The Virginia Tech Cyberschool: Critical Reflections on a Decade of Distance Learning

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This paper is a set of critical reflections on a decade of digitally-driven distance learning on the web with e-texts, online courses, and virtual faculties. It reconsiders the project of building a virtual campus for existing brick-and-mortar universities around online communities--with their many perils and prospects--amidst broader shifts in the global economy. This "brick-and-click" option has been up and running at one particular North American university: Virginia Polytechnic Institute and State University, or Virginia Tech, for a decade. And, this analysis recounts the pluses and minuses of this experience. It, first, indicates why many existing offline university practices prevent change, and, second, it suggests how some online functionalities easily accelerate change. Yet, in considering how all universities might be transformed with digitalization, it also worries about what kind of changes, change defined by whom, and change for whose benefit in the larger society?

Most importantly, however, it sees e-learning on virtual campuses as an on-going reinvention of existing university institutions. Such organizational innovation can enable universities to create new learning communities and learned discourses, while keeping many of their traditions alive. Corporate entities can switch societies over into shoddy substitutes for present-day universities. Yet, such moves are

misguided efforts to commodify the forms of higher learning that universities historically have produced. Virtual campuses instead can use online classes to reach both existing and new clients.

I. The Foundations of Cyberschool

Virginia Tech began constructing its virtual campus in 1993 with the launch of the Faculty Development Initiative (FDI). This experiment depended upon the implementation of distributed computing, which was launched by the Provost's Office and the Vice President for Information Systems. By closing down the university's old centralized mainframe systems, the FDI gave a new Apple desktop computer, a suite of software applications, and nearly a week's worth of hands-on training to a cadre of Arts and Sciences faculty with the hope that they, first, would quit using the old, expensive mainframe system and, second, might start experimenting with these new personal computers in their teaching, research, and service. Without this first piece of almost accidental history, far less would be occurring at Virginia Tech because this one decision got computers out of the control of those who everyone once believed should have them--engineers, computer scientists, physicists--and into the possession of those who many thought did not need them--philosophers, political scientists, poets. Once those who supposedly did not need or allegedly could not use personal

computers got a hold of them, several new virtual communities--both online and offline--were more easily "imagined" (Anderson 1991) at Virginia Tech. And, everything began to change rapidly, fundamentally, and unpredictably.

At the same time, a small group of faculty in the College of Arts and Sciences was charged by Dr. Robert C. Bates, who had just been appointed the Dean, to think about using computers to break the credit-for-contact paradigm in response to fiscal pressures: rising enrollments, falling numbers of faculty, and decreasing state appropriations. Led by Associate Dean Lucinda Roy, this committee advanced a proposal to construct a virtual college in November 1994 (Luke 1994) around a series of on-line courses, which came to be called the Virginia Tech Cyberschool. Because of a parallel development in town, or a new off-campus online community, the Blacksburg Electronic Village, many students and faculty had the Internet access and technical skills to put this initial vision of a virtual campus into practice during summer 1995 with the first Virginia Tech Cyberschool courses. At that juncture, a major Sloan Foundation grant also allowed another team develop new computer-enhanced introductory biology courses in the ACCESS project, and a larger mix of totally online courses was offered at a distance over the Net in summer 1996 in the humanities, sciences, and social sciences.

Running parallel to these successes, the university self-study of 1996-1998 aimed at reimagining Virginia Tech around its high technology strengths, including the enhancement of the university's online teaching capabilities. Totally online MA programs in physical education and political science went up on the web in 1996-1997 and 1997-1998, and Virginia Tech Online--a full service virtual campus site--was activated in the College of Arts and Sciences to support its online courses during 1997-1998. Finally, all graduate theses and dissertations were required by the Graduate School to be archived as digital documents in 1997, and all entering students were required to have a computer during the Fall 1998 semester. And, the entire e-learning environment was anchored in Spring 1999 to a new dedicated organization--the Institute for Distance and Distributed Learning (IDDL)--that reported to the Provost's Office.

A. The Cyberschool Idea

The key issue for Cyberschool, which the founding faculty anticipated in 1994, has been how to value instruction in virtual teaching environments. Does online teaching enhance and enrich the education that university has always provided? For the most part, Virginia Tech students tend to agree that it does, both as an on-campus complement for face-to-face instruction and an off-campus virtual source of on-campus

educational activities, because online technologies do create a new kind of learning community. Students consistently indicate that Cyberschool classes have increased their interactions with each other and faculty, have given them more convenient access to learning opportunities, and have enhanced their opportunities to work with course materials in a newer, more informative ways that emulate many corporate, governmental, and not-for-profit work environments.

By 1996, then, the exponents of Cyberschool-style classes could say this experiment had fulfilled most of its original design agendas. As the 1994 cyberschool plan proposed,

> 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 (Luke 1994).

