Going Beyond the Conventions of Credit-for-Contact:
A Preliminary Proposal to Design
a "Cyberschool" for VPI&SU

Timothy W. Luke
Department of Political Science
College of Arts and Sciences
Virginia Polytechnic Institute
and State University
Blacksburg, VA

11.2.94

I. Introduction

In this paper I want to discuss the possibilities of constructing a new type of college campus out of the social interactions made possible by new technologies (or a "cyberschool") in order to cope with some of the challenges facing VPI&SU during the next ten years. Basically, the faculty and administration are being told by the Commonwealth to prepare to teach many more students without receiving any additional funds to hire more faculty, build new buildings or create additional institutions. At the same time, we are being asked to maintain our existing research programs and service responsibilities. One response being pushed by SCHEV and the University's Provost Office is to exploit "the educational promise of new technologies" as a strategy to cope with "resource shrinkage" as we figure out how to teach more students with a stable or declining level of faculty resources. I believe that this will mean, although SCHEV apparently has

not conceptualized it in such terms, building a virtual campus out of the cyberspaces, telepresences, and telecommutes now developing within information infrastructures (or "infostructures"). This document, in turn, tries to concretize exactly what I mean in making this claim.

This discussion also answers a call for any and all sorts of creative new proposals on strategies for breaking the credit-for-contact paradigm that was issued to the faculty of the College of Arts and Sciences at VPI&SU by Dean Robert C. Bates during the Spring 1994 term. One avenue of approach to this challenge was identified by the Ad Hoc Committee on Educational Technologies, chaired by Associate Dean Lucinda H. Roy, as it thought through how the classic conventions of credit-for-contact in higher education might be altered by expanding the use of personal computers and distributed computing networks in teaching undergraduates. The key goal of these discussions was asking how personal computing might enrich or enhance the level of education provided by VPI&SU to its students. If personal computers would dilute or devalue the already high quality of instruction at VPI&SU, then they ought not be mobilized as a shortcut to teach the massive influx of new students coming to the university in the next generation. Such policies would only shortchange the students, the university, and the Commonwealth. New technologies should help us do our jobs better without degrading the high quality of work already being performed. Yet, these technologies also should not be allowed to be captured and contained by old ways of doing things in higher education if they are going to truly enrich and enhance college teaching in the next century.

In two earlier memos (May 11, 1994 and August 8, 1994) that Lucinda Roy invited me to write as part of our committee's exploration of

these issues, I talked in some detail about the professional and institutional hurdles that a cyberschool facility would need to jump over before it got rolling. This discussion simply amplifies upon the ideas first expressed in those memos and the committee's deliberations about the prospects for a cyberschool here at VPI&SU.

II. A Cyberschool Design

What SCHEV and the Provost's Office seem to advocate with their support of new technologies is something more fundamental than simply getting more computers into the classroom or more television on campus in order to enhance faculty productivity on campus and in the classroom. We have been doing this since the 1960s, but such measures will not solve our problems in the 1990s. Rather than remaining in the operational register of getting "computers into the classroom" as our vision of the educational promise of new technologies, we need instead to get "classrooms out of the computer." Technical infrastructures composed of distributed personal computer networks tied together in high-speed networks capable of fairly transparent, cross platform image/audio/text/date transmission should be seen as technologies for fabricating and utilizing new social spaces suitable for virtualizing many educational activities.

In other words, the cyberspaces generated by distributed computing allow us to reinvent some of what we do in virtualized terms in virtual classrooms on virtual campuses; hence, the notion of a cyberschool. Most personal computer software now emulates some artifact or collection of artifacts in the virtualization of typing as wordprocessing, art studios as graphics packages, the post as e-mail, causal conversation as bulletin boards, bookkeeping as financial management systems, and recordkeeping

as hypertextual databases. Cyberschool software packages would incorporate all of these innovations into the workings of a virtualized campus encompassing emulations of ordinary classrooms, art studios, university libraries, faculty offices, student centers, media centers, science labs, and administrative offices in different mixes for an on-line and off-line format.

