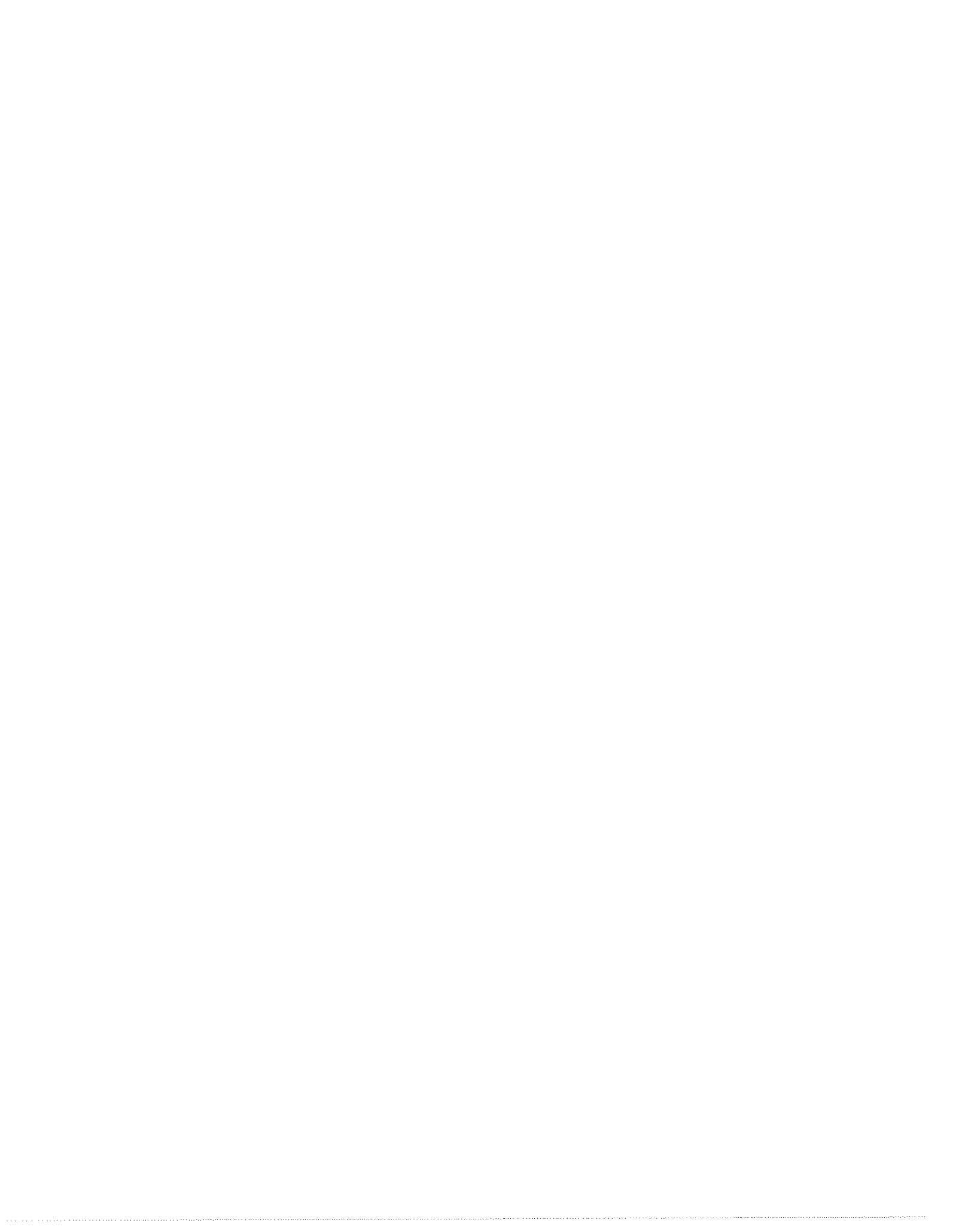
## ENFORCEABILITY

The true utility of policies and procedures for responsible use of resources in a networked information environment is generally dependent upon the individual users of the environment. Minimum effectiveness requires the user community to behave in responsible ways, to respect the rights and restrictions within the environment, and to bring to the attention of administrators, violations and additional requirements. Having some form of policy around these issues demonstrates the institutions responsible behavior and may protect the institution from legal challenges and liability.