There have been many rewards in creating Cyberschool-style classes. Students were enthusiastic about these innovations, and many measures of their learning showed considerable gains. Nonetheless, it also did prove to be a more punishing way to

work for faculty. Instruction modules take time to develop, and most online course interactions with students are much more intense, time-consuming, and demanding than regular face-to-face teaching. Keeping machines, software packages, network links as well as course websites, listserves or chat rooms up and running was an exhausting ordeal on top of simply "teaching" the class once all of the IT components do, in fact, work online. IDDL mitigates this load considerably, but online teaching still requires different skills.

These demanding new work obligations caused friction inside of many units, because so few departments materially supported, financially rewarded, or professionally endorsed these new initiatives in e-learning. Of course, such success also brought additional expectations for publicity events as faculty colleagues and administrators made demands upon the pioneers to do demonstrations, speak their mind about the pluses and minuses of cyberschooling work, or consult with the next wave of innovators as they launched Cyberschool-style classes. This agitprop work typically turned into “defend what you are doing” episodes as often as they served as “show me how to do it” events.

Many of the changes in workload brought to faculty by Cyberschool were, at bottom, net individual add-ons as well as basic departmental increases. Cyberschool faculty did new kinds

of work, but they also did more of it. Resources were provided temporarily through infusions of one-time grants and other funds, but the university did not make changes in the basic structures of faculty rewards. And, even today in 2004, there is insufficient stable base funding for this activity. While Cyberschool used technology, its participants also have not altered an academic culture that still underappreciates, for instance, the prestige and resource needs of arts, social sciences, and humanities programs against those of the natural sciences, business or engineering. While the College of Arts and Sciences responded positively to e-learning, the university moved very slowly to rethink the rewards (in tenure and promotion, salary raises, or departmental prestige) for this new kind of teaching-centered, research-and-development work at the heart of many Cyberschool innovations.

The combined faculty challenges--measured in terms of workloads and rewards--have led to cases of "burnout." Most of those who first helped initiate the Cyberschool project at Virginia Tech have moved on to other interests. They feel that they cannot afford the costs that their participation incurs against professional research projects or their tenure and promotion reviews. Early Cyberschool pioneers expressed a sense of exhaustion as they struggled to achieve excellence on both a new, and the traditional, scales used to measure teaching,

research, and service success. Cyberschool was an initiative rooted in the College of Arts and Sciences with faculty from English, Philosophy, Communications, Music, Theater Arts, Art History, Psychology, Biology, Political Science, and History. Most of Cyberschool's initial efforts focused on the classroom, but no school is merely a collection of classrooms for faculty teaching. Such e-learning activities also need an extensive administrative infrastructure to support its activities. Until given new support with online community infrastructure at the university-level through IDDL in 1999, Cyberschool did not move forward too far.

From 1994 to 1999, then, Cyberschool essentially ran on a "demonstration project" basis in one college. In times of very tight budgets, Dean Bates in Arts and Sciences supported Cyberschool with some college funds and the time of his staff. A university center, or the Center for Excellence in Undergraduate Teaching, provided seed money for developing online courses, the FDI support staff helped immensely, and the Departments of English, Communications, Biology, Art and Art History, Music, and Political Science also contributed to the Cyberschool initiative. Yet, it was time by 1999 to move beyond the "demonstration project" stage with IDDL so that online education at Virginia Tech would not lose momentum entirely.

B. Pushing Cyberschool Up to the University Level

In 1994, the Cyberschool faculty also proposed that Virginia Tech construct a set of virtual environments for online education that could 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 (Luke 1994).

Cyberschool faculty made these proposals, because their biggest needs were logistical or administrative.

The Cyberschool faculty and the College of Arts and Sciences provided the real push needed during 1994-1998 to get

the university focused on online learning and its new institutional requirements. By 1996-1997, Cyberschool coordinated about fifteen online classes, and collaborated with the Vice President of Information Systems to construct Virginia Tech Online (VTO) as Virginia Tech's portal to distance and distributed education courses. The College of Arts and Sciences covered VTO's administrative costs as well as paid buy-outs for faculty to teach online in 1997-1998. That year was spent as a focused pilot project to demonstrate the demand for more online instruction, which brought the Provost's Office, Educational Technologies, and the College of Arts and Sciences together to build the IDDL unit. A matrix organization, the IDDL was organized by the Provost's Office, but much of its personnel and resources come from the Vice President for Information Systems, Extension and Outreach, and the College of Arts and Sciences. With a teaching and research faculty executive director as well as an administrative and professional faculty director, the IDDL was assigned the task of bringing more Virginia Tech classes and programs to the Web in addition to the Commonwealth's large ATM network, or Network.Virginia.