In its on-line manifestation, the VPI&SU cyberschool could be designed to operate something like an on-line information service. That is, access to the system could be represented aesthetically or graphically as a trip to campus where the screen would display a rendering of campus. To access the course space, one might travel to or click on an icon/ image/ photo of McBryde Hall which would move one to a classroom where course syllabi, tests, lecture notes, student-teacher/ student-student interactions, and multimedia presentations could occur. To access the assigned class readings, one might travel to or click on an icon/ image/ photo of Newman Library where reserve readings, videotapes, audiotapes, reserve room information sources, and other on-line library services could be obtained. To access required readings, one might travel to or click on an icon/ image/ photo of the Campus Bookstore where full text facsimiles could be pulled down for actual printing or quick delivery through the mail of books and articles might be obtained. To access faculty, one might travel to or click on an icon/ image/ photo of a faculty office where an on-line real-time chat session or desktop video conferencing session could be scheduled just like ordinary "real" office hours. To access lab experiments as well as communications, music, art, and architecture studios, one might travel to or click on an icon/ image/ photo of science and art buildings where on-line virtual lab exercises, image generation, computer assisted

design, or multimedia mixing software packages could be accessed by students. To access other students, one might travel to or click on an icon/ image/ photo of Squires Student Center where on-line real-time chat sessions or study tutorials could be scheduled for peer learning projects. And, finally, one might even have access-times and/or access-points driven by other graphic clues to film series, video programming, teleconferences, speaker's series, and athletic event broadcasts available only on-line through the cyberschool campus.

The key educational issue for a cyberschool arguably is the valorization of instruction on such virtual campuses. Unless and until cyberschool instruction enhances and enriches the education we now provide, it will be counterproductive to advance in these directions. Computerized instruction systems will be seen by faculty and students, on the one hand, as techniques for degrading and displacing academic labor as well as, on the other hand, institutions leading to the degradation of degree credentials and the displacement of academic status. Virtual instruction can be designed to greatly increase faculty workloads, decrease student interactions, shortchange certain disciplines, overemphasize particular skills, scatter institutional resources, and reduce the value of academic services. In turn, many people--both inside and outside of the university--will see this set of outcomes as either the insidious planned intention or the inevitable unfortunate outcome of such initiatives.

Consequently, the cyberschool must be designed as an experiment to change (but not increase) faculty workloads, enhance (but not decrease) student interactions, equalize (and not shortchange) the resources, prestige, and value of all disciplines, balance (and not over emphasize) the transmittal of certain vital skills, concentrate (and not scatter) the

investment of institutional resources, and strengthen (and not reduce) the value of all academic services. Technologies do not have one or two good and bad promises locked within them, awaiting their right use or wrong misuse. They have multiple potentials that are structured by the existing social relations guiding their control and application. We can construct the cyberschool's virtual spaces and classrooms so that they help actualize a truly valuable (and innovative) new type of higher education.

To reduce the number of students doing seat-time on campus in standardized three credit, three hours a week university courses as one strategy for serving more students much more effectively, VPI&SU might virtualize its current campus with on-line and off-line course formats to teach existing and new groups of students which are: a) enrolled in courses on the main campus in Blacksburg; b) enrolled in courses away from the main Blacksburg campus in the Abingdon, Richmond, Roanoke, Tidewater Northern Virginia and Riva San Vitale education centers; and, c) enrolled only in courses offered through the cyberschool. Students from group A also could, for example, easily become part of group B and/or C during summer breaks, allowing them to accumulate hours toward graduation without being in Blacksburg. Moreover, students might also be permitted as group A or B students to supplement their on-campus or off-campus education center hours with some pre-set number of cyberschool hours during the regular academic year as a group C student. In any event, constructing cyberschool courses could help teach more students in many more places more efficiently. The Extended Campus Network now being organized to link together Abingdon, Roanoke, Richmond, Tidewater and Northern Virginia with Blacksburg should provide the carrying capacity to mount such an effort as well as allow faculty more flexibility in

determining from what geographic site they would be most effective at teaching their courses. In the southwest Virginia context, a cyberschool infostructure also might allow VPI&SU to base a virtual branch campus in Roanoke, using facilities in and around the Hotel Roanoke conference center, without a huge bricks-and-mortar physical infrastructure investment.

