General Remarks

Humanists teach the critical analysis and persuasive use of words and images. Such teaching has been deeply embedded in the information technology of the printed book. To be educated has meant above all to know your way around books, and in its fundamentals the technology of the book matured quickly and remained stable for a remarkably long time. Erasmus and a graduate student of the 1970's "navigated" their way around "Typospace" in very similar ways. But deep changes are now transforming the technology of words and images. They will not displace the book, but they are changing the definition of what it means to know your way around words and images in the professional, business, and other environments to which a Northwestern undergraduate education is a gateway.

The extension of the campus network to student residences recognizes these important changes in information technology. It also sets up an evolving baseline for curricular
planning. The computing and communications operations that incoming freshmen expect to and are expected to use routinely in the course of their education will set parameters for what counts as adequate or obsolete in class rooms, departments, and faculty offices. Our goal in this report is to spell out some principles and priorities in maintaining a pedagogical environment in the humanities that will adequately support the growing number of faculty who will want to try out new technologies in their teaching, whether as useful tools or as ambivalent phenomena to be submitted to informed critique.

For humanists, changes in information technology can be summarized under four headings:

1. Changes in the ways of making, copying, and moving words have been well understood and almost universally adopted.

2. Changes in communications technology - e-mail and its more elaborate cousins - have spread more slowly but will find equally broad and quick acceptance once people are in fact on the network and have user-friendly communications passages.

3. Electronic information can be searched very fast and flexibly, both for simple look-up operations and complex analyses. The search tools are more powerful by orders of magnitude than their analogues in the world of print culture, such as bibliographies, dictionaries, indexes, and concordances.

4. "Image processing" has joined word processing as a basic capability of the personal computer. Digitized images that are good enough for most pedagogical purposes can now be made, copied, and moved by end users with no particular technical skills. This has far-reaching consequences for the integration and mutual reinforcement of verbal and visual materials in many pedagogical contexts.

In what follows we address items 2, 3, and 4. We focus on the pedagogical environment, but it is worth stating that the boundaries between pedagogical, scholarly, and administrative use of technology are very fluid. Computers are very much like pencil and paper in this regard.

It is also worth stating that unlike the sciences, the humanities require very little in the way of discipline specific hardware or software. Off-the-shelf business software meets most needs with little or no modification. The most powerful text searching software, for instance, is a form of document control software used by such companies as Boeing for their technical documentation. There may be many ways in which sophisticated pedagogical and scholarly applications can be piggybacked on to administrative routines. It will in any event be useful to keep a watchful and opportunistic eye on the capacity of equipment and expertise to sustain very different services.

Our recommendations are very broad and intended as a statement of principles and priorities that should govern the allocation of resources at the level of the department, the
school, ACNS, the university library, and the central administration. We deliberately sidestep the question of who should pay for what as beyond our competence, but offer some general budgetary considerations instead:

1. Information technology must compete with all other resource requests at all other levels of the budget process. There may, however, in the short run be a need for pump priming from the central administration.

2. The logic of the network, which is social, and the emphasis on the pedagogical applications of information technology suggest that the provision of an adequate computing environment for faculty be recognized in the operating budget as part of the instructional cost. The case for such a shift is particularly strong in the humanities, where there is no grant or contract income to maintain, upgrade, or replace equipment.

3. The Library will play a critical role in the acquisition and maintenance of text and image tools and resources of special interest to the humanities. For humanists this is a good thing: they will find it an overwhelming advantage to encounter new technology in an environment with which they are already familiar, and the library will be in many cases the best site to weave new technologies gracefully into the web of traditional scholarly and pedagogical practices. But in the process of reallocation that will be part of phasing in new information technology, it is critical that the Library retain its ability to acquire primary research materials in whatever format they are most valuable to the scholars using them.