Virginia Tech by 1998-1999 had many distance and learning courses, but lacked a friction-free means of publishing distance learning course details through an online catalogue, updating an online timetable, registering students on demand for online

classes with an e-commerce utility, managing the mechanics of online class enrollments, administering the demands of online student grading or major/minor/core requirements fulfillment, or paying for class credits and other student fees online. Initially, VTO in the College of Arts and Sciences provided some of these services, but it was not until 2000 under IDDL that VTO finally could manage online education enrollment as e-commerce transactions. Still, something more comprehensive was plainly needed, even five years into the Cyberschool project. Most of Virginia Tech's online classes were undergraduate classes, no single program of study was put entirely online until 1997, most of the courses were core curricular offerings, and no course was designed outside of the normal time/credit/work rules of conventional contact teaching. For the most part, this outcome was a cost conflict and a turf question. Cyberschool was regarded as a College of Arts and Sciences project, which had very limited funding and its Liberal Arts approach was unpopular in the professional schools and more applied fields.

With scores of courses in Virginia Tech's eight colleges using Cyberschool-like methods of instruction by 1999, the university did put its e-campus on a more solid administrative footing by creating the IDDL in 1999. Its task was to develop reliable means for: a) rewarding faculty materially for their efforts; b) supporting departments for their engagement with

these innovations; c) consolidating new administrative software, procedures, or rules for coping with expanded online teaching; d) preparing students for online learning by insuring "one student-one PC" access levels with adequate network and computer support for all students; e) publishing information about distance and distributed learning course availability more widely to increase enrollment; and, f) organizing all of their activities through a central site to avoid duplication of efforts, standardize curricular planning, and reduce lead times in scaling up Cyberschool-like classes for access by anyone anywhere anytime. This involved new expenditures of time, energy, and money in the Provost's Office, but that investment was well-worth the effort.

Like many other groups elsewhere, the Cyberschool faculty at Virginia Tech operated as an advocacy organization, issue group, or social movement to criticize and popularize the use of computer-mediated communication in university instruction. This point is important, because despite what all of the digital futurists claim, technology does nothing on its own. Technically-driven change is neither automatic nor easy; and, every apparent technological innovation either is hobbled by significant anti-technological resistance or advanced by supportive pro-technical allies. Unfortunately, however, myths people share about technological inexorability make it difficult

to think "outside of the box" when it comes to using most new technology (Luke 1989).

In many ways, the virtual campus at Virginia Tech is an uneasy amalgam of post-Fordist flexible work organizations and digital network technologies (Jameson 1991; and, Reich 1991). When combined together by academics, they can provide a new model for flatter, leaner, more responsive academic work organizations. Despite such alluring prospects, however, none of the changes happened on their own. They became possible only by determined groups of people that worked to reorder how the university actually operated in 1994. In 2004, e-learning is now a routine service provided by special administrative units like Virginia Tech's IDDL.

Given its experience from Cyberschool with online undergraduate instruction, for example, the Department of Political Science also launched the development of its fully online Masters degree program in Political Science <http://www.olma.vt.edu> during 1997, and individual courses were being taught through it as early as Summer 1998. The College of Arts and Sciences was asked at that time to expand its teaching presence in the state's urban areas across Northern Virginia, and this approach seemed like a relatively cost-effective strategy for providing the M.A. in political science to non-traditional students residing in the DC area. Of course,

the site is available to anyone anywhere anytime in the world, so nearly sixty students are now taking courses in the program from all over the U.S.A. as well as Europe and Asia. Most of the online M.A. students are individuals serving with the U.S. military, working for international agencies and state governments, or teaching in secondary school and community colleges. Its first full class was admitted in 1999, and all of them graduated by 2003.

The deployment of digital technology in this program has had two aims. First, it helped to overcome the university's place-bound qualities by making the M.A. degree offered by the Department of Political Science fully available online. And, second, it addressed the needs of place-bound students whose career and family demands made it impossible to pull up stakes to move to Blacksburg for their studies. The decisions taken by the university at-large to put much more emphasis on digitized library resources, to provide an excellent support structure for registration, enrollment, and records-management with VTOnline, and to push for a campus-wide electronic thesis and dissertation requirement made it possible to produce an excellent graduate educational experience online. The first OLMA/PSCI student finished writing his M.A. thesis during Fall 2001, and he orally defended it before his committee members in Blacksburg, Virginia

and Washington, D.C. from his place of work near Frankfurt, Germany during an extended video conference in December 2001.

A majority of the faculty at all ranks in the Department of Political Science has participated in the online M.A. program. The common caricature of university faculty members as neo-luddite opponents to technological innovation simply is not true. Once faculty were shown the utility of new digital teaching tools, which enable them to communicate more effectively as well as allow students to learn more flexibly, they adopted such innovations. While some faculty will remain quite wary of administrative dictates from above, they enthusiastically join challenging new projects, like Cyberschool or OLMA/PSCI, that afford them fresh opportunities to try out new approaches, to learn different educational techniques, and to use better communications.