The cyberschool idea is partly distance learning, but in a new register. Instead of relaying information from the Blacksburg campus to students elsewhere in the state, cyberschool courses would use the teleconferencing, telepresencing, and telecommuting capabilities in computer networks to bring teachers and students together on virtual campus sites accessible from anywhere equipped with the requisite computing/networking links--Blacksburg computer classrooms, Northern Virginia Graduate Center lecture halls, Riva San Vitale seminar rooms, municipal libraries anywhere in Virginia, corporate workstations in Tidewater businesses, Extension Service offices in Southside, or home computers in suburban Richmond apartments. Some services would be on-line, but some services also could be off-line CD-ROM or floppy disk based. Some classes would be on-supply synchronous interactions, linking students and teachers as a group interactively. Other classes might be purely on-demand asynchronous interactions, looping individual students on their demand into self-paced, stand-alone course modules. Many classes might include much more peer learning and team teaching, but a few also could be small tutorials involving one faculty member with a small group of students. When it becomes fully developed, it could be possible for a student to do almost anything in the cyberschool's infostructures that he or she would do in VPI&SU's physical

infrastructures: attend classes, meet faculty during office hours, discuss coursework with peers, do library research, check a reserve room article, purchase a textbook, see a movie from a film series, perform a science lab exercise, submit a term paper, hear a distinguished speaker, etc.

III. Developing Cyberschool Systems

The cyberschool, however, should not be totally driven by computing technologies. If the goal is to teach more students more effectively and efficiently beyond the credit-for-contact paradigm, then a more creative use of television and audio technologies coupled with new testing methods also could open up new teaching venues. Cable television and satellite television systems need programming to justify 500 + channel delivery systems. VPI&SU courses in many areas could be redesigned to be cassettecast on personal home videoplayers, cablecast through municipal cable systems or direct cast via satellite systems in addition to be vended through conventional educational television broadcasting. Audiocassette packages for home, automobile, and walkman audioplayers also could be efficient delivery systems for certain kinds of classes. VPI&SU faculty might, in fact, design entire courses around out-sourced commercially available materials in addition to generating their own programming to get these kinds of courses going as part of a cyberschool's virtual campus offerings. Computers, then, are not the only technology capable of virtualizing instruction. Video players, cable television, audioplayers, satellite television also can do a great deal towards reaching new students in new ways by breaking a credit-for-contact model of higher education.

The cyberschool initiative, at this juncture, will not be the only new departure that VPI&SU faculty members and administrators experiment

with as part of their efforts to serve more students more effectively. Proposals that test the viability of one credit or two credit courses given in five week or ten week slices of class time, three credit courses presented as intensive one week long institutes, credit by examination over self-paced learning modules in reading-based tutorials, and credit for group projects in service learning, industrial internship, or business cooping contexts also should be tried. Similarly, the expanded use of conventional television, audio and film materials in more inventive ways, either run over cable systems, broadcast on WVTF, shown on WBRA, or packaged as media center modules, also have considerable promise.