**Access to the network**

An effective network requires that all or most faculty are accessible by simple e-mail and that faculty eager to use more sophisticated network services get the level of access they need (RECOMMENDATION 1). We are a considerable distance from a reasonable balance of access and accessibility. Although fiber-optic cable has been brought to the buildings, inside wiring has not yet been budgeted or scheduled for Harris Hall, which houses History, and the buildings across Sheridan Road that house Philosophy, Religion, the Writing Program, and the Humanities Center. We understand that solutions to these hook-up problems are under discussion and hope that over the summer and fall quarter all buildings will be fully connected.

Obsolete equipment poses a more difficult challenge to network access. Most equipment currently in the offices of humanities faculty is obsolete in the sense of being unable or barely able to perform the computing and communications operations that next fall's students in the dorms will take for granted.

The English Department, which probably has a better computing environment than any other humanities department, is a case in point. On the plus side, all offices in University Hall have Ethernet connections. A handful of faculty either do not want to be bothered or have equipment that is too old to support any network connections. But most faculty can
do word processing and e-mail. The department is thinking about shifting routine communications to e-mail, and by the end of the quarter much of the memo traffic may be paperless. That is the good news. On the other hand, of an inventory of about 40 machines, only one can comfortably handle anything beyond simple e-mail. Some of the machines in the department office, but hardly any of the machines in faculty offices, are worth upgrading. The situation in English, then, is that most faculty are or shortly will be accessible over the network but that almost nobody has the equipment to do more than word processing and basic e-mail. In other departments, the situation is worse, and in some of them considerably worse.

If new information technology is going to be worked into the humanities curriculum, much of the equipment in faculty offices will need to be replaced over the next few years and will need to be regularly replaced thereafter. Assuming a useful life of four to five years for a desktop computer, no more than a quarter of the equipment should be obsolete at any one time. More than three quarters appear to be obsolete now.

There is a perception on the part of many humanities faculty that university support for computing equipment has been disproportionately tilted toward incoming faculty. College officials dispute this and point out that substantial sums are spent every year on continuing faculty. Whatever the truth, the hodgepodge of current practices for purchasing and maintaining equipment has not worked well enough: far too much of the equipment is at the end of its useful life. We think that the logic of the network calls for a different approach and recommend that the University recognize and write into its operating budget the need to maintain an inventory of equipment capable of supporting appropriate uses of evolving information technology for pedagogical and scholarly purposes (RECOMMENDATION 2).

Given the size of the humanities faculty (about 120) and the current rate of technological change, a policy of maintaining a reasonably up to date inventory of equipment will amount to buying between two and three dozen computers a year. There are various sensible ways of going about implementing some version of such a policy, and we offer no particular advice. There may be some virtue in following the practice of large families who buy their clothes sturdy and a size too big for children to grow into and hand them down to the next one. Putting new equipment into the hands of "power users" first and then moving it to other users over its life cycle is likely to keep the aggregate inventory in better shape than meeting the current minimal needs of users. Unlike fast cars, fast computers manage the transition from race horse to work horse very gracefully.

**User training and technical support for general network services**

It is plausible to look ahead eighteen months or so and envisage an environment in which all or most faculty members are accessible on the network by e-mail and a growing number make active use of the network and will routinely

- use e-mail and its elaborate cousins, listservs and conferencing software, in their
teaching

- access library catalogs and other bibliographical databases at Northwestern and elsewhere
- access text searching software to look up words in the Oxford English Dictionary or perform keyword in context (KWIC) searches on digitized texts
- use gopher and Mosaic for various local and global information resources
- distribute syllabi, handouts, and other classroom materials over NUNet via Mosaic or other browsers
- incorporate digitized images into lectures in electronic classrooms
- use server facilities to back up important files.

All of these services are available now, and for a user with a stable Ethernet connection and an adequate computer they are low-hassle activities with a relatively gentle learning curve. It will, however, take a very large amount of time, patience, and thoughtful user training and support in order to turn moderately interested but variously fearful novices into competent users of routine services. Here the record of the recent past has not been wonderful, and we must do significantly better.