II. Building an Online Community for Education

The semester that the IDDL was launched, there were 17 distance and learning courses with under 1,000 enrollments. Most of these courses originated in the College of Arts and Sciences from Cyberschool, but the IDDL gradually promoted more diversity and depth in the course offerings. In Summer 1999, there were 35 distance learning classes with 1,155 enrollments; in Fall 1999, 73 distance learning classes were given with 2,218 enrollments, and, Spring 2000 saw 88 distance learning courses

with 3,001 enrollments. The total online inventory of courses was over 100 by 2001. While it is not a huge number, 6374 enrollments in distance learning classes in 1999-2000 represented a 24 percent increase over 1998-1999. At the same time, the number of courses offered rose from 135 to 214, which is a 60 percent increase. By 2002, over 300 courses were available online, and its was possible to fulfill most of the core curricular requirements entirely online.

Much of this increase came from IDDL efforts to support distance learning in all of the colleges and departments of the university. Of the university's nearly 1,500 faculty, 136 were involved in 1999-2000 as instructors in distance and distributed learning. The IDDL gave fifteen faculty summer stipends for courses in Summer 1999, and fourteen more course development fellowships were given out in 2000. An online IDDL newsletter was started to publicize distance learning achievements and developments, and the IDDL touted the merits of online teaching for faculty to their deans, directors, and department heads. New personnel were hired to manage marketing, assessment, and new course development, which also demonstrated the university's resolve to take new teaching techniques seriously.

While financial challenges are difficult, they often are easier to tackle than overcoming the entrenched routines of face-to-face interaction embedded by everyday administrative

practice. Virginia Tech was teaching courses over the Web in 1995, but it still has not cycled all of its administrative and information systems to work on Internet time. The contradictions made obvious by doing coursework online, like registering for classes with paper forms, paying with a paper check, getting paper documentation of registration, and checking on records with paper archives all brought the university to a major upgrade of its Administrative and Information (AIS) services in the mid-1990s. Existing AIS systems from the 1970s tended to pull data into peculiar pockets of power and privilege from which it neither circulated widely nor linked easily with other information sets.

The infiltration of net-centered thinking in the classroom as well as the desire for an enterprise level integration system moved Virginia Tech to contract with SCT. This partnership adapted Banner™ to Virginia Tech's workings in ways that it made logical to support network-based teaching and administration. Nonetheless, the IDDL still had to lobby hard to convince the Bursar's, Registrar's, and Treasurer's Offices to accept credit cards from distance learners for tuition and fee payment, dedicate specific index numbers for online classes, break apart three hour/three credit courses for distance learning students, and allow flexible scheduling for online classes. All of these provisions are necessary to succeed at distance learning, but

each one of them transgressed existing practices that favor on campus enrollments. The architecture of Banner™ has been modified to deal with these needs, but it would have been much more difficult to make such policy innovations without this ongoing enterprise reintegration project growing alongside, albeit separate and apart, the IDDL.

Instead of starting with a clean sheet of paper to build a corporate-oriented thin, for-profit, skill competency based virtual university, like the University of Phoenix, Virginia Tech has renovated the public-supported, thick, not-for-profit, and degree granting structures of the traditional university, injecting bits of market response into its virtual campus while remaining committed to traditional education ideals. After offering their first classes in 1995, and even once IDDL was started in 1994, Cyberschool faculty have continuously worked as change agents, pushing the university to adopt many new reforms, ranging from mandatory individual computer ownership for students, new technology support fees, student peer learning and teaching, and mandatory electronic thesis and dissertation submissions to on-line student registration, electronic records access, digital university press publications at a digital discourse center, alumni-centered life-long learning initiatives, and redefined faculty reward systems. At the end of the day, these reforms have effectively restructured some of

the university's research, teaching, and extension services to be more responsive to changing demands off campus and new needs on campus. Virtual campuses at traditional universities, then, can advance radical changes that are far greater and much more diverse than simply deploying computer multimedia to teach workplace skills, because they build new online communities. Many visions of the virtual university do little to move past a limited changes in content delivery, while a few, including the Virginia Tech, push to make these technology-driven changes much more creative.

First, a virtual university can be in many ways an entirely new form of learning community. Anyone who has paid attention to everyday practices since 1994 in the U.S.A. should see this change. Today most colleges operate extensively through computer-mediated communications every working day. E-mail interactions are displacing telephone conversations, F2F meetings, and personal exchanges in ways that once were carried exclusively by written texts. While this traffic often is also fleeting, underdeveloped, and exhausting, it has textual, hypertextual, or multimedia qualities unknown outside of computer networks. Written words carry more and more instructional activity, while most basic information resources once printed in catalogues, mailed out as brochures, accumulated in libraries, or posted on bulletin boards now must be pulled

down from websites. They can be changed more frequently, and hard copy costs are shifted to users. Physical location, synchronously shared times, and group meetings are becoming less vital to learning than network connectivity. So access to education has been quickened and broadened. In addition to everyone who would be traditionally on campus, one finds nontraditional students, clients abroad, not-for-credit students, and residential students temporarily located elsewhere all commingling together in e-learning classes at virtual campus sites in new kinds of communal interactions.