Ideally, the traditional academic performance of a professor in a classroom "professing" to students engaged in some combination of activities, mixing rigidly defined routines of class seat time, assigned readings outside of class, in class exams over content acquired from their seat time listening and study time reading, and maybe some in-class or faculty office hours Q-and-A, must be augmented by other modes of teaching. Professors also can do their work as educators by guiding tutorials, organizing film-based, self-paced learning modules, facilitating on-line information searches, giving critiques of group learning projects, designing off-line CD-ROM courses, or running intensive week-long special classes. Most of what stands in the way of these innovative changes are the existing systems of allocating campus appropriations at the state-level, which tie campus funding to seat time served by students, and the prevailing institutions of faculty workload definitions, which connect what faculty are paid for doing as their "jobs" to the number of courses in which they profess to students doing seat time.

To make the cyberschool idea work for the faculty, some serious

intellectual property questions need to be addressed actively head-on. The Art and Art History Department, for example, has been bogged in securing site licenses for digitized displays of artworks. Some museums want as much as $400 to display one time in one class an art image from their collections. These kinds of restrictions will kill a cyberschool before it even starts. If a cyberschool cannot establish a virtual library, art museum, bookstore and/or copy center to support its course offerings, then the idea might not go anywhere. Likewise, if the cyberschool is to succeed, then the intellectual property issues involved in its course packages, system infostructures, and on-line services need immediate attention. Mobilizing an entire university's resources, and even possibly all state colleges and universities across the whole Commonwealth, in this endeavor could make more things happen positively early on. Similarly, for the students, the sociological issues involved in creating cohesive class dynamics, a "campus" identity, workable educational rituals, and computerized schoolwork routines need to be considered carefully in setting up the cyberschool. And, for administrators, all of the problems tied up with existing professional reward systems, state funding, university resource allocations, and national accreditation need to be reconsidered, if cyberschool courses are to become a major part of VPI&SU's delivery of educational services.

These types of infostructures also could be adapted easily to other additional applications, of benefit to the university and the Commonwealth. Once VPI&SU constructed a virtual campus, it could use some of its on-line spaces as a virtual conference center, staging virtual conferences or conventions for interested groups using either computing capabilities in school, government and corporate offices or tying together groups at

different sites on the Extended Campus Network around the state. Likewise, VPI&SU faculty could stage special educational institutes as mini-courses or mini-conferences for corporate groups or members of the public in a new kind of extension/outreach services. Similarly, the activities of the Extension Division could be greatly enhanced and elaborated by using the cyberschool infostructures to reach its existing clientele as well as new potential groups in need of redefined Extension Division services. And, finally, a VPI&SU cyberschool could provide the technical frameworks possibly to supply courses to other Virginia colleges and universities as well as to receive comparable out-sourced courses from other colleges and universities on VPI&SU's virtual campus. Academic specialties that have been underdeveloped in the past, and which are unlikely to receive new investment in the future, might make innovative arrangements with second (in-state) or third (out-of-state) source specialists to complement VPI&SU's first (on-campus) source supplies of teaching and research expertise.

With VPI&SU's widely acknowledged expertise in advanced computer technologies as well as its relatively well developed on-campus infostructure, the cyberschool initiative provides an opportunity for this university to become one of the pioneering agenda-setters in the area of educational technologies, computer-based instruction, and multimedia-driven teaching. Those universities that get such facilities up and running first will undoubtedly have much greater control over how such institutions will operate, get greater access to more corporate and government support, and secure greater access to cyberschool student clienteles where they begin to develop. If VPI&SU does not pursue this goal, there are many other universities that will begin to set the standards.