In developing these policies and guidelines, administrators must be concerned over their ability to enforce them. As noted earlier, under the section on Specific Use Guidelines, having system administrators involved in the creation, implementation, and enforcement of the policy and guidelines will greatly increase the chances that they will be enforced. It is critical, however, that the policy and guidelines be written in such a way that they are enforceable. Writing policies or guidelines that require large numbers of full time staff to monitor for compliance is both ineffective and likely to irritate honest members of the college or university community. In addition, creating policies that are difficult or impossible to enforce can, if they are regularly abused, undermine the motivation for users to comply with other forms of policy.

Using the example of regulating content, if the policy or guidelines are written in such a way that they ban all obscene materials on the institution's computers, chances are that faculty will resist enforcement since these policies and guidelines will restrict what the faculty member can and cannot legitimately teach. A possible solution to this dilemma is to draft a policy or guideline that states that: 1) web pages without faculty sponsors or that are listed under aliases can be pulled by a system administrator; and 2) the person whose web page has been pulled has a right to a hearing at which time he/she can appeal the system administrator's action.

A major challenge in protecting producer rights is the duplication and dissemination of software by individuals who do not pay the producer for the duplicate copies. While having a policy that explicitly declares this type of activity to be a violation of institutional policy is absolutely necessary, enforcing such a policy can be very difficult. Hence, an additional step that the institution's administrators can take to improve enforcement efforts in this area is to provide users with incentives to adhere to the policy. An example of an incentive is a policy that requires the institution's data center to aggressively pursue site licensing of software products for which there is a high demand



on campus. Often software licenses can allow users to purchase a copy of their favorite software product for only ten or twenty dollars versus the normal cost that could be hundreds of dollars. Pursuing policies of this nature greatly improve the likelihood that users will voluntarily comply with the institution's policies.

## **SYSTEM SECURITY**

In addressing information technology system security, it is important to understand and address four unique areas of computer security. It is also important to address three key concerns. The four unique areas of computer security are: 1) remote loss exposure; 2) information theft; 3) unique crime opportunities; and 4) equipment theft. The three key concerns related to computer security are: 1) computer system outages; 2) fraud; and 3) information disclosure.

### **FOUR UNIQUE ASPECTS OF COMPUTER SECURITY**

#### **Remote Loss Exposures**

Because computers can control financial assets whose value exceeds the cost of the actual hardware, it is difficult to assess the loss exposure by simply examining the computer system itself. Even a system outage that has little impact on the equipment itself can result in the interruption of service that may cause significant losses to the institution. Hence, developing effective policies and guidelines for limiting an institution's risk to remote loss exposure is one that must be examined thoroughly.

#### **Information Theft**

As computer technology continues to improve the amount of data that can be stored in a small diskette is increasing. Currently, vast amounts of data can be downloaded in seconds. In contrast, the equivalent data on paper records could take hours to copy. In addition, it is much more difficult to transport hundreds of paper records without detection than it is to take a few small diskettes off of an institution's premises. Hence, developing effective policies, guidelines, and procedures for curbing information theft must be aggressively pursued.

#### **Unique Crime Opportunities**

When records that used to be kept as written entries in paper journals are converted to magnetic data recordings, new opportunities for fraud become possible. The manipulation of electronic data can be accomplished with more stealth than that of paper records, and there is less risk of detection since no physical access to the storage site is necessary. When combined with the issues referenced above under Remote Loss Exposures and Information Theft, an institution is truly faced with having to confront and regulate Unique Crime Opportunities that require the cooperation of a wide range of departments and individuals. A further discussion of the many individuals involved in



curbing these Unique Crime Opportunities is presented under the section on Roles and Responsibilities.

### Equipment Theft

The data contained in the computer systems are not the only valuable items. Computer equipment is a very desirable target for thieves. In addition, there is a growing market for computer components. Especially attractive are the hard disk drives, math processors and memory chips. These items are small enough to transport easily and are usually not traceable once removed from the computer housing that contains the serial numbers. Hence, policies and guidelines that educate users on how to protect their computer equipment from theft are essential.

