New Information Technology and Liberal Education: A Manifesto

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Academic Computing Committee
Plans for the library renovation
The Free Software Foundation
Statement of copyleft
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DISCLAIMER
THE MEMBERS OF THE FURMAN FACULTY WHO HAVE ALLOWED THEIR NAMES TO BE ATTACHED TO THIS MANIFESTO DO NOT NECESSARILY AGREE WITH EVERYTHING IT SAYS. BY CONSenting TO THE PUBLICATION OF THE MANIFESTO, THESE FACULTY MEAN TO INDICATE ONLY THAT THE MANIFESTO BRINGS UP ISSUES THAT ARE IMPORTANT FOR THE FURMAN COMMUNITY TO DISCUSS. THE MANIFESTO ATTEMPTS TO FOCUS THOSE ISSUES SHARPLY BY MEANS OF ARTICULATING THESES FOR DEBATE.

Click here for a list of Furman faculty consenting to the publication of this manifesto.

Introduction

Sometimes, a manifesto is thought of as a document that signals the end of discussion and the beginning of some sort of more direct political activity. As indicated in the "Disclaimer" above, the intent of this manifesto is the opposite: it aims to open discussion, certainly at Furman but maybe at other liberal-arts colleges as well, about the new information technology and liberal education. Because the new technology changes so rapidly, such a manifesto has a useful life-span about equal to that of an institution's strategic plan. This particular manifesto should be read together with Furman's strategic plan, which itself should be thought of as a document continually under revision. This manifesto means to participate in an ongoing process of assessment, reflection, and decision-making.

It is important to remember that this manifesto arises from a seminar composed almost entirely of faculty, and that it articulates faculty concerns. The impact of the new information technology on liberal-arts institutions spreads wider than the faculty, and the faculty, though their collective voice should be decisive in academic matters, should not pronounce unilaterally on all of the issues involving the institution's use of the new technology. Part of the intent of this manifesto is to initiate discussion among students, faculty, administration, and trustees on issues--and they are many--that impinge upon but extend beyond the academic program.

As a document limited specifically to the faculty's point of view, this manifesto does not always give students the prominence of mention proportional to the concern of the Furman faculty for students. But it should be remembered that every faculty member's primary concern at Furman is presumably teaching. Therefore, most of the faculty concerns articulated in this manifesto are, at least implicitly, concerns about how the new information technology affects Furman students.

In general, the manifesto proceeds by giving theoretical arguments that might provide premises upon which decisions about information technology should be based, and then giving links to pages identifying particular applications for Furman that might be thought to follow from those premises.
The faculty listed below all participated in the year-long Mellon Capstone Seminar in "Liberal Education and the New Information Technology" (1999-2000). One of the goals of the seminar was to produce a document to serve as the basis for community-wide discussion of the issues addressed in this manifesto. The faculty indicated were members of the writing team who drafted the manifesto.

Lloyd Benson
Chris Blackwell
Dennis Haney
Tim Hanks
James Inman
Kailash Khandke (writing team)
Dan Koppelman (writing team)
Cherie Maiden
Edgar McKnight
Melinda Menzer (writing team)
Richard Nelson (writing team)
Ken Peterson
Hayden Porter (writing team)
Steve Richardson
Bill Rogers (writing team)
David Rutledge
Dan Slaughter (writing team)
Mark Stone
Michael Svec
Frank Taylor
Mark Woodard
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Definitions and Premises

The term "information" is used here to mean whatever can be represented as a string of ones and zeroes. The "new information technology" refers to ways of representing information that involve use of the digital computer.

It is not so easy to say what "liberal education" is, but one might begin with a remark of Charles Sanders Peirce on the subject:

... the university which is to be the exponent of the living condition of the human mind must be the university of methods. ... Now although a man needs not the theory of a method in order to apply it as it has been applied already, yet in order to adapt to his own science the method of another with which he is less familiar, and to properly modify it so as to suit it to its new use, an acquaintance with the principles upon which it depends will be of the greatest benefit.¹

Peirce identified this sort of study with "logic," but what he meant by the term includes considerably more than what is commonly called logic today. In fact, Peirce at times equated logic with semiotics in general.

Education is "technical" when its purpose is to master some particular interpretive system--for example, law, medicine, or electrical engineering. Education is "liberal," on the other hand, when its purpose is to study interpretive systems as such--that is, to understand the ontological, epistemological, and ethical commitments implied in particular interpretive systems, and the workings of those systems as they are applied to their appropriate "contents." Interpretive systems cannot be studied in isolation from the contents to which they are meant to be applied--in fact, ideas become "contents" or "subject-matter" precisely by being brought into relation with some interpretive system. Nevertheless, liberal education is best thought of not as the study of particular subject-matters, but instead as the study of the especially powerful interpretive systems of the culture: for example, the scientific method, or mathematical logic, or textual hermeneutics.

Liberal study, then, amounts to thinking about how people think. New information technology poses one kind of challenge to liberal-arts institutions in that these institutions must find intelligent and economically feasible ways of using the new technology to do "what we have always done": for example, to access, to organize, and to present information--or, in short, to deal with complexity, and to help students deal with complexity. But the new information technology poses another kind of challenge if the new technology itself represents a new and powerful way of thinking, analogous to but crucially different from the technology of the book.

Certain conclusions about the liberal-arts curriculum and about the notion of intellectual property follow directly from the premises just articulated.

