MEMORANDUM

To: L. K. Monteith

From: College of Engineering Computer Committee, T. K. Miller, chairman

Subject: Importance and Urgency of Student Computing Fee

Date: August 23, 1989

The College of Engineering Computer Committee has been working for several years on the development of a plan for increasing quality and availability of student computing in the COE. At the same time, the COE Course and Curriculum Committee has been working on curriculum revisions scheduled to go into place in the fall of 1990 which rely heavily on our plan. These activities in both committees are predicated upon the consensus supported by the majority of the faculty that NCSU has lagged behind in the exposure of engineering students to computing, and in incorporation of computing into the engineering undergraduate curricula. The purpose of this letter is to impress upon you the urgency of this matter, summarize our alternatives, and to make a recommendation as to which alternative should be pursued.

There are at least five important factors which contribute to the urgency of this matter:

- The proposed common freshman year from the Course and Curriculum committee is scheduled for implementation in the fall of 1990. This curriculum assumes the availability of an undergraduate computing environment which the freshmen will learn to use, and subsequently have access to for the remainder of their engineering undergraduate education. In order to meet that schedule, we must begin constructing the computing environment within the next 6 months.

- The Computer Science facility in Leazar Hall is greatly in need of updating. The aging Sage computers that form the bulk of that facility are no longer adequate to meet the demand placed on them. The Computer Science Management of Operations and Computer Acquisition and Planning committees have slated fall of 1990 as the deadline for replacing those machines. The estimated cost of the replacement is approximately $1.2M. Ideally, this replacement should be integrated with the development of the student computing environment for the entire College. If the implementation of a College computing environment is delayed, the capital outlay for replacing the Computer Science facility will still have to take place, and everyone will likely suffer in the long run due to incompatibilities and other inequities between the Computer Science facility and the other engineering computing facilities.

- At least two departments in the COE have had accreditation difficulty recently due to inadequate computing in their curricula. It is also believed that the Computer Science Department's present computing facilities would not measure up to ABET standards. These departments must take action to rectify this problem. Again, if the coordinated implementation of a uniform computing environment for the COE is delayed, we will face the problem of incompatibilities and inequities brought about by interim solutions.

- The COE has been purchasing experimental clusters of engineering workstations with $200K per year of funding allocated by the legislature. These systems are now in place in selected departments, and have been in general well received and heavily utilized. Unfortunately, we will be soon faced with a significant maintenance problem unless a continuing source of funds becomes available for this purpose. In addition, one cluster (MAE) was purchased under a special arrangement with IBM which involves a $684K loan to be repaid in the next five years. Without the proposed student fee in place, some other source of funds must be identified to repay that loan.

- All but one department in the COE has a departmental computer which is in need of replacement, determined by the fact that the annual maintenance costs for these machines exceeds their market value. In many cases, the departments are waiting to see what is to happen with regard to the student computing environment before proceeding to replace or upgrade these machines. In addition, a plan to purchase faculty workstations is being proposed in the COE. It would be somewhat counterproductive not to coordinate the deployment of faculty workstations with the development of the student computing environment.

The committee has considered at least four basic alternatives to supporting a student computing environment. These are:

- Request funds from the legislature to provide and maintain a state-of-the-art computing environment for engineering undergraduates. (A change budget request submitted for this purpose in 1986 was funded, but only at a level of 20% of the requested amount. These funds have been used to build the experimental clusters mentioned above, but fall far short of providing a steady-state solution to this problem.)

- Provide a state-of-the-art student computing environment, and levy a mandatory student fee to cover the capital equipment, software, and operating costs.

- Require students to purchase computers. This is the alternative of greatest cost to the student. We estimate the cost of a machine which would be adequate for the level of computing expected of our students to be in excess of $5,000.

- Require students to lease computers. This would be only slightly lower cost than purchasing the computers outright, since the practical lifetime of the machines is about five years.

Of the above alternatives, our committee believes that a combination of state funds and a mandatory student fee is the most viable approach. Given in-state tuition rates, it is impractical at this time to require incoming engineering students to purchase a $5,000 computer which is likely to be nearly obsolete by the time they graduate. Leasing is probably less attractive, since the cost would be nearly the same and the student is left with nothing. In addition, student-owned or leased computers would not benefit from the network facilities that we have in place in the COE.

Our conclusion is strongly supported by a survey of approaches to this problem by other state supported universities. Table 1 lists 19 engineering colleges which responded to a survey recently taken by the University of Illinois on this subject. The table shows that 58% of the colleges participating in the survey either have in place or have proposed some form of student fee to pay for computing. Only one of the colleges, Virginia Polytechnic Institute, currently requires students to purchase computers. The table also shows that our proposed fee of $100/semester is in line with the fees that other colleges have levied or proposed. In the case of the four-year engineering student this is a total cost of $800, which is less than 20% of the estimated cost of purchasing a computer.

Engineering College	**Source of Funds for Computing**	**Student fee**	**Amount**	**Purchase Policy**
Arizona	state, grants and gifts	no		no
Colorado/Boulder	differential tuition	yes	$100/sem	N/A
Florida	state	no		recommended
Georgia Tech	state, gifts, endowment	no		recommended
Iowa State	alumni, industry, state, student fees	yes	$100/sem	no
Iowa	university funds, student fee	yes	$100/sem	no
Michigan State	university funds	proposed	$1500 total	no
Minnesota	university funds, gifts	"access card"	$30/qtr	no
		proposed	$100/qtr	
Nebraska/Lincoln	student fees	yes	$9/credit hr	no
N. C. State	state funds	proposed	$100/sem	no
Ohio State	state funds, grants, alumni	no		no
Penn State	tuition surcharge, state funds, gifts	yes	$200/sem	no
Purdue	gifts, university funds	no		under consideration
Texas A&M	state funds, gifts, student fee	yes	$5/credit hr	no
Texas/Austin	university funds, student fee	yes	$5/credit hr	no
Virginia Tech	earned overhead	no		required
Washington	state funds	proposed	$100/qtr	no
Wisconsin/Madison	university funds	no		no
Worcester Polytech	university funds	no		no

Table 1: Approaches to student computing at several state supported engineering colleges.

In conclusion, we stress the urgency for action on the proposed student fee. A number of reasons for this urgency have been stated. In addition, we believe that if we are to remain a first rate engineering college, it is essential that we move forward on this issue. We will be doing an extreme disservice to our students if we fail to adequately expose them to and educate them on the single most important tool of the modern engineer.