Second, new discursive possibilities are developing within, and as integral parts of, the virtual campus at this university as online technologies begin to do much more than simply electrify print documents. The WWW, CD-ROMs, hard drive software, and floppy disks all represent new communicative media whose functionalities sustain fresh modes of discourse with their own conventions, formations, and practices as well as unconventionalities, misformations, and malpractices. The electronic thesis and dissertation, online catalogues, student access to registration sites, and online advising are all good cases in point. In-house administrative discussions and external research communications on the WWW in PDF, Eudora, or Word software packages are carrying hypertextual, multimedia, or technoscientific discourses, which lead to a profusion of new

logics, pragmatics, and rhetorics in their arguments that print cannot capture. Research is being conducted, written up, peer reviewed, published professionally, and then permanently archived all in entirely online modes--often cheaper, more accessible, and much faster. This experience at Virginia Tech indicates that research, reflection, and reasoning about knowledge in almost every discipline must confront this new communicative dimension of virtualization in tertiary education.

Third, the virtual campus at a traditional university leads to new disciplinary coalitions and social networks. The pervasiveness of changes brought on by computer-mediated communication has remade, if only in part and for awhile, the disciplinary divisions and canonical conceptualizations embedded in the structures of the university's essentially industrial, nationalist, and scientific organization. Globalization and marketization are reshaping economies and societies, and legitimate forms of knowledge about them also are evolving in ways that no longer mesh as fully with the existing organizational outlines of established academic disciplines. Newer networks of knowledge production, consumption, circulation, and accumulation nest now in processional consultancies, for-profit enterprises, and state agencies. Off campus, there is a market-based sense of knowledge consumption, a quick-and-dirty approach to knowledge production, and a task-

oriented sense of knowledge definition that all are reshaping what some disciplines do research on, when they do it, why they do it, and how it gets done. The virtual campus of traditional universities can import insights or experts from these parallel networks of scientific investigation off-campus as well as begin to rebuild traditional on-campus faculties to emulate these new modes of research.

A fully virtual university is technologically feasible at this juncture. Yet, there are many obdurate material practices and cultural values impeding its development. On one level, new tremendous infrastructure requirements--whose costs and complexities have not been fully grasped by most supporters of the virtual university--loom over the growth of every e-campus. In 1999-2000, barely fifty percent of all households in the U.S. had a personal computer with Internet connectivity, and most connections moved up and down their link at baud rates of 28,800 to 56,600. By April 2004, things here have improved in the U.S.A. with 50 percent of all homes having a computer, and over 55 percent having a high-bandwidth connection <http://www.pewtrusts.com>. More political jurisdictions in the world, following trails blazed by Commonwealth of Virginia and the city-state of Singapore in 1995-1996, are building widely available high bandwidth networks, Internet 2 level networks are spreading, and wireless technologies can address some of these

problems. Nonetheless, like most traditional media, the Internet creates its own inequality (Schiller 1996). Connectivity still is geographically patchy, unequally enjoyed, and technically immature. Even then, these telecom systems can fail, charge high basic rates, and limit equipment choices in a manner that obstructs communicative ease, ready connection, and cheap websurfing.

On a second level, there is a real gap between the predicted level of network use puffed up, on the one hand, by hardware producers, telco operators, and software firms and the actual numbers of users, on the other hand, that show up at the virtual campus' digital doorsteps. Most people use their PCs for doing e-mail, visiting sex sites, hitting online casinos, or visiting shopping outlets. After three years of intense public relations on campus, Cyberschool enrollments in Summer 1997 barely hit 350, or an average class size of about 10 students. Off-campus interest is quite intense, but total IDDL enrollments for its courses during Spring 2000 only just barely reached 3,000. So F2F connections at our university's home and extended campus outreach sites still anchor Virginia Tech's enrollments. Much of this is due undoubtedly to access costs, bandwidth limitations, and hardware shortages, but institutional barriers, cultural inertia, and professional prejudices also cannot be discounted as sources of serious resistance to virtualized

instruction. Ultimately, online education with the virtual campus is a niche market for most universities and many students.

For academics, the most basic issue raised by the virtual campus is "job control." The model of flexibilized efficiencies promised by the University of Phoenix masks a knotted tangle of serious job control questions by bundling them up with fancy technological innovations. Going online with university instruction conducted through multimedia packages does abridge many prerogatives now exercised by professors in F2F classroom teaching. These online alternatives mostly presume that professors simply are dispensing information in their traditional lectures and seminars, and therefore their information-dispensing efforts should be enhanced, extended, or even extinguished by technological surrogates.