### ISSUES OF CONCERN:

#### Computer System Outages

Three basic kinds of events can cause outages: 1) external factors like electrical storms and earthquakes; 2) failures of the environment in which the computers are kept; such as fires in the building, sabotage of telephone lines, and water leaks; and 3) system failures, such as equipment breakdowns, software "bugs", or operator error.

Two actions that can be taken to reduce losses are 1) preventive measures to reduce both the likelihood and duration of an outage, and 2) maintaining alternative means of providing service in the event of an outage.

In the case of measures to reduce both the likelihood and duration of an outage, institutions need to develop explicit policies that address the trade-off between the security and reliability of the institution's systems and the costs of installing uninterruptible power systems (UPS) and/or backup generators. Similarly institution's need to develop policies that address the trade-off between the costs of lost productivity from system failures and the costs of having "warm" or "hot" sites available to run the institution's normal business systems.

#### Fraud

Almost every computer system is exposed to fraud. There may be dozens, even hundreds, of people using the system who become intimately familiar with its operation and procedures. Many of these people may even become familiar with the safeguards for the system. Sometimes, complexity is assumed to be an adequate safeguard. This, however, is not the case.

Experience shows how easy it is for a hacker to access computer networks, even those thousands of miles away. In many cases hackers are not the geniuses that the media makes them out to be. When the system access software is first installed it has a default





password and ID so the system administrator can dial in and setup the system. Sometimes, the system administrators and/or service technicians forget to change this default password, even though the system instructions always include a caution to immediately change it. Hackers take advantage of this common oversight. They frequently use Bulletin Board Systems (BBS) to exchange information concerning penetration methods; including common default passwords. As soon as one hacker learns how to penetrate a system, other hackers will quickly learn. Hence, having policies is not sufficient. In addition, there must be periodic audits to insure that system security measures are being followed.

Another issue that must be addressed is the level of evidence that must be secured in order to prove that a given individual has hacked the institution's system. Simply tracing a remote break-in to a given computer is not sufficient since the owner of the system can often claim that someone else may have had access to his or her machine. This is especially true if the hacker is a student with roommates. Hence, in developing policies and procedures for tracking hackers, attention must be given to the steps that will be required to prove that a given person was using a specific computer, at a specified time, when making the illegal entry.

#### Information Disclosure

As previously noted, theft of electronic data is much easier than from a paper filing system. If a stranger were to enter an office and ask to see a particular file folder his/her identity and authorization would be closely checked. Anyone looking at this stranger could tell if the identification matched the person. In the case of electronic data the computer checks for identification, although in a much less certain manner. If a stranger learns a valid log-on password he/she can gain acceptance by the computer as if he/she were the valid password holder since the computer does not make a visual match. While a foolproof solution to this challenge does not currently exist, the creation and enforcement of guidelines that require users to change their passwords every three or four months can at least reduce an institution's exposure in this area.

Hence, for an institution to be adequately protected in this area it must develop effective policies and procedures for managing passwords and the discovery of penetration attempts.

#### PRERQUISITES FOR EFFECTIVE COMPUTER CRIME CONTROL:

To effectively control computer crime a college or university must have: 1) a clear policy statement from the Board of Trustees and/or the CEO of the organization; and 2) a set of specific guidelines that promote an environment of cooperation between the various managers concerned with controlling computer crime.

The policy statement should be the same statement referred to earlier in this paper under the discussion on the Responsible Use of information technology. For the



Responsible Use Policy to address the needs of a computer security program it should define the institution's objectives for: 1) protecting the institution's assets and information; 2) preventing misuse of the institution's computer resources; and 3) protecting the privacy of personal information.

The specific guidelines designed to promote an environment of cooperation between the various managers concerned with controlling computer crime should define the responsibilities of the key on campus personnel needed to enforce computer security. At a minimum the persons that should be involved in this endeavor are the director of data processing, the internal auditor (including, the electronic data processing auditor), legal counsel, the director of human resources, and the director of security. These guidelines should also set forth the manner in which the institution will interact with external organizations that can impact on the institution's ability to enforce computer security. Among these external organizations are the local telephone company, the local police force, and the FBI.