的表现 - 定义和前提

This section of the manifesto deals with curricular change that seems to be called for by the new information technology. The immediate impact of the new information technology on the curriculum has been to provide a new set of pedagogical tools to help us liberal educators do better what we have been doing. Although this section of the manifesto will not talk much about such innovations, clearly such innovations in the existing curriculum are extremely important and should be encouraged and supported.

But the larger question posed for liberal-arts colleges by the new information technology is whether the new technology itself constitutes an interpretive system potentially (or already) as powerful as the interpretive systems traditionally studied in the liberal-arts curriculum. How does the new information technology affect how people think? Liberal-arts colleges must begin to explore this question by approaching the new information technology as interpretive system. That seems to imply some sort of curricular change, since the curriculum of a liberal-arts college organizes itself around the major interpretive systems of the culture.

Traditionally, in the liberal-arts curriculum students learn how interpretive systems work by practicing them: by taking courses in various disciplines. The liberal-arts curriculum also sometimes provides experiences--typically, "interdisciplinary" courses--in which students are invited specifically to study academic disciplines as such. We can thus imagine two different methods of studying the new information technology considered as interpretive system. (1) There might be courses in which students actually use the new technology to address questions posed by the traditional disciplines that are difficult or intractable without the new technology. In such courses, because the questions being addressed cannot be dealt with satisfactorily without the new technology, the new technology actually constitutes a different way of thinking about the subject-matter of the course. (2) There might be courses in which the new information technology considered as interpretive system is itself part of the subject-matter of the course.

The question is how to get the new information technology into the curriculum in the right way. It is important to be clear about a couple of points.

First, the manifesto is not describing courses in "computer literacy," or even, in most cases, courses taught by the computer science department. The crucial feature of the courses envisioned here is not that they require the ability to operate computers, but instead that the courses cause students to consider how computers affect human thinking about other subject-matters. Thus, these courses will often have some sort of interdisciplinary component.

Second, the fact that a course relies heavily on the new information technology is by itself neither necessary nor sufficient to qualify the course as appropriate for the liberal-arts curriculum. Even if one believes that the new technology constitutes a different and powerful interpretive system, one does not necessarily achieve a liberal-arts perspective on technology just by using it heavily.

This point may be elucidated by considering the techniques of "distance learning" enabled by the new information technology. Using these techniques (e.g., Web-based courses, chat-rooms, discussion lists,
e-mail, etc.) does not necessarily entail reflection on the crucial issue: that is, the issue of how the technology affects thought. In fact, uncritical use of the new technology can go far toward rendering the technology transparent. The collective experience of liberal educators suggests that face-to-face, personal interaction is an indispensable modality for liberal education, and therefore, in spite of economic pressures, should not be replaced as the main modality of the liberal-arts college. The techniques of distance education ought to be used to do things that cannot be done in better ways—for example, conferences with distant scholars or virtual attendance at distant events—but it would be wrong to suppose that students are being educated liberally about the new information technology just because the institution becomes invested in the techniques of distance learning.

The AAUP Statement on Distance Education is worth reading in regard to these issues. The AAUP also provides Sample Language for Institutional Policies and Contract Language, issued by the AAUP Special Committee on Distance Education and Intellectual Property Issues.

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Curriculum: Applications

The new information technology has proven important in helping liberal educators to do better the kinds of things that have traditionally been done with other media: for example, by digitizing a collection of slides, or by creating digital three-dimensional models to replace wooden or plastic models, or by picturing the behavior of mathematical functions with software instead of with chalk. Such uses of the new technology, however, are not the main concern of this section of the manifesto. This section of the manifesto proposes curricular change: specifically, the development of courses that cause students to consider the new information technology as interpretive system.

Two types of courses seem appropriate at a liberal-arts institution for approaching the new information technology as interpretive system: (1) courses in which students use the new technology to address questions posed by the traditional disciplines, such that the new technology itself constitutes a different way of thinking about the subject-matter of the discipline; and (2) courses in which the new information technology is part of the subject-matter of the course.

Prototypes of both sorts of courses exist already at Furman. One example of the first sort of course is the "paired course" taught by Hayden Porter and Bill Rogers: "Communicating in the Digital Era," in which students used the techniques typically taught in Computer Science 16 to address the tasks typically assigned in English 11. Another example is Lloyd Benson's history seminar "Words and Boundaries in a Secessionist Age," which depends upon computer-assisted analysis of primary texts. An example of the second sort of course is the new Humanities 21 taught by Melinda Menzer and Claude Stulting: "The Joy of Texts," in which the students study the technology of the book and, ultimately, confront that technology with the new information technology.

All three of these courses fulfill requirements already in place: English 11, the major requirement for a history seminar, and the GER in an upper-level humanities course, respectively. If faculty are willing, it seems possible to develop a battery of courses that, while fulfilling requirements that already exist, would also accomplish the goal of approaching the new information technology as interpretive system. The manifesto does not propose adding hours to the GER. The most desirable scenario is that students become involved in studying information technology during the normal course of their degree programs.

For this scenario to develop, however, some existing courses need to be reconfigured, and new courses need to be developed.