If the logic of the network calls for adjustments in the purchasing policy for equipment, it calls for even greater adjustments in the concept of user support. In fact, the network, the individual computer, and the service to support both should be seen as one bundle of problems, and in the business of making the system as a whole run, the time and money costs of support should be given their proper weight, which is very considerable indeed.

As it now stands, individual faculty in the humanities buy hardware and software of their choice, sometimes with, sometimes without, support from the College. They then expect unlimited help from the departmental support staff to make their choices run on the network, and they get very frustrated if it does not work, as it frequently does not. This is a very expensive way of making people unhappy. To a considerable extent, the network has created these problems, which did not exist in the stand alone world of the "personal" computer (brilliantly named to sustain illusions of intimacy and autonomy), and the benefits of the network have as their cost a greater need for compliance with shared standards.

Good and affordable user support may be compared to a triage system of self-help, nurse practitioner, and doctor that puts a premium on self help and diagnostic skills at the local level, facilitates help at the local level through common standards, and reserves the use of expensive technical support for special problems. An effective support policy will need to 1) reduce the choices of supported hardware and software, 2) choose supported hardware and software with a view to ease of support, and 3) pay a lot of attention to lucid and comprehensive documentation that allows average users to get up and running on the network with a combination of self-help and modest hand holding (ACNS documentation does this very well for Macintosh networking software but not so well on the DOS/Windows side).
If our discussion of equipment and service policies in a network environment carries a centralizing message of sorts it will be also critical to keep in mind that faculty in general, and humanities faculty in particular, are intensely local folks. An effective service structure must work with rather than against the grain of life in the departmental parish, and the site and source of support should be as local as possible.

Locally based support can be achieved by relying on the very bright and cheap source of labor the university has in its own undergraduates. We recommend the establishment of a user training and technical support team consisting of six to eight undergraduates (preferably work-study) who are hired and paid for out of departmental funds, are each attached to one or two departments, receive initial and continuing training as a team from ACNS, and are expected to back up each other and develop areas of special expertise to be shared across departments. Such a plan provides 60 to 80 hours of service per week for some 120 faculty (RECOMMENDATION 3).

For the first and much of the second year of its operation, such a team will be concerned mainly with user training in basic network routines. Once that has been done, the operation can be scaled down. The odds are, however, that there will be more than enough work for a well-trained cadre of undergraduate helpers and that they can play an important role in working with support staff and faculty in the humanities to phase in a variety of more sophisticated network services and routines.

Successful implementation of such a plan will require a non-trivial investment of time and supervision by ACNS staff: it takes commitment and skill to build a team and hold it together. But this investment will be in keeping with the policy of ACNS to teach users how to help themselves rather than do it for them. It will also ensure that help is usually delivered in the faculty member's office, where it is most needed and most useful. Finally, undergraduate helpers who are attached to departments but also form part of larger teams will be useful in spreading various kinds of know-how across departmental boundaries.

**Library based network services**

Subject based guidance to global network resources will be a critical element in educating users in the proper use of information technology, and it forms part of a service structure in a wider sense. In principle, anybody can find anything on the Internet. In practice, such searches are like finding a telephone number in a city that has no directory but occasional listings by some people of some of their friends. Nor is this a temporary deficiency: the Internet is a sprawling and anarchic structure that requires a great deal of informed mediation to be useful. Such mediation is the traditional role of reference and subject librarians. Their role will become more complex and difficult in a world where the network is something like a vast but chaotic reference collection whose items lack many of the formal or informal clues about date, status, reliability, and the like that even readers of moderate experience pick up and respond to in the simple act of opening a book and turning its pages.
In addition to drawing attention to the critical role of librarians as guides to network resources for students and faculty, we single out three services that are of special interest to teaching and scholarship in the humanities.

**Bibliographical databases**

Remote access to bibliographical databases is clearly a major incentive for faculty to seek access to the network. Several converging developments will strengthen this incentive in the near future. The Library has set up a local area network of bibliographical databases on CD-ROM, but before the end of the year plans to move its heavily used databases (e.g. the MLA bibliography) onto more robust servers that are accessible like LUIS. We welcome this development and hope that in time the remaining CD-ROM based databases also become available over the network to DOS/Windows, Macintosh, and UNIX users alike (RECOMMENDATION 4).