## **ROLES AND RESPONSIBILITIES**

Having a clearly defined and agreed to set of roles and responsibilities for the on campus managers involved in controlling computer crime is one of the most effective ways to insure an environment of cooperation among these managers. The following are proposed roles and responsibilities for the director of data processing, manager of internal auditing, legal counsel, the director of human resources, and the director of security as they relate to the issue of enforcing on campus computer security.

### **Director of Data Processing**

The director of data processing should design and implement procedural and software safeguards to control access to key data processing resources. This person should also maintain operating logs that ensure individual accountability for all data processing activities. Old copies of these logs should be kept in a secured location. In addition, this person should maintain a system of controls and file backups that will ensure that should the system crash a minimal amount of data (preferably no more than one day's transactions) will be lost in the case of a disaster. This person should coordinate activities with the director of security during the investigation of suspected cases of computer crime. Finally, this person should serve as the primary liaison between the campus community and the local telephone company in cases involving access to the institution's system via dial-in through the off campus telephone lines.

### **The Manager of Internal Auditing**

The manager of internal auditing should review the design of all computer systems to ensure that the controls and checks that are planned are adequate and effective to protect the institution's physical and information assets. This person should also ensure that suitable audit trails are in place for the future review of system activity. In addition,



this person should review the techniques that have been put in place to detect suspicious transactions to assure that the techniques are adequate. Finally, the manager of internal auditing should work cooperatively with the director of security to investigate any suspected computer crimes.

### **The Legal Counsel**

The legal counsel should develop policy and guidelines for the investigation and prosecution of computer crime that ensure the proper protection and balance of individual rights and institutional rights. This person should also provide guidance to administrative personnel when determining which cases the institution should prosecute. In addition, this person should work cooperatively with the human resources director to develop clear guidelines for the conduct of all employees regarding the use of computer systems. Finally, this person should work cooperatively with the director of security during the investigation of suspected computer crimes.

### **The Human Resources Director**

The human resources director should coordinate with legal counsel the development of guidelines for employee conduct regarding the use of computer systems. They should also work cooperative with the director of security to prepare for and conduct recurring security awareness training for all employees.

### **The Director of Security**

The director of security should work with all of the above to develop and implement a security plan for the protection of organizational information, the institution's data network, and individual hardware and software computer resources. This person, in cooperation with all of the above, should conduct investigations into suspected computer crimes. In addition, this person should serve as the primary liaison between the campus community and the local law enforcement agency and the FBI in cases involving off campus and/or interstate activities. Finally, this person should prepare criminal cases that are deemed worthy of prosecution for review by the local district attorney.

## **INFRASTRUCTURE DEVELOPMENT**

As noted earlier, Infrastructure Development encompasses the issues of: 1) control of the institution's infrastructure resources, 2) policies aimed at determining how an institution can remain at the correct level of technological currency/obsolescence without bankrupting the institution, and 3) how to determine appropriate uses of technology in the administrative and academic areas.

## **CONTROL OF THE INSTITUTION'S INFRASTRUCTURE**



Twenty years ago during the era of mainframe computing the question of who controlled the college's or university's information technology infrastructure was reasonably simple. In most institutions the computer center controlled the institution's infrastructure. Ten years ago during the height of the personal computer revolution, the answer to who controlled the infrastructure was still reasonably simple. The computer center still controlled the mainframe environment and individual users or departments controlled their own desktop machines. Today, as the paradigm for the information technology infrastructure shifts towards the concept of the "Network as Computer", the question of who does or should control the institution's infrastructure becomes a much more complex one.

The relevance of this control issue on the institution's operations is visible in the relatively simple issue of protecting the institution's databases from the ravages of a computer virus. If the approach of ten years ago is to be followed, and the owner of a desktop computer has complete control over its use, then the institution has no right to require some form of virus protection software to be installed on each desktop machine. The flaw in this approach is that if a machine, that is connected to the institution's computer network, becomes infected with a computer virus it can place the institution in grave danger of lost productivity and/or lost data due to the impact of the virus.

Similarly, whether or not individual data backups are performed on desktop computers has traditionally been an issue left to the control of the user of the desktop system. In general, the loss of data on the hard drive of a single desktop computer is not as grave as a virus on an institution's productivity and operational effectiveness. However, as hard drives become larger and more data is stored on them the impact of a desktop computer's hard drive crashing on an institution's productivity increases. Hence, institution's may want to consider policies that require each user to back-up their data on a regular basis.