This type of technological intervention can rob professors of their authority, and cheapen the educational experience. Nonetheless, as scale increases, many course syllabi can be designed and constructed by technical designers, panels of experts, or outside consultants, and then sold as mass media products on-line or in boxes by publishers. Lectures, in turn, can be automated with such multimedia replacements. Testing might be contracted out to assessment businesses, and student

advising, tutorial discussions, or independent studies could be conducted by paraprofessional workers without Ph.D.s.

This image of the future is not favored by academics; instead, it is a dream of corporate players, like Microsoft or Intel, or lobbying groups, like EduCause. Behind these simplistic narratives, it is claimed that technological imperatives, economic necessity, or unserved markets "make change inevitable" for professors as researchers, teachers, and service-providers. Yet, such allegedly inexorable forces of change essentially are, in fact, lobbying campaigns by hardware manufacturers, software publishers, telecommunications vendors, and educational consultants.

At this time, online education as e-learning at Virginia Tech still works in the opposite register: small-scale, handicraft production for local use, not global exchange. Often one instructor is mapping his or her existing courses over to a self-produced or common utility website, generating computer-animated overheads, or organizing multimedia demonstrations to enliven traditional contact-style teaching and/or to experiment with asynchronous learning interactions. The material still mostly is a "home-made" production for "on-campus" circulation through "in-house" means of student consumption or at "on-site" centers of knowledge accumulation. The IDDL's biggest project since 1999 has been a joint master's degree in Information

Technology jointly created by Computer Science, Electrical Engineering, and the School of Business. While the enterprise is larger, it too largely follows these handicraft models. Therefore, existing pedagogical practices in the university, academic department, and professional discipline still capture and contain e-learning by providing virtual flexibility and multimedia enhancements in established programs of study.

Despite the rhetoric of accessibility, democracy, flexibility, participation, or utility associated with cybernetic technologies, most networks today are, in fact, formations whose characteristic qualities in actual practice are inaccessibility, nondemocracy, inflexibility, nonparticipation, or disutility. Many web domains are not readily accessible, and those that often are nearly worthless. Some schools like MIT have their whole suite of course curricula on the web, but quality and quantity vary widely. There are at least five billion pages on the WWW, but the best search engines easily miss about 500 million or more of them. No one voted to empower Microsoft, Intel, IBM or Netscape to act as our virtual world-projectors, on-line terrain-generators, or telematic community-organizers, but they behave as if we did by glibly reimagining our essentially choiceless purchases in monopolistic markets as freely cast votes. Inequality and powerlessness are not disappearing in the digital domain; they simply have shifted

their shapes and substances as human beings virtualize their cultures, economies, and societies in networked environments.

After a decade of experience with designing, launching, and using online education applications at Virginia Tech, it is clear that many of the initial naysaying claims made by opponents of online learning have proven dead wrong. There is no significant difference between online and offline classes in terms of the quality of instruction, level of student satisfaction, effectiveness of faculty work or overall student success that can be attributed to the use of digital technologies and networks. In fact, the nature of the entire project, if anything, often shows that VT Cyberschool courses were, and still are, such that overall student success is slightly higher, faculty are more effective in communicating with students more often and directly, many students are satisfied with the flexible course environments time-wise, and the quality of instruction due to greater emphasis on clear, cogent, and continuous writing is seen as better.

Of course, the VT experience is unusual in that this institution consciously focused upon its core curricular and large enrollment courses at the undergraduate level, which was meant to keep the time-to-degree durations down and lower class sizes in F2F on-campus courses. This policy also essentially "saved" summer school as an institution, because many of its

courses had the same orientation historically. From 1990 to 1994, summer enrollments were falling due to state budget cuts and economic recession: these two forces reduced both the supply of and demand for summer classes in Blacksburg. In 1995, around 25 students took courses online, or far less than .025 percent of the student body. By 2004, about 12,000 students took a course online, or nearly 45 percent. The Cyberschool experiment widely is acknowledged as keeping summer school alive at VT as well as making it possible for undergraduates who return home in the summer to remain enrolled on the University's "virtual campus." Beyond the summer school and core curricular foci, however, few undergraduate classes are taught online at VT.

At the graduate level, VT's location in a comparatively remote and underpopulated area of the Commonwealth with no large urban sites nearby forced it online to serve niche markets at the graduate level in masters degree and graduate certificate programs. With five major off-campus graduate centers scattered around the state, the use of online courses also broadened and deepened the number of course choices available for such course of instruction. During the 1980s, the University did offer a handful of classes over K-band satellite uplinks as well as with "freeway flyer" instructors doing long road trips. In 1994, several scores of students took such courses, but there were few full degrees offered by VT through such means. By 2004, over

5,100 graduate students were enrolled in hundreds of online graduate classes, seventeen degree and certificate programs were available fully online, 85 percent of all departments had an online class, and the diversity of classes available for students at the five off-campus centers was enriched greatly.