More generally, we recommend that the Library's network habits and priorities quickly come to reflect its central role as the guide to and provider of information over the network. The Library has been exclusively a DOS environment, and its internal network protocols differ from those of NUNet. Northwestern students are predominantly Macintosh users. The humanities faculty are balanced somewhat toward a Macintosh environment. ACNS is a much stronger support organization on the Macintosh than on the DOS/Windows side. Outside events will introduce a lot of change and uncertainty about operating environments in the next few years. In responding to these changes, the Library should closely cooperate with ACNS in developing common and cross-platform network protocols and evaluate choices from the perspective of users who would prefer never to know that there was a problem in the first place (RECOMMENDATION 5).

**Full text searching capability over the network**

Two years ago, the College funded as a pilot project the purchase of a text searching program called PAT, which was developed to search the Oxford English Dictionary but can search any suitably prepared text corpus. Over the past two years ACNS and the Library have cooperated in using PAT to develop a basic text searching capability accessible over the network. Currently the PAT based version of the OED is accessible over the network via different clients (Mosaic, OnLine Library). A number of literary and philosophical texts are available via a Macintosh client called The Searcher.

Similar initiatives, sometimes and perhaps misleadingly called "e-text centers," have been underway at various other universities, notably Virginia and Stanford. The e-text business is not about adding books on disks to books on shelves. It is a matter of adding an analytical capability and is best seen as a powerful extension of traditional philological tools, such as indexes or concordances. E-text technology converts a text into an index of its parts, down to the word or letter, which may be searched at speeds that are faster by several orders of magnitude than "manual" searches. In addition to being much faster, e-
text searches are much more flexible and can be performed according to many criteria separately or in combination. The technology has many useful applications for students of closed textual corpora, whether legal, linguistic, literary, philosophical, or religious. It can be easily taught to freshmen and has the virtues of a microscope in directing attention to detail. Very much the same equipment and expertise is required to deliver a range of search operations from the elementary to the advanced.

The Library and ACNS have worked out a schedule to move the PAT project from a development to a fully operational phase by the end of the spring quarter and make the text search capability available over Windows, Macintosh, and UNIX clients to any user with a network connection. In adding to its collection of searchable texts, the Library will respond to user demand and will rely mainly on the sizable and rapidly growing supply of free or low-cost texts available through the cooperative ventures of e-text centers across the country. We endorse these decisions and their timetable for implementation (RECOMMENDATION 6).

Supporting the word-and-image processor

The computers next year's incoming freshmen will be encouraged to buy can download, store, display (and to a lesser extent, edit) images that are good enough for most pedagogical and many scholarly purposes. The word processor of a few years ago has become a word-and-image processor. This development holds great promise for teaching in the humanities

Some power users will rediscover the joys of the darkroom in Adobe Photoshop and will do amazing things with digitized images. But the technology will probably have a broader and deeper impact in the hands of many teachers, who think of "show and tell" as a wonderful thing but find the slide projector and similar technologies daunting and cumbersome devices, especially when used on a casual basis. Such teachers will be keenly interested in a technology that allows them to weave visual and verbal information into their teaching, sometimes systematically, sometimes casually and improvisationally. The "good enough" digitized image does just that. It looks very good on a monitor and acceptable on a screen projector. Above all, it can be easily displayed in a classroom, reviewed by students in their dorm rooms or labs, and image collections can be made part of assigned "readings."

For this technology to be available in a low-hassle environment there needs to be a service structure capable of doing the following:

- identify available sources of digitized images
- make digitized images from papers, slides, film, and video sources
- store images temporarily or permanently and control access to appropriate user groups
- provide databases that allow for the cataloguing, description, and searching of images
- provide remote access to the images over the network on a cross-platform basis.
We understand that the Library is planning such an image service as part of a pilot project for an "electronic reserve collection." We strongly endorse this initiative and hope that a pilot version can be up and running by this fall. We also think that development in this area will benefit from close and continuing cooperation between ACNS and the Library (RECOMMENDATION 7).