Indeed, other individuals and institutions in higher education are pushing ahead along several fronts of educational innovation that potentially will influence any cyberschool facility. A survey on The Chronicle of Higher Education just over the past two months is quite striking in this regard. The NSF, NASA and ARPA (DOD) awarded $24 million in late September 1994 to Carnegie-Mellon, Stanford, UC-Berkeley, UC-Santa Barbara, Illinois, and Michigan to develop a diverse array of virtual library applications. Simon and Schuster in an alliance with America Online is developing a package of on-line information services for tutorials, text display, and student discussion groups for higher education markets. The Clinton Administration and the Commerce Department have special working groups investigating intellectual property issues of fair-use, copyright law and site licensing for digitized electronic materials for virtual library and classroom use. Drake University is installing Apple personal computers and local access networks in every one of its college dormitory rooms as a campus-wide capital investment to transform student living spaces into learning spaces. Bill Noyes of the University of Arizona is raising money to launch Magellen University as a purely on-line university in which video, CD-ROM and e-mail technologies would become the basis of an entire course of study for fully accredited college degrees. California State University's Project DELTA is attempting to integrate fully on-line computer systems and other new technologies into the teaching and administrative practices of the entire twenty campus California State University system. And, finally, Carnegie-Mellon is rethinking how it teaches its courses to integrate new technologies into the classroom by studying the merits of a new wireless network to supplement its already up-and-running "Andrew" computing/communication network on campus.

All of these activities suggest that the technical pieces for a cyberschool more or less already exist; the key problems are really of a cultural or institutional nature as various actors experiment with those new social practices, pedagogical values, legal obstacles, political arrangements, and economic categories needed to, first, construct cyberschool infostructures and, second, create more enriching educational experiences within its new communicative sites.

A cyberschool infostructure, therefore, could tie together many parts of VPI&SU's tripartite educational mission--teaching, research and service--as well as most of its new physical sites of instruction--Riva San Vitale, the NOVA Graduate Center, Hotel Roanoke, and the off-campus centers in Abingdon, Roanoke, Richmond, and Tidewater--into a new multipurpose university campus. Once they are perfected, anyone in the Commonwealth (and probably soon the entire country or world) could attend VPI&SU through cyberschool infostructures on a flexitime basis either on their timed-demand in self-paced sessions or at our timed-supply in group-paced classes. If this initiative is matched by Virginia Commonwealth University and the University of Virginia, then a state-wide cyberschool system could be built on the Extended Campus Network, allowing some new synenergies potentially to be realized in the teaching and research of the Commonwealth's three flagship research campuses. This state-wide "metaversity" could feature another menu of course offerings, conference presentations, and special institutes by VPI&SU, UVA and VCU faculty to many clienteles both in on-line and off-line formats.

IV. Some Practical Recommendations

Building a cyberschool at VPI&SU as a full-service, around the clock,

year round facility obviously will take years, if the College and/or University administration decides to go ahead with any experiments based on this idea. We propose to design at least three courses for the 1995 Summer School as test-bed classes to assess cyberschool techniques and ideas. In order to minimize possible technical glitches, the courses will all be set up to run on campus in this iteration so that the faculty, students, and educational technology support staff can collaborate on debugging their experiments when problems arise. We might even experiment with different equipment configurations in dorm rooms, classrooms, and media centers to identify the best hardware systems and determine the practicalities of student access to them. Once the classes are tested in a virtual form by on-campus users, then these virtualized courses of instruction can be tried out in on-line and/or off-line formats in subsequent academic terms for off-campus users. By starting out small, these initial experimental classes also can begin testing the ancillary support services and ordinary "school-going" routines that a cyberschool will need to develop, but which will undoubtedly be, at the same time, much different than those used in the noncyberschool settings we are all familiar with now.

Developing cyberschool classes can lead to some tremendous innovations in higher education. By using personal computing to virtualize instruction, entirely new kinds of educational interactions in new spaces and times will lay the foundations of a new sort of college campus that can serve existing groups of students as well as new populations of learners now not being served by VPI&SU. It will be expensive, but it might well prove to be much less costly than building entirely new physical infrastructures for additional colleges and universities. Installing

computing networks at existing physical sites (municipal libraries, community colleges, state hospitals, extension offices, or even state prisons) plus stipulating a standardized requisite hardware/networking configuration for purchase by private users or businesses through home and corporate computers would create the necessary distributed infostructure needed for the VPI&SU cyberschool campus. This response would not provide all of the answers to the questions raised by teaching more students with stable levels of funding, but could be a suitable response for some students.