To address the challenge of the new information technology for the liberal-arts curriculum, the manifesto proposes that the faculty, with appropriate support (normally, stipends and released time), develop a number of curricular experiences--revised courses, paired courses, interdisciplinary courses, team-taught courses--that require students to think about how the new technology influences their thinking. Some of these courses might be envisioned as electives, but many of them should be designed as GERs or as courses appropriate for major credit. Means of supporting the development of such courses are already available for the humanities, in the endowment from the NEH Challenge Grant. The institution should...
generate similar support for courses in other divisions. Such courses should be identified as "technology-conditioned," just as courses at some institutions are identified as "writing-conditioned." Students should be required to take one or more of these courses during their time at the institution.

In short, the manifesto proposes a kind of "technology-across-the-curriculum" program, constructed so as not to require extra hours in the GER, and administered in the normal way by the faculty committees responsible for overseeing the curriculum.
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Intellectual Property: Theory

A liberal-arts institution cannot exist without a commitment to the free exchange of ideas. Indeed, the "liberal" in "liberal arts" refers to freedom in the sense of the Latin libertas.

The phrase "intellectual property" seems to suggest that a person or corporation can possess creations of the mind, not merely in their material instantiations, but in their essence. Such a notion is relatively new. In their day, Newton and Leibniz argued over who was the first to create calculus, but it would never have occurred to either of them to claim sole rights to the creation.

Without free access to ideas, liberal education becomes technical education. That is, as Peirce indicates, one may learn how to apply a theory by simply following the patterns demonstrated by others, but understanding implies the ability to adapt a theory to new situations. To do that requires "an acquaintance with the principles upon which it depends." Hence, the very notion that products of the mind can be treated as material property seems antithetical to the pursuits of the liberal arts.

No society has ever accepted an absolute right to the possession of products of the intellect. Even in those societies which have copyright and patent laws, the right to so-called "intellectual property," unlike the right to possess material property, is always a limited right. For example, the Constitution of the United States allows Congress, "in order to promote the progress of science and the useful arts," to grant exclusive rights to authors and inventors for "limited times."

Copyright developed during the age of print as a compromise between the need of a liberal society for the unrestricted flow of ideas and the perceived need of publishers for some guarantee of return for the large expense required to run a printing press. The new information technologies have changed the economics. With the financial barriers to publication lowered, much of the original justification for copyright, at least in the form of a right which may be sold to another, no longer holds.

Today authors may use copyright to protect the way in which their creations are distributed. In particular, because the business of educational institutions is to educate, faculty at liberal-arts institutions should use copyright to guarantee that their ideas are freely available to the public.
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Intellectual Property: Applications

It should be the policy of the university that faculty, not the university, own the copyright to their intellectual creations, whether these works be text, hypertext, multimedia, software, or in any other form in which information may be instantiated. In the production of these works, faculty normally do not "work for hire" in the legal sense. (See the AAUP position on copyright articulated in the AAUP Statement on Copyright. The AAUP also provides Sample Language for Institutional Policies and Contract Language, issued by the AAUP Special Committee on Distance Education and Intellectual Property Issues.)

Nevertheless, faculty often produce these works in the course of fulfilling their role as faculty. The business of the faculty--the business of education--is to disseminate ideas. Therefore, it should be the policy of the faculty that, where possible, they will make their intellectual creations available to the general public under licenses such as the copyleft license advocated by the Free Software Foundation.

The copyleft license does not deprive faculty of the right to present their ideas undistorted and receive the credit of authorship. The license requires anyone who uses or modifies the covered material to publish the original copyright notice, and to indicate what modifications have been made.

It is understood that often a particular work, in order to reach the intended audience, must be published in such a way as to require the surrender of the copyright. However, faculty should recognize this practice as potentially inconsistent with their mission and should work towards establishing other means of bringing their work to their audience.

Students who work for hire, either for the university or for a faculty member, do not own the copyright to the materials they produce. An example might be a student paid from grant money to help a faculty member do research for a publication or produce courseware. The faculty member would own the copyright, in such a case. On the other hand, students not working for hire who produce intellectual creations in the course of their study should own the copyright to those creations, and the policy of the university should be that, as with faculty, students will make such creations available to the general public under licenses such as the copyleft license.

Sometimes, a member of the faculty or a student might not wish to make his or her work available under copyleft, because of a desire to profit financially from the work. For example, a faculty member not working for hire might wish to sell a copyright to a publisher in expectation of royalties. In such a case, whenever the faculty member's or the student's position at the university has enabled the faculty member or the student to produce the work, it is reasonable to expect the university to share in any profits. In such a case, the faculty member or the student should make appropriate contractual arrangements with the university with regard to the use of the faculty member's time and/or the use of university equipment and resources.

Also, in such cases, the university, as well as the faculty, must remember that selling information is not part of the mission of a liberal-arts institution. Rather, as stated earlier, liberal education "amounts to
thinking about how people think." Neither faculty nor students can do this effectively if the flow of ideas is artificially restricted by the economic motives of those seeking to make profits from the sale of that which, in a liberal society, should not be for sale.
This section of the manifesto deals with decision-making about academic computing. The issues ultimately are acquisition, implementation, and support. But in most cases, instead of attempting to reach specific decisions about these issues, the manifesto proposes that the institution (faculty, administration, and trustees) needs to think through the processes and administrative structures by means of which such decisions should be made. Because academic computing depends crucially on the total technological infrastructure, faculty should not unilaterally determine budgets and organizational charts--nor should trustees and administrators make these determinations without good-faith consultation with faculty. Here, the manifesto attempts to articulate from a faculty perspective the functions and relationships by means of which sound decisions can be made about acquisition, implementation, and support with respect to academic computing.