Classes in American culture have already begun to make use of images over the network and are likely users of such a facility. Other plausible candidates are a collection of the most commonly used slides in introductory Art History classes and a collection of theater history images for the basic freshman theater course. Such collections would be more or less permanent. The value of the service, however, should not be measured by the size and scope of a permanent collection, but by the speed and ease with which it facilitates the use of visual materials in diverse pedagogical settings.

We do not address here the creation of large-scale and high-standard image archives, such as the conversion of the several hundred thousand slides in the Art History slide collection. There is a place for such projects down the road, but for the next year or so there is a place for limited projects that have a short-term payoff for the end user, develop staff expertise in what will be a very complicated business, and allow for trial and error at an affordable cost.

**Other matters**

**Small smart classrooms**: The smart classrooms recently installed have been very thoughtfully designed and have met with enthusiastic response from users. Most humanities teaching, however, takes place in smaller settings, and many pedagogical uses of network technology may take place in a casual or snacking mode in seminars. It is possible to turn any room with a network connection into a "smart enough" classroom with portable equipment. Alternately, it is possible to set up some small rooms with fixed equipment for special bookings. There is something to be said for both approaches, but we recommend that in one way or another smart classroom technology should be made available for small classrooms in addition to lecture rooms (RECOMMENDATION 8).

**Foreign language teaching**: The most extensive pedagogical application of computing technology in the humanities currently occurs in the teaching of foreign languages. Some excellent development work is being done, especially in the teaching of German, and the Multimedia Learning Center in Kresge is making good progress in moving the technical support structure for foreign language instruction from older to newer technologies. Many rote exercises in first- and second-year language instruction can be restructured into network accessible programs, and this should be done wherever possible. Other exercises, such as phonetics drills, are likely to remain lab-bound within the current generation of the network. Similarly, the most imaginative current development work involves video technologies that cannot yet be moved over the network. This work should
continue to be supported (RECOMMENDATION 9).

**Need for a continuing committee:** Many items relating to humanities computing will need to be discussed in the next few years. There should be greater representation of humanities faculty on general computing committees. We also see a continuing need for a body to give advice to the Central Administration, the College, ACNS, and the Library on humanities computing issues. We recommend therefore that our task force or a committee similarly composed continue in existence for at least two years as a general advisory body (RECOMMENDATION 10).

**Summary of recommendations**

1. Make every faculty member accessible on the network and provide appropriate resources to insure adequate network access to faculty seeking to make active use of information technology in their pedagogical and scholarly work.
2. Maintain as part of the operating budget an inventory of computing equipment capable of supporting appropriate uses of evolving information technology for pedagogical and scholarly purposes. Follow a hand-me-down policy in matching equipment with user needs.
3. Develop a training and technical support structure that will encourage self help and will provide locally based support within a framework of common standards for supported hardware and software. In particular, hire a team of departmentally based and ACNS trained work-study students to provide technical support and user training in the humanities departments.
4. Support the Library's plan to move heavily used bibliographical databases to a client/server system and urge the Library to insure remote access to CD-ROM based bibliographical databases on a cross-platform basis.
5. Keep in mind the Library's critical role as a guide to and provider of networked information services and insure that the Library's internal network protocols interface seamlessly with NUNet.
6. Support the Library's plan to assume the major responsibility for making a basic text searching capability fully operational and accessible over the network on a cross platform basis by the end of the academic year.
7. Support a joint initiative by the Library and ACNS to establish by the fall of 1994 a pilot project for a digitized image service to support the casual and systematic use of digitized images by faculty and students for instruction and research.
8. Make smart classroom technology available in some small classrooms.
9. Develop network accessible programs in foreign language teaching while also supporting programs that cannot yet be moved over the network.
10. Continue this task force or some committee like it as an advisory committee to the Central Administration, the College, ACNS, and the Library on matters relating to humanities computing.