Hence, in drafting specific guidelines for the use of information technology on a college or university campus special attention must be given to who has control of the institution's information technology resources. While any policies in this area will be subject to the normal give and take of campus politics, a general guiding principle must be that any information technology hardware and software tied to the institution's network must be subject to some form of control by the institution's data center with appropriate oversight from an advisory group that represents the user community's interests.

## POLICIES ON TECHNOLOGICAL CURRENCY/OBSOLESCENCE

Most colleges and universities have a culture which views the institution's fixed assets as having useful lives of at least five years in the case of furniture and equipment. In addition, this culture assumes that even though the official useful life of an item may only be five years, its actual use may be indefinite. Unfortunately, most computer hardware and software is obsolete in two to three years. In some cases the useful life is less than two years. In addition, unlike furniture and other forms of equipment, computer hardware





and software older than three years, if still in use, can impede a college's or university's ability to adequately carry out its mission or attract the best students.

An example of the speed at which technology can become obsolete is the recent history of the 486 computer. As recently as a year ago stores were still selling 486 computers with only 8 megabytes of RAM memory. Today one cannot buy a new 486 computer. In addition, the ability to run the latest software on these machines is becoming increasingly difficult, especially if they have less than 16 megabytes of RAM memory. Hence, an institution whose written or unwritten policy is to base purchases of computer hardware on price without clear performance specifications could have purchased a large number of 486 computers less than a year ago that are incapable of running the latest software without upgrading the hardware.

To deal with the pressures that this planned obsolescence is creating for many colleges and universities, administrators have begun to actively search for industry partnerships that will allow donated or highly discounted hardware or software to be bought by the institution. In structuring these agreements both the administrators and their attorneys need to: 1) have a clear understanding of the institution's information technology needs and evolving directions; 2) actively work with the campus' information technology center to receive counsel on the compatibility of the "new" hardware and software with the institution's existing and planned technology infrastructure; and 3) be very clear on the warranty limits on the "new" hardware and software.

An example of how a seemingly wonderful opportunity may have serious complications involves the current tendency for businesses to donate their 486 computers to colleges and universities. As noted earlier, a 486 machine with 16 megabytes of RAM may be adequate to run today's programs, like Windows 95 and related applications, especially if it is a fast machine. Unfortunately, many of the 486 machines being offered have only 8 megabytes of RAM and are not particularly fast. Hence, an institution getting machines with only 8 megabytes, depending on how they will be used, could be faced with the cost of upgrading the memory in all of the machines. In addition, as a number of organizations have recently found, even upgrading the computer memory may still leave users with intolerably slow machines for normal business applications.

## MIGRATING FROM LEADING EDGE TO MATURE TECHNOLOGIES

The Gardner Group, an information technology consulting organization, has defined three types of organizations on the basis of their use of information technology. The three organization types are Type A, Type B, and Type C.

Type A organizations are described as being leading edge users of technology. Type C organizations are described as waiting until a technology has become fully "mature" and proven before incorporating it into normal business operations. Type C organizations are also referred to as trailing edge users of technology. Type B organizations are mainstream users of technology.



Colleges and universities are unique in that they often include Type A, B, and C units. Usually the Type A units are in academic areas while the Type C units are often in administrative areas. The primary relevance of this to college and university policies occurs when a given leading edge technology that was used by Type A units, within the academy, becomes a mature technology.

Most colleges and universities have an unwritten policy that allows their Type A units to experiment with leading edge technologies without requiring prior approval or adherence to a predefined set of standards. While this policy, even if explicit would be a good one, the problem arises when there are multiple versions of a technology that used to be a leading edge technology that are now a mature technology. An example of this dilemma is email on many college and university campuses. When email was first being used on college campuses eight to ten years ago it was a leading edge technology. Today it, like an institution's telephone system, is a mature technology. While few institutions would have multiple telephone systems on campus, many institutions are faced with trying to cobble together multiple email systems without the resources or policies to make this possible without major problems.

In general, creating a policy to deal with this challenge includes having the institution offer incentives to departments to encourage them to migrate towards the preferred single technology solution.