Furman faculty are evaluated in terms of teaching, scholarly or creative activity, and institutional service; and since Furman is part of the larger community it serves, institutional service often includes community service of various kinds. Faculty performing activities considered to be part of their job should be supported with new information technology to the limit of the institution's financial ability to do so.

Furman should remain sensitive to the socio-economic diversity of the student body, and should ensure that all students are supported with appropriate access to the new information technology, to the limit of the institution's financial ability to do so.

"Support" in this context does not imply "control." Insofar as faculty or students are teaching or performing scholarly or creative activity, denying them the use of technology customarily provided by the institution, or attempting to control their use of such technology, constitutes a violation of academic freedom.
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The Concept of "Support": Application--Administrative Structures

The functional units provided for by current policies and practices at Furman are basically sound. On the other hand, relationships at Furman among these functional units often need to be "formalized"--that is, job-descriptions and policies need to be written or rewritten, or administrative structures need to be altered, to ensure that the functional units in fact maintain the relationships necessary for effective decision-making.

These functional units operate at three levels: (1) the departmental level, (2) the faculty level, and (3) the institutional level.

At the departmental level, departmental liaisons should determine the needs of the members of the department, communicate those needs to support personnel, represent their respective departments to the faculty Academic Computing Committee, and educate the members of their departments about developments in information technology that are likely to be useful to their disciplines. The job of departmental liaison, if properly done, is a big job. Departmental liaisons should have released time, and their performance evaluations should deal explicitly with their performance as liaisons.

At the faculty level, the Academic Computing Committee should advise Computing and Information Services and the administration in general about acquisition, implementation, and support, with respect to academic computing. To function properly, the ACC must be responsive to departmental liaisons--which means, at a minimum, meeting with liaisons regularly to identify problems, solicit opinions, and provide information about larger institutional issues. The ACC should also meet regularly with the administrative committee responsible for overseeing the use of information technology on campus. The ACC should formally include, not necessarily as voting members, personnel from Information Services.

At the institutional level, two functions need to be discussed: (a) academic computing specialists, and (b) the director of information services.

The Academic Computing Specialists

Academic computing specialists provide support specifically for academic computing, as opposed to maintaining the infrastructure. Their job is to help faculty implement new technologies in their teaching and/or research. An important part of this job is to remain current with respect to new hardware and software potentially useful for the disciplines the specialists support, and to keep faculty abreast of developments.

The academic computing specialists at Furman, in general, do well at what they are doing. But the difficulties of conceiving and implementing an administrative structure that will ensure appropriate university-wide support for academic computing become most apparent at this level.

For example, when the academic computing specialists are diverted to perform basic support for the infrastructure, their special expertise is underutilized. Stories circulate about how academic computing specialists spend time maintaining labs, swapping out hard drives, setting up discussion groups, or performing other low-level tasks. This sort of thing happens sometimes because immediate problems...
arise and an academic computing specialist happens to be on the spot. It can happen also at the behest of faculty. When faculty discover that a specialist solves problems, faculty might call directly on the specialist for something that should be referred to the help desk, thus short-circuiting the system and in effect wasting the specialist's time.

That this problem exists demonstrates, first, that the institution is understaffed for meeting the current expectations of the faculty with respect to basic support of the infrastructure. But the problem also illustrates the complexities inherent in maintaining the necessary interface between support personnel and the faculty. The academic computing specialists operate at this interface.

Part of the problem is clearly with administrative structure. Here as elsewhere, informal relationships that sometimes work well, and sometimes do not, need to be formalized. In the overall support-structure described here, it is important that the academic computing specialists be somehow accountable to the departmental liaisons. Therefore, the Academic Computing Committee (and therefore, indirectly, the departmental liaisons) should be formally involved in deciding how many and what sort of academic computing specialists to hire. Also, the academic computing specialists should not have different reporting structures in different disciplines. Instead of being directly responsible to department chairs in the sciences but not in other divisions, as is currently the case, the academic computing specialists should have uniform job-descriptions that make them accountable, directly or indirectly, not to the chairs but to the departmental liaisons.

Support personnel for academic computing ought to be located physically in the Center for Collaborative Learning and Communication (CCLC). Locating the academic computing specialists in the CCLC, in close physical proximity to Multimedia Services, the help desk, and library personnel, offers the obvious advantage of providing one-point support for academic computing. It is also important that the specialists interact on a daily basis with the student assistants in the CCLC who are also helping faculty with projects. No individual can develop expertise in all areas, and a close working relationship between the specialists and the student assistants will facilitate consultation and appropriate assignment of projects.

It is far from clear what sort of reporting structure would best fill everyone's needs. The situation is made even more complex by the current confusion in the administrative structure of the CCLC, which is located in the library, but whose director reports to the Director of the Christian A. Johnson Center for Engaged Learning, to a supervisory committee for the CCLC, and, in regard to matters of tenure and promotion, presumably to a subset of the supervisory committee (although some members of the English Department, whose courses the director of the CCLC teaches, insist that the voice of the English Department should be decisive in matters of tenure and promotion).