To conclude this overview, virtual courses of instruction provided by cyberschool programs address three serious policy interests expressed by SCHEV and the Provost's Office at VPI&SU over the past three years: first, they should begin breaking the credit-for-contact model of university instruction by supplementing it with a regular set of cyberschool courses; second, they would start expanding the options for distance-learning by giving anyone with access to a personal computer an opportunity to enroll in VPI&SU courses of instruction; and, third, they could begin realizing new efficiencies in service delivery by building instructional facilities in cyberspaces and serving students on the basis of their individual demand rather than as a massed class cohort. In the beginning, these changes should be directed at supplementing what VPI&SU already does on campus by providing new points of access to its educational facilities, not unlike how summer school provides another option to students on different schedules access to on-campus educational facilities, from personal computers anywhere in Blacksburg, across Virginia or around the world.

Given the comparative lead of the College of Arts and Sciences in

computer-based instruction, this college should initiate the construction of a cyberschool capability by developing a preliminary set of courses in Summer 1995 to be run through a set of dedicated servers. Calling upon the expertise of Educational Technologies as well as interested faculty in several Arts and Sciences departments, these servers should be configured as the initial access points to the cyberschool spaces of instruction. By adapting already existing electronic mail and courseware software packages, these cyberschool spaces eventually should be designed to provide:

A) a set of basic orientation, enrollment, credit acquisition, syllabus, and fee payment information about all cyberschool instructional sessions;

B) a system of secure access and use rules to insure that students are who they represent themselves to be, are fee-paying legitimate users of the system, and are guaranteed confidentiality in their interactions with the cyberschool, which also would guard this fair use of copyright restrictions of on-line materials;

C) a series of multi-user domains, structured as on-line chat sessions or time-delayed bulletin board structures, that can be assigned to an instructor, a student or groups of instructors and students in order to work through pre-arranged course of instruction;

D) a linkage to second-source educational packages switched from VPI&SU libraries, other VPI&SU college cyberschool systems, or off-campus sources of video/audio/textual educational information; and,

E)   a means of collaborating with off-campus corporate, university and government offices to test new networking, software, hardware, multimedia technologies and services that might improve the VPI&SU cyberschool campus.

All of these technical capabilities exist right now on campus. We only need to reorganize the pieces, while addressing a number of fairly complex institutional, legal, pedagogical and structural issues, into new configurations as a cyberschool facility. Most importantly, the cyberschool must involve students in the design of its on-line and off-line architectures in order to make them as user friendly as possible. And, the cyberschool might even mobilize student time and energies to help plan and build the actual systems needed to make it work as part of internship or service learning group classes.

To launch this project, the cyberschool could follow the lead of summer school sessions by stressing introductory courses, courses from the core curriculum, and courses tied to independent study/ internship/ coop credits. These courses either are in high demand (so shifting load to cyberschool settings would improve course loadings on campus) or are well-suited to close computerized interactions (so the discipline of cyberschool meetings could enhance the various independent study experiences). All departments should be invited to offer courses in cyberschool, but they should not be forced to do so at this time. A more rational system of determining course menus beyond the first-wave of already up-and-running pioneer courses needs to be determined.

At this juncture, this cyberschool enterprise would be purely experimental. If it falls flat on its face due to a lack of interest, then it could be a resounding success. This outcome would illustrate how limited

such ideas actually are in practice, even though they may have seemed quite promising in theory. However, if it can become allied with some interested corporate sponsors (perhaps Apple Computer, Bell Atlantic and/or America Online here in Virginia), if it is publicized widely, if it presents courses-for-credit with broad transferability, if it provides high-quality instruction unavailable elsewhere, and if it taps new constituencies of students inside and outside of Virginia, then the cyberschool could become a successful test-bed for many new educational technologies and practices to deal with some of the resource shortage challenges facing higher education at VPI&SU as well as the Commonwealth of Virginia in the near future.