These 2004 enrollments constitute a ninety percent increase in online graduate student enrollments since 1999, and a 325 percent increase of graduate courses available internationally, so these innovations are starting to change a fairly traditional campus with residential requirements into one of an entirely virtual campus. There is much more resistance to starting new graduate programs now among the faculty and administration due to changes in the top academic leadership, willingness to fund such educational experiments, demand for additional degree options, and the culture of risk taking caused by draconian state budget reductions. While there is a real interest in online doctoral work, university policies and national accreditation practices make this move quite unlikely in the near future. Most master degrees entail discrete bundles of 30 to 48 hours of work, and only one program requires a demanding research project like a full M.A. thesis. The thesis requirement has been successfully adapted to online environments with committee structures and writing requirements equal to those of on-campus programs as well as oral defense sometimes

held as videoconferences intercontintently. Still, the faculty and administration are unwilling to push forward with online doctoral degrees at this time, even for those disciplines in the humanities, social sciences, policy studies or arts that could easily tailor their degrees to operate in online environments.

It would be disingenuous to deny that much of the momentum behind online education at VT in the 1990s came from the excessive exuberance of the decades' dot com mania. Too many believed the spiel spun up by enthusiasts about everything changing rapidly overnight; and, since not all that much did change; and, since most firms behind these changes went bust, there now is little interest in maintaining what already has been achieved, much less making any bold new moves. University administrators make their reputations by launching bold new initiatives or dismantling allegedly broken old institutions for the greater good of all. Even though existing strategic plans and mission statements are on the books at VT with online distributed and distance learning at their core, it is obvious that the money, the commitment, and the will to push forward for Cyberschool-style instruction has fallen considerably from 1994 to 2004.

A great deal of this doubt has come after 2000-2001 with the dot com implosions, but some of it simply derives from changes in administrative focus, leadership, and will. Funding

for online instruction was championed most fervently by a dean now long gone to be a provost elsewhere. A former VT provost with some commitment to online learning has been replaced by an outsider with less interest in, support for, and understanding of what VT attained form the early 1990s to 2001. And, the discretionary funds once allocated to online learning have had to be diverted elsewhere simply to keep the University running after several reductions in state monies coming to VT from Richmond. Consequently, energy and time from faculty and support personnel that once went into expansion and invention is being diverted to holding onto what already has been achieved against rising resistance to doing more.

III. Conclusions

On one level, the project of distance learning in the knowledge business is the latest promised land in many corporate market-building strategies. There are 3,600 colleges and universities, for example, in the United States alone, and over 14 million FTE students are enrolled in their courses of instruction. Marketing departments share a dream: what if every department, all libraries, each dormitory, every student center, all classrooms, each faculty office, not to mention administrative and support personnel, got a personal computer and/or web appliance installed at a level of concentration approaching one per student and faculty user, then millions of

new product units could be sold, installed, and serviced. Being rational entrepreneurs, then all of the world's computer builders, software packagers, and network installers are exerting tremendous pressure on colleges and universities to open their campuses to computerization so that these markets can be made, serviced, or conquered.

On a second level, however, the project of e-learning meets stiff resistance on campus. Few faculty see the merits of computerized teaching, not all students are computer literate, and most administrators are unable to find funds to pay for all of the computers and network connectivity that the private sector wants to sell them. Most people use their machines for e-mail, word processing or game playing. There are few on-campus agents of change who will ally themselves with new economic modernizers off-campus to transform education through computerization and networking as the corporations imagine it. They are aided, in part, by digital capitalists, who want to build new markets on campus for their hardware, software, and netware; in part, by the digital mass media, which want to popularize wired cultures and informational communities; and, in part, by digitizing content providers in the entertainment and publishing industries who want to reconfigure or repackage their products for computer-mediated on-and-off-line delivery systems. Still, their effect is limited; and, after a decade of real

change at Virginia Tech, only five or six teaching packages have been created in this style.

The sale of computer-mediated communication and online multimedia to teachers, however, is not where the virtual campus starts and stops. Increasingly, as the Virginia Tech Cyberschool has illustrated, when these technologies are introduced into the practices of university administration, they create new online communities whose members can force very closed, hierarchical, and bureaucratic institutional structures to become slightly more open, egalitarian, and consensual sites of collective decision-making. Online information sources, self-paced online application forms, and user-oriented online records management can take access to bureaucratic information out of the hands of special administrative personnel and hand it over to the faculty and students who actually are using it to coproduce educational services. Universities can retain their older, closed bureaucratic structure, but online enterprise reintegration applications usually start to restructure them as looser, flatter, and more responsive entities just by deploying computer-mediated communication technology to new users as a labor-saving strategy. A virtual campus, then, does not necessarily represent business as usual plus some computer multimedia. Instead, it often marks the onset of far more fundamental organizational changes, which give many faculty and

administrators on campus the opportunity to rethink and rebuild what they are doing.