No particular reporting structure is proposed here. The issue of the reporting structure appropriate for the academic computing specialists can be settled only by careful study and consultation among all the relevant units of the university. Policies, job-descriptions, and the organizational chart should formalize an administrative structure that ensures (1) accountability, direct or indirect, of the academic computing specialists to the departmental liaisons; and (2) appropriate coordination of the work of the academic computing specialists with Computing and Information Services and with other support personnel (e.g., the personnel of the CCLC). This issue should be settled, and a perspicuous reporting structure arrived at, by consultation involving the Academic Computing Committee, the Director of Computing and Information Services, the Librarian, the Director of the CCLC, and the Vice President for Academic Affairs. In this process of consultation, the ACC would work with the departmental liaisons to determine and represent the interests of the faculty.
The Director of Information Services

The position of director of information services, whatever such a position might be called and wherever it might appear on the institution's organizational chart, is necessary to ensure coordination of academic and administrative computing.

The current Director of Computing and Information Services asserts that a person with his responsibilities needs authority and access to deal with the vice presidents of the university as a peer. He asserts further that he currently feels that he has sufficient authority and access, though on an informal basis. He declines to speculate upon whether some other administrative structure would or would not be more desirable or effective.

The authority and access just mentioned need to be formalized. Centralization is necessary at some point even in a distributed computing environment. Sound stewardship of university resources and the health of both academic and administrative computing depend crucially upon the ability of someone like the Director of Computing and Information Services to coordinate acquisition, implementation, and support university-wide. There are several possible models for formalizing the relationships necessary for this person to function effectively, only three of which are mentioned here.

- There might be a Vice President for Information Services.
- There might be a Chief Information Officer, whose job-description would allow this person to function much as a vice president.
- There might be a Vice President for Information Systems, to whom both the Director of Computing and Information Services and the Librarian would report.

This manifesto does not endorse or condemn any one of these models. The point is rather that the administration, in good-faith consultation with the faculty, needs to formalize in the organizational chart the relationships necessary for sound decisions to be made for both administrative and academic computing.

Two points are especially important here. First, although the current Director of Computing and Information Services asserts that relations between C&IS staff and library faculty and staff appear to be effective and productive, the links between C&IS and the library need to be formalized. This goal may be accomplished in any of several ways: by having a Vice President for Information Systems, as mentioned above; or by rewriting the job-descriptions of the Librarian and the person in charge of information services so as to formalize these links; or by rewriting the job-description of the Systems Librarian so as to guarantee that this person works on a day-to-day basis with information services; or by rewriting mission statements so as to ensure that joint project teams are frequently necessary between the library and information services. But formalizing these links in some way is crucial.

Second, the person in charge of information services, whether or not the person is a vice president, needs to have the same direct access to trustees as the vice presidents currently have. Trustees need access to the highest level of technological expertise available at the university, to help them determine our strategies with respect to the new information technology.
Minimum Faculty Competencies

It is impossible to relieve all faculty of the necessity of interacting with the new information technology. Therefore, before attempting to specify what kinds of support are appropriate for academic computing, it makes sense to specify a set of basic competencies that faculty members should have and basic responsibilities they should assume. The following seems to constitute a reasonable list at this time. Any list of this sort will change over time, as the new information technology becomes more widely disseminated and it becomes reasonable to expect more of faculty. The competencies listed here are, in general, those that enable efficient support of the institution's technological infrastructure.

Multimedia equipment:
- be familiar with the basic operation of the actual equipment to be used;
- know the capabilities of the equipment with respect to the planned use;
- where appropriate, know how to change lamps and batteries (where spares are provided with the equipment);
- request instruction on use of the equipment;
- know what software is needed (e.g., browser plugins or version of software) and verify that it is installed.

Personal computer:
- be familiar with the basic operation of the computer provided for everyday use;
- know where personal files are and how to back them up;
- make sure that important files are backed up and archived, where appropriate [Note: this item and the preceding one presuppose the existence of clear policies and procedures for backing up personal files. The issue of backup is extremely complex and is far from settled at Furman. The position of this manifesto is that the Director of Computing and Information Services and the Academic Computing Committee should develop, as soon as possible, the policies and procedures that would make these items reasonable demands.];
- keep antivirus software up-to-date;
- disinfect computers that are infected by viruses;
- know how to use those systems commonly used to communicate with faculty, staff and students;
- know the preferred channels for getting support. [Note: this item presupposes that Computing and Information Services will provide the faculty with current information about whom to contact for support. One possibility would be to include this information on a well-publicized, regularly updated Web page.]

General:
- know the university's policies with regard to use of information technology:
know what facilities are available to students;

know what students are expected to know about the use of information technology, and make sure that students have the skills and information necessary to complete any assignments that rely on the students' use of information technology.
The Concept of "Support": Theory

For the university to carry on normal business, basic support of the technological infrastructure is necessary: maintaining e-mail and Internet accounts, repairing and replacing equipment, providing the basic suite of software and offering training in its use, maintaining the computer labs on campus, and so on. Such support activities are not specific to the academic program, and this section of the manifesto will not talk much about support of the infrastructure. The list of Minimum Faculty Competencies is, for the most part, a list of the things faculty need to be able to do in order to make efficient support of the infrastructure possible.

This section of the manifesto discusses support for academic computing above and beyond normal support of the infrastructure.

The challenge of constructing a strong support-system for academic computing is to navigate between two undesirable (and impossible) extremes: (1) requiring faculty to develop so much technological expertise that the task of support personnel reduces to maintaining the infrastructure; and (2) providing every faculty member with whatever support he or she deems desirable. Recalcitrant tenured faculty cannot be forced to become involved with the new information technology, but those who do not become involved will in a few years become disenfranchised. On the other hand, for the foreseeable future, demand for support will outstrip supply.

What Furman presumably wants is faculty who use the new information technology appropriately in their teaching and learning.

Lack of time is one of the main difficulties faculty have in integrating information technology into their courses and their ongoing professional activities. Even when faculty have resources for a project, computer-based work can be enormously time-consuming. Presumably, creative thinking and close interaction with students are what liberal-arts faculties do best and what make liberal education valuable. When work with the new technology gets in the way of these activities, instead of fostering them, then the means usurp the place of the ends.

Liberal-arts institutions should provide technological support that will enable the faculty to work on innovative projects to improve education and to practice their disciplines without eating up time and resources that would be better spent elsewhere. Because faculty are the best judges of how to spend their time in teaching and learning, faculty themselves must choose the level and degree of technological support they need.

Lessons learned from the Furman/Wofford Joint Andrew W. Mellon Project in Information Technology, and from other successful and unsuccessful experiments in integrating technology with liberal education, provide a body of doctrine about how to achieve the goal of integrating the new information technology generally into the curriculum.

- Faculty willingly embrace the new technology when they see clear and immediate benefits for their own teaching and learning. Not surprisingly at Furman, where excellent teaching is
supposedly the highest priority of everyone on the faculty, faculty embrace technology most enthusiastically when they themselves conceive and initiate projects to produce courseware for their own courses.

- Because faculty are so diverse in terms of technological competence and needs, it is impossible to predict or define the kinds of academic support that will be appropriate for everybody. Faculty are presumed competent to teach their courses and to do their research. It follows that, once faculty are made aware of the kinds of things the new information technology enables, individual faculty are the ones to decide what support is appropriate for them. This principle implies that there must be some rational system for allocating scarce resources.

- Faculty who "learn the technology" by working on projects they themselves have conceived tend to achieve and retain a higher degree of technological competence than faculty who receive generalized instruction with no particular project in mind.

- Peer pressure is the most effective way to win over the Luddites. Technological competence spreads among the faculty because technologically advanced faculty inspire or embarrass their lagging colleagues.

- Project teams composed of faculty and carefully chosen students are an extremely effective method of providing support for academic computing. These teams also provide for the students experiences of "engaged learning" that are closely integrated into the academic program.

With these principles in mind, the rest of this section of the manifesto discusses applications under three headings: "Delivery of Support," "Acquisition and Implementation," and "Administrative Structures."
The Concept of "Support": Application--Delivery

Because faculty are diverse, their needs will vary widely. Some faculty might decide that writing HTML code or maintaining course bulletin boards is not a good use of their time, and might want that sort of support. Some faculty might want to learn how to use a scanner and scan their collections of slides themselves; others might want to ask a support person to scan the collections for them, freeing themselves to focus on developing innovative ways to use the digitized images in their courses. Some faculty might find it most efficient to construct their own Web pages, but would like help in installing and learning high-level software, or help in surveying the software that might be useful for their courses.

The goal is to help all faculty use the new information technology appropriately for teaching and learning. It does not make sense, then, to write policy about what support personnel will and will not do. It is impossible to say beforehand precisely what will be needed at a particular time to encourage a particular faculty member to integrate new technology into his or her teaching or professional activities. The general rule is that to the limit of the institution's financial ability, support should be based on the needs of faculty who wish to take advantage of it.

Obviously, priorities will have to be set. Also, it is important that faculty regard support personnel--both staff and students--as colleagues not clerical workers. The challenge here is to create administrative structures that will result in rational decision-making and will foster collegial relationships. This challenge is addressed in the section of the manifesto entitled "Administrative Structures."

Since time is such an important issue, however, it makes sense to provide one-point support on campus for faculty who need assistance with projects involving academic computing. Support for academic computing should be delivered through the Center for Collaborative Learning and Communication (CCLC). The CCLC is the ideal conduit for technological support. There are plans already to locate Multimedia Services and the help desk in the renovated library, near the CCLC. Besides the advantages of its physical location, the CCLC will have the resources and the flexibility to respond to individual faculty members' needs. It would be wasteful to create another entity with similar resources.

In addition, the CCLC will make extensive use of student assistants. Its culture therefore harmonizes with the model of faculty-student teams that has proven so successful in the Mellon projects. Presumably, in their interactions with student assistants in the CCLC, faculty seeking to integrate technology into their courses or their research will at the same time provide students opportunities for "engaged learning."

It is important to understand that the point being made here is about the physical location and the culture of the CCLC. The CCLC should become the first resort for faculty as well as students seeking support for academic computing, because of where the CCLC is and because of the equipment and personnel (especially students) available there. The administrative structure of the CCLC is another issue, which is discussed under "Administrative Structures."