The scope and depth of these moves toward e-learning on a virtual campus shows that the ideas advanced by the original pioneers at Virginia Tech in 1993-1994 do “work.” Indeed, the concept of a "virtual university" complements, questions or even challenges the ways of the "material university" works at Virginia Tech in many fundamental ways. This collision of values and practices obviously fuels the on-going reinvention of institutions for Virginia Tech’s virtual campus. Like Lucinda Roy, many believe Virginia Tech successfully made it through the first phase, but deeper cultural contradictions still require us "to assess what we've learned and start anew with some new approaches" (Young 1998: A24).

To sense the significance of using computers to teach college and university courses, and begin making a new start, as our experience at Virginia Tech shows, one ought not to fixate upon the machines themselves. Plainly, the acts and artifacts used to reproduce collective understandings among specific social groups are changing profoundly: print discourses, face-to-face classes, paper documents are being displaced by digital discourses, on-line classes, electronic documents. Because they are so flexible, the former will not entirely disappear, but so too can they not be counted upon to continue uncontested. The

latter will never fully be perfected; but, so too can they not be expected to remain oddities.

Many choose to misread this shift as a classic confrontation of humans with machines (Noble, 2002), but it is, in fact, a conflict between two different technocultures--one older and tied to mechanism, print, and corporal embodiment, another newer and wired into electronics, codes, and hyperreal telepresences (Deibert 1997). Building the facilities of a virtual campus is only one piece of this new technoculture, just as the first founding of medieval universities articulated the technics of yet another technoculture tied to the scriptorium, lecture hall, and auditor. While the two technics can throw much light upon each other, the workings of new university technocultures do not exhaust the full range of structural change occurring with informationalization in the global economy and society.

Without being as dismally dismayed about this shift as Birkerts is, the process of digitalization itself does bring a fundamental transformation in many fixed forms of being, especially those tied to communication, discourse, memory. With the proliferation of computer-mediated networks, "the primary human relations--to space, time, nature, and to other people--have been subjected to a warping pressure that is something new under the sun...We have created the technology that now only

enables us to change our basic nature, but that is making such change all but inevitable" (1994: 15). Of course, the same was said about steam locomotives, telegraphy, airplanes, radio, and telephones but much still remains the same. This change does bring about a move from printed matter to digital bits as a technics to accumulate, circulate, and manipulate stores of knowledge. There are, as Turkle (1996: 17) claims, different "interface values" embedded in each particular medium, and those embodied in print inculcate a special measured, linear, introspective type of consciousness that has anchored our understandings of higher education for several decades. Yet, it took print decades to move universities in the eighteenth and nineteenth centuries out of their oral modes of operation.

Inasmuch as digital discourses with their own digital debates, documents, and disciplines supplant libraries of print, a remarkable erasure of experience can indeed occur. Again, Birkerts asserts:

> our entire collective subjective history—the soul of our societal body--is encoded in print...if a person turns from print--finding it too slow, too hard, irrelevant to the excitements of the present--then what happens to that person's sense of culture and continuity? (1994: 20)

Shrewdly enough, Birkerts recognizes his worries and warnings essentially are overdetermined questions, leaving no one with an effective means for pulling single strands of this question out

for easy analysis. Instead too many are left with both a sense of profound loss and immeasurable gain as the popularity of digital modes of communication spread.

Without succumbing to Birkert's fears that everything will change forever, and mainly for the worse, when it runs through electronic circuitries, we should realize in the same moment that everything will not remain the same in online communities, only now in silicon instead of on paper. Instead of "the death of distance" (Cairncross 1997), the Internet often creates "the creation of community." Along the fractures of these faultlines, what is new and different in digital communities must be mapped to address the impact they have upon the culture of universities.

No educational technology exists simply as such with its own immanent dynamics separate and apart from the declared and implied uses for it (Bowles and Gintis 1976). Technics remediate the pragmatics, logics, and economics in the politics of artifacts (Lyotard 1984). Some outcomes are unintended and unanticipated, but they emerge from human use. Online learning, then, represents a cluster of much more performative technical applications that are being invested with special importance and power. So, ironically, the WWW is, and is not, just another way for delivering substantive content to content-users by content-providers. Technology is not, as many believe, "just

technology." It also is culture, economics, and politics; and, when such technology is combined with education, it becomes even more culturally unstable, economically demanding, and politically threatening (Brockman 1996). On one side, many exponents of technologically-enhanced teaching envision it as leading to new discursive formations, intellectual conventions, and scientific practices. On the other side, many opponents regard any efforts taken toward making such change as malformations, unconventionalities, and malpractices. Strangely enough, a decade of experience with e-learning at Virginia Tech suggests there is merit in both positions that deserves a broad hearing.

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