Perhaps, the responsibility for the CCLC described here might appear to some to require a change in the
CCLC's philosophy. Currently, some faculty speak of the CCLC as a "writing center" focused on developing students' skills in communication. Certainly, that is part of the CCLC's mandate. But the CCLC was at first envisioned, at least by those most deeply involved in writing the grant that paid for its start-up, as much more than a "writing center." The faculty who initially conceived the CCLC already thought of it as the keystone of the support-system for academic computing. It is impossible to know for sure, but it might well be that this broader conception was part of what attracted funding for the CCLC in the first place. This broader mandate, to the extent that it has been lost sight of, needs to be restored.
New Information Technology and Liberal Education: A Manifesto

The Concept of "Support": Application--Acquisition and Implementation

Furman's policy on academic computing technology, Policy 071.5, drafted by the Academic Computing Committee and issued by the Vice President for Academic Affairs and Dean, is sound. The policy considers the needs of all levels of users and provides guidelines on how those needs should be addressed. The policy was an ambitious one when first issued, and the administration, Computing and Information Services, and the Academic Computing Committee are all to be commended for the strides that have been taken toward its implementation.

However, there are two guidelines in the policy which have not yet been fully implemented and which are key to the full development of faculty use of information technology. The first is Guideline 4: "Equipment will be allocated to individual users, departments, and academic divisions according to a comprehensive and equitable equipment request system." The current request system may indeed be both comprehensive and equitable, but it is not perceived that way. Furman needs a standard procedure through which faculty may submit requests which are then judged on merit by a competent authority. In regard to minor changes to the standard packages, the request might be judged by a designated member of Computing and Information Services; the case of more extensive requests might require the guidance of a body such as the Academic Computing Committee.

Policy 071.5 addresses such "high-end" requests in Guideline 7. This is the second guideline which has yet to be implemented. In accordance with the guideline, the university should establish a procedure for faculty to apply for information technology grants to aid them in their research and teaching. The Academic Computing Committee should play a role in administering these grants that is similar to the role played by the Research and Professional Growth Committee in the awarding of grants for faculty research.

The introduction of a regular replacement schedule for hardware and software, as called for in Guideline 1 of 071.5, has been a major help in keeping faculty resources up to date. It is important that the Academic Computing Committee continually evaluate the standard packages used in this schedule. At the same time, not all faculty have the same needs. Before receiving new hardware or software, the individual faculty member should have the opportunity to request changes to the standard package that the individual feels necessary for her or his work. Moreover, faculty should be fully aware of request procedures under Guidelines 4 and 7, when they find their current equipment insufficient for their needs.

Guideline 5 calls on the university to make "technology-ready" classrooms available to all faculty who require them. Much progress has been made in this direction. But with respect to interpretation of the guideline, it should be clearly and emphatically stated that high-speed Internet connections should be made available in all faculty offices and in all academic spaces (i.e., spaces used for classes or for teams working on course-related projects). No academic buildings should be built or renovated without providing for these connections. All academic spaces should have integrated hardware and software that will allow for the presentation of digital materials. No academic buildings should be built or renovated without...
without providing for this hardware and software.

The ideal "smart classroom" should allow a teacher or presenter to be spontaneous. For example, the teacher should be able to walk into the classroom without the intention of using any kind of multimedia, and then, perhaps as a result of a question posed by a student, should have access to electronic resources to illustrate answers to that question, or to explore other ideas that arise during the class. As long as the class is restricted to the use of a predetermined sequence of media resources, Furman will not have achieved the goal of integrating technology into the processes of teaching and learning.

The attainment of such a goal for the classroom requires an expensive infrastructure and an expensive set of hardware and software. It requires professors who are comfortable with the available technologies and who know how and where to access the information needed at any particular point. It also requires that an appropriately qualified consultant be involved in all stages of implementation, from conceptual design of the room through installation and testing of the equipment. It has proven insufficient to rely in the input of the end-users, of those who support the equipment, and of the vendors of the equipment.

Currently, the optimal situation for classroom presentations appears to be, not shared PCs in the classrooms, but instead individual notebook computers for faculty. Ideally, the standard academic computing environment should provide every faculty member with a notebook computer that may be easily integrated into any academic workspace. In particular, a faculty office should have a monitor, a keyboard, a mouse, network access, and a backup device, all easily connectable to a notebook computer; and every classroom should have multimedia presentation hardware and network access, again easily connectable to a notebook computer. Such a model would allow faculty the portability they need to be spontaneous in the classroom, while also addressing the common complaints about notebooks (namely, that the keyboard and screens are too small). Some faculty may still require a desktop for their work, but that issue is addressed by the provisions in Policy 071.5 for special requests. Until every faculty member has a notebook computer, the institution should have a clear policy and procedure for deciding which faculty members get the notebook computers first when funds are available.

An ideal is articulated here, which nevertheless suggests some immediate practical consequences. First, with respect to the design of new and renovated classrooms, qualified specialists should be involved at every stage of planning and implementation; second, with respect to equipment, the institution should begin moving as quickly as possible to a situation in which every faculty member who uses a computer in academic workspaces is provided a notebook computer.
New Information Technology and Liberal Education: A Manifesto

Propositions for Debate: Furman and the New Information Technology

1. Furman should develop a "technology across the curriculum" program. The faculty, with appropriate support (normally, stipends and released time), should develop a number of curricular experiences that require students to study the new information technology considered as interpretive system: courses in which students actually use the new technology to address the questions posed by the traditional disciplines, and/or courses in which the new information technology considered as interpretive system is itself part of the subject-matter of the course. Students should be required to take a certain number of these "technology-conditioned" courses during their time at Furman-without, however, adding to the total hours required for the GER. (Curriculum)

2. Face-to-face interaction between students and faculty should not be replaced with other modalities enabled by the new information technology, except when a compelling case can be made that the other modalities are not only cheaper, but better in terms of carrying out the mission of a liberal-arts college. (Curriculum)

3. Faculty, not the university, should own the copyright to their intellectual creations, whether these works be text, hypertext, multimedia, software, or in any other form in which information may be instantiated. At the same time, faculty should make such creations available to the general public, where possible, under licenses such as the copyleft license advocated by the Free Software Foundation. The same principles should apply to the scholarly or creative productions of students. (Intellectual Property)

4. When a member of the faculty prefers not to make his or her work available under copyleft, because of a desire to profit financially from the work, the faculty member should make appropriate contractual arrangements with Furman with regard to the use of the faculty member's time and the use of university equipment and resources. The same principle applies to students, not working for hire, who use university equipment or resources to produce copyrightable materials for profit. (Intellectual Property)

5. Faculty performing activities considered to be part of their job (teaching, scholarly or creative activity, institutional service) should be supported with new information technology to the limit of the institution's financial ability to do so. (Academic Computing)

6. The institution should ensure that all students are supported with appropriate access to the new information technology, to the limit of the institution's financial ability to do so. (Academic Computing)
7. Insofar as faculty or students are teaching or performing scholarly or creative activity, denying them the use of technology customarily provided by the institution, or attempting to control their use of such technology, constitutes a violation of academic freedom. (Academic Computing)

8. Furman faculty should possess the following basic competencies and assume the following basic responsibilities (Minimum Faculty Competencies):

   ○ Multimedia equipment:
     ■ be familiar with the basic operation of the actual equipment to be used;
     ■ know the capabilities of the equipment with respect to the planned use;
     ■ where appropriate, know how to change lamps and batteries (where spares are provided with the equipment);
     ■ request instruction on use of the equipment;
     ■ know what software is needed (e.g., browser plugins or version of software) and verify that it is installed.

   ○ Personal computer:
     ■ be familiar with the basic operation of the computer provided for everyday use;
     ■ know where personal files are and how to back them up;
     ■ make sure that important files are backed up and archived, where appropriate;
     ■ keep antivirus software up-to-date;
     ■ disinfect computers that are infected by viruses;
     ■ know how to use those systems commonly used to communicate with faculty, staff and students;
     ■ know the preferred channels for getting support.

   ○ General:
     ■ know the university's policies with regard to use of information technology;
     ■ know what facilities are available to students;
     ■ know what students are expected to know about the use of information technology, and make sure that students have the skills and information necessary to complete any assignments that rely on the students' use of information technology.

9. To the limit of the institution's financial ability, support should be based on the needs of faculty who wish to take advantage of it. Faculty should choose the level and degree of technological support they need, with the provision that allocation of scarce resources should be subject to a rational system. (The Concept of "Support")

10. Support for academic computing should be delivered through the CCLC. (Support: Delivery)

11. Furman should implement as soon as possible the guidelines of Policy 071.5. Specifically: (1) there should be a standard procedure through which faculty may submit requests for computing equipment which are then judged on merit by a competent authority, and this procedure should be
12. High-speed Internet connections should be made available in all faculty offices and in all academic spaces (i.e., spaces used for classes or for teams working on course-related projects). No academic buildings should be built or renovated without providing for these connections. All academic spaces should have integrated hardware and software that will allow for the presentation of digital materials. No academic buildings should be built or renovated without providing for this hardware and software. In particular, all faculty offices should have a monitor, a keyboard, a mouse, network access, and a backup device, all easily connectable to a notebook computer; and every classroom should have multimedia presentation hardware and network access, again easily connectable to a notebook computer. (Acquisition and Implementation)

13. With respect to the design of new and renovated classrooms, qualified specialists should be involved at every stage of planning and implementation. (Acquisition and Implementation)

14. The institution should begin moving as quickly as possible to a situation in which every faculty member who uses a computer in academic workspaces is provided a notebook computer. (Acquisition and Implementation)

15. Departmental liaisons should have released time, and their performance evaluations should deal explicitly with their performance as liaisons. (Administrative Structures)

16. The Academic Computing Committee should meet with liaisons regularly to identify problems, solicit opinions, and provide information about larger institutional issues. The ACC should also meet regularly with the administrative committee responsible for overseeing the use of information technology on campus. The ACC should formally include, not necessarily as voting members, personnel from Information Services. (Administrative Structures)

17. Policies, job-descriptions, and the organizational chart should formalize an administrative structure that ensures (1) accountability, direct or indirect, of the academic computing specialists to the departmental liaisons, and (2) appropriate coordination of the work of the academic computing specialists with Computing and Information Services and with other support personnel (e.g., the personnel of the CCLC). This issue should be settled, and a perspicuous reporting structure arrived at, by consultation involving the Academic Computing Committee, the Director of Computing and Information Services, the Librarian, the Director of the CCLC, and the Vice President for Academic Affairs. In this process of consultation, the ACC would work with the departmental liaisons to determine and represent the interests of the faculty. (Administrative Structures)

18. An administrative structure should be formalized to ensure that the person responsible for coordinating academic and administrative computing at Furman has access and authority to deal with the vice presidents of the university as a peer, including the same direct access to trustees as
19. An administrative structure should be formalized to ensure that the activities of Computing and Information Services are properly coordinated with the activities of the library. (Administrative